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# JOURNAL OF SPACE LAW

A journal devoted to the legal problems arising  
out of human activities in outer space

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# LEGAL ASPECTS OF MONITORING AND PROTECTING EARTH ENVIRONMENT BY SPACE TECHNOLOGY

HE Qizhi\*

The United Nations General Assembly at its 44th session approved the designation of 1992 as International Space Year<sup>1</sup> which placed special emphasis on earth-looking activities. With the use of space technology greatly expanded, the earth has never been so closely observed as contemplated in the past. The year 1992 could be a milestone in the search for understanding the earth. The efforts in this direction have been further progressed and environmental issues have proceeded from scientific and technical studies to the probes of legal and institutional measures, designed to cope with and prevent dangers involved.

## *Potentials of Monitoring Environment by Remote Sensing from Space*

In the application of space technology, remote sensing has become increasingly important. That is because remote sensing by satellite has planetary dimensions. The synoptic view and the possibility of frequent repetitive coverage of large and inaccessible areas of the earth, makes global monitoring of changing environmental phenomena technically feasible and economically attractive. While LANDSAT of the United States and SPOT of France have been widely used, other countries, including a number of both developed and developing countries, have used their own and other satellites for remote sensing purposes.

## Land

The inherent capabilities of space observation is particularly suited to the study of land masses and nearly every facet of human activities on land, such as resources management, agricultural production, forestation, hydrology, the prevention of floods, droughts, desertification, soil erosion and other natural disasters, etc.

The various space programs, such as, for instance, the International Geosphere-Biosphere Programme (IGBP), demonstrate clearly how these programs on land are critically dependent on the data gathered by space technology. Data obtained by remote sensing satellites often unobtainable

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The views expressed in this article are those of the author and do not necessarily represent those of any organization with which he is connected.

<sup>1</sup> U.N.G.A. Res. 44/46 of 8 December 1989.

truth," have been used with great success and brought huge benefits to mankind. In this context, the United States proposed the so called "Global Habitability"<sup>2</sup> focusing on the study relating to habitability of the earth.

### Sea

Marine remote sensing is an integral part of space technology. Data derived therefrom were extremely helpful for predicting and analyzing periodic and cyclical phenomena of the ocean, thus making climate forecasts more reliable and valuable.

Satellite surveillance is also the best way in discovering ocean pollution by detection of chemicals, oil, petroleum, hydrocarbons, sewage, solid wastes and radioactive substances, etc. in the sea. The Global Investigation of Pollution in the Marine Environment (GIPME), founded by UNESCO's Intergovernmental Oceanographic Commission (IOC), provides continuing assessment of the health of the sea through various projects and methodologies. The primary objective of this Commission is to establish the relationship between marine pollution and its effects on ocean organism and man, constituting an important contribution to the study of Global Habitability.

During the Gulf War, satellite surveys showed that millions of gallons of oil pouring from Kuwait terminals formed a slick of about 56 km long by 16 km wide, causing severe damage to the marine birds and life.<sup>3</sup> All these indicate that the application of remote sensing by satellite in the study of marine pollution and other items of oceanography seems to be boundless.

### Atmosphere

The study of earth atmosphere involves numerous programs, such as the World Climate Programme (WCP) and World Weather Watch (WWW), established by the World Meteorological Organization (WMO), and the Earth Watch or Global Environment Monitoring Systems (GEMS) organized in the early 1970's by the United Nations Environment Programme (UNEP). These programs were aimed at using international efforts to monitor the

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<sup>2</sup> This term was first proposed by NASA during UNISPACE-82 (see "Global Habitability," printed materials presented at the Conference), and in the statement made by the Head of the United States Delegation in the general debate of the Conference. See *Report of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 9-21 August 1982*, U.N. Doc. A/CONF/101/10, at 126-127.

<sup>3</sup> CHINA DAILY, 29 January and 23 February, 1991.

atmosphere over the land and sea. The WWW is a global observing system that gathers and disseminates data of the atmosphere by weather satellites of various space countries. These data serve as the foundation for weather forecasts, storm warnings and other environmental assessment world-wide. The emissions of carbon dioxide and other gases leading to green house effect, and the release of chlorine and hydrogen chloride into the atmosphere which is believed to be the main cause of ozone layer depletion, including the ozone hole in the Antarctica, are grave issues confronting mankind. In dealing with these urgent problems, space technology has an important part to play.

All these developments concerning the utilization of space technology for monitoring and protecting the environment call for a response in the legal field, so as to guarantee and promote continuous progress on this topic of vital importance.

#### *Legal Framework*

The monitoring of earth environment by satellite, like any other space activity, is governed by the general principles of space law, as enunciated in the Outer Space Treaty.<sup>4</sup> One major principle is that outer space shall be free for exploration and use by all states without discrimination of any kind.<sup>5</sup> This freedom is subject to certain other restrictions prescribed in the Treaty, such as the requirement that space activities must be carried out for the benefit of all mankind and in accordance with international law, that states must bear responsibility for national space activities, that outer space should be used for peaceful purposes, etc.<sup>6</sup>

In addition, specific principles governing remote sensing by satellite were elaborated by the Legal Subcommittee of COPUOS after long years of deliberation. These are a set of principles concerning remote sensing of the earth from space adopted by a United Nations General Assembly Resolution in 1986.<sup>7</sup> These principles allow states to carry on remote sensing activities from space without advance notice, and implicitly

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<sup>4</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 610 U.N.T.S. 205 (hereinafter "Outer Space Treaty").

<sup>5</sup> Outer Space Treaty, art. I.

<sup>6</sup> *Id.* at arts. I, III and VI.

<sup>7</sup> U.N.G.A. Res. 41/65 of 11 December 1986. According to Principle I concerning the definition of remote sensing, meteorological and military reconnaissance activities by satellites are excluded from the scope of these Principles.



permit free dissemination of data and information without prior consent by the sensed states. Principle X stipulates that remote sensing shall promote the protection of the Earth's natural environment and, to this end, states participating in remote sensing activities shall disclose all information in their possession identified as capable of averting any phenomenon harmful to the Earth's natural environment. Principle XI further provides that remote sensing shall promote the protection of mankind from natural disasters and, to this end, states participating in remote sensing activities which have identified processed data and analyzed information that may be useful to states affected by natural disasters, or likely to be affected by impending natural disaster, shall transmit them to the latter as promptly as possible.

With regard to the acquisition of data and information obtained by remote sensing, Principle XII provides that the primary data, processed data and analyzed information acquired over the sensed state must be made available to that country on a non-discriminatory basis and on reasonable cost terms once they are produced. Meanwhile, international cooperation is provided in Principles V, VIII, and XIII, which call in a number of ways for cooperative actions to benefit as many countries as possible.

It shall be noted that the above mentioned Principles on remote sensing though in the form of a United Nations Resolution and being recommendatory in character, are nevertheless important in carrying out remote sensing activities. That is because most of the substantive content of these principles are already a part of existing treaties, and others are customary rules of international law. Still others may require some operational context to solve the problems likely to arise in the course of implementation. Thus as a whole, these principles are useful and can serve as guidelines in carrying out remote sensing activities.

#### *Need for Global International Coordination*

The importance of monitoring and preserving the earth environment by space technology has become increasingly apparent and is being recognized by the world community. As a result, some international research programmes, such as IPGP, WRPC, WWW, GIPME, UNEP (United Nations Environment Programme), etc., have been initiated. However, these programs have been carried on separately. There is no overall coordination of the growing number of existing and perspective earth observation satellite programs.

There have been a number of suggestions of setting up an overall international organization charged with the function of tackling the challenge of monitoring the environment on a world-wide scale. The notable one is the International Satellite Monitoring Agency (ISMA) proposed by

France in 1978,<sup>8</sup> which though being put forward essentially for arms control verification purposes, could be turned into an international monitoring agency for the environment. Again, a World Environment Authority was proposed recently,<sup>9</sup> charged with the huge task of setting up both the space system, with satellites stationed in geostationary and polar orbits and the creation of ground infrastructure for gathering, processing and managing data derived from the earth observation system from outer space

However, owing to the tremendous investment and other difficulties involved in these proposals, these propositions could hardly be realized in the near future.<sup>10</sup> The practical way is to accomplish the goal phase by phase or step by step. The initial phase could comprise the setting up of an international coordination center or agency, while the final goal of establishing a complete space monitoring system could be accomplished in the second or final phase.

With the ultimate goal in mind, what is needed at present is an international coordination center or agency, based on comprehensive, continuous and long term acquisition of data and information on earth environment from existing space systems. In view of the key role played by UNEP (United Nations Environment Programme), the proposed agency could be established under the aegis of UNEP and could be charged by an international agreement/arrangement with the following main tasks:

1. To gather and administer all data and information on the environment provided by national ground stations. As provided in Principle X of the Remote Sensing Principles, states participating in remote sensing activities shall disclose all information in their possession identified as capable of averting any phenomenon harmful to the earth's natural environment, and should transmit such information to the international organ for collecting and managing environmental data;

In the field of meteorology, the distribution of data obtained by satellite is provided free of charge to member states of the World Meteorological Organization (WMO) in accordance with the practice of offering international service for public use.<sup>11</sup> With regard to

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<sup>8</sup> U.N. Doc. A/S-10/AC. 1/7 (1978).

<sup>9</sup> S. Courteix, *Towards An International Satellite Monitoring System of the Environment*, 33 PROC. COLLOQ. L. OUTER SPACE 148-151 (1990).

<sup>10</sup> For instance, the cost of building and launching a LANDSAT would be of the order of U.S \$6/800 million, excluding the building of ground infrastructure and operational costs.

<sup>11</sup> Cf. John A. Leese, *World Meteorological Organization: Demonstrated Accomplishments and Strong Plans for the Future in Applying Space Technology*, 14 J. SPACE L. 140-147 (1986).

environment, the commercial distribution of remote sensing data and information seems to be inconsistent with the public purpose of using such data and information for environmental protection. This problem has to be faced and there might be two ways of solving it: either adopting the meteorological type of free charge, or taking some sort of hybrid system based on both commercial distribution and free supply, as in the meteorological field. Anyhow, an international coordinating agency is necessary to serve as a data bank or center for the environment. In this way, all these data and information can be better and more widely used, and proposals on environmental issues could be made by UNEP for implementation by the states concerned;

2. To coordinate the activities of various scientific programs on the environment, such as IGBP, GIPME, WCRP, etc. At present, relevant data and information acquired by satellite remote sensing though being used in various scientific programs, still lack coordination and concentration. The proposed agency could be regarded as a kind of effort to rationalize the various observation projects on global level. Through such coordination, access to and exchange of data and information between different international partners could be achieved, thus enhancing the complementarity and compatibility of the earth observation systems;

3. To increase assistance to developing countries by encouraging them to concentrate their attention and efforts to environmental issues and by helping them to acquire the technology of receiving, processing and using remote sensing data and information they need. The center or agency could also be charged with expanding training for developing countries, whose participation is indispensable for monitoring and protecting the earth's environment.

The universal dimension of the work requires international cooperation. While the final goal will be achieved at a later stage, the imminent aim seems to be some sort of global coordinating center or agency for comprehensive gathering and administering data and information provided by existing satellite systems. Such an organization is actually a data bank on environment, and would be an important step toward the ultimate goal of setting up a World Environment Authority with global space monitoring system for the protection of the earth.

# TWO EUROPE IN ONE SPACE: THE EVOLUTION OF RELATIONS BETWEEN THE EUROPEAN SPACE AGENCY AND THE EUROPEAN COMMUNITY IN SPACE AFFAIRS

*Dr. K.J. Madders and Dr. W. M. Thiebaut \**

## *Introduction*

The adoption of the Single European Act (SEA) in 1987<sup>1</sup> formally conferred competence upon the European Community (EC) in the field of research and development (R&D), so paving the way for the EC to develop and implement its own set of strategies regarding the technologies of the future. Once the EC sought to map out its new domain, however, it was evident that in one area, space R&D, European integration was both well organized and already far advanced. Over several years, the European Space Agency (ESA) had been the principal instrument of such integration, having used to the full the mechanisms available to this intergovernmental organization under its 1975 Convention.<sup>2</sup>

Despite the tendency of some academic writers to relish the prospect of conflicts of interest between two European organizations in such a situation, the more appropriate question in practice is -- precisely because both have similar goals -- why the EC and ESA did not start to cooperate earlier and how far have they been able to do so now? For with its obvious potential to stimulate growth, inspire and motivate Europe's youth and challenge the hidebound ways of thinking that continue to hamper too much of European industry, the exploration of humankind's last frontier allows ample room for, and indeed would seem to demand, such cooperation.

As will be seen below, up to around the time of the SEA, the EC and ESA Europes could in fact almost have inhabited parallel worlds, each

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\* The authors are staff members of the European Space Agency (ESA). This article is written in their personal capacities and their views do not obligate the European Space Agency.

Editor's note: the authors were bound by ESA's practice and could not provide references to internal sources of ESA throughout this article.

<sup>1</sup> Single European Act, signed at Luxembourg on 17 February 1986 and at The Hague on 28 February 1986. See COMMISSION OF THE EUROPEAN COMMUNITIES, TREATIES ESTABLISHING THE EUROPEAN COMMUNITIES (ECSC, EEC, EAEC) - SINGLE EUROPEAN ACT - OTHER BASIC INSTRUMENTS 523-602 (1987).

<sup>2</sup> For text, see Convention for the Establishment of a European Space Agency, UKTS no 30 (1981), CMND 8200.

moving in its own direction and speaking a similar polyglot language but with each missing large segments of the other's vocabulary. The cause for this is simple, and springs from the specialization of function native to any class of international organization. With this observation in mind, this article will seek to show how the two bodies' different paths did meet up and also to outline the means which have been created to help them better understand and relate to each other's systems.

### 1. *The Europe of Space Cooperation and Integration*

The birth of the space age and the epoch of major European economic integration share a rough contemporaneity, the Treaty of Rome being signed on 25 March 1957 and the first Sputnik flight taking place on 4 October of the same year. The order of events meant that, if Europe were later to consider engaging in space activities of its own, the question would be posed at some point as to whether the European Communities might not be a suitable device for pursuing them, especially since signature of the EEC Treaty, which joined in one Community the six signatories' manufacturing and agricultural markets, was accompanied by signature on the same day of the Treaty establishing the European Atomic Energy Community (Euratom). What was proposed in 1959 was that a space science program be undertaken by a new European Community called "Eurolune."<sup>3</sup>

Had, as we must assume, membership of Eurolune been restricted to the original six EEC/Euratom Member States (France, Germany, Italy and the Benelux countries), space activities in Europe would then probably have become an integral part of the Communities' system. But, to the surprise of Amaldi, Auger and most observers, the United Kingdom -- the only European nation with a significant space-related capacity at that time -- entered the discussion and proposed to participate fully, so firmly excluding the Eurolune option. The result of the ensuing negotiations, which were matched by a further initiative in the launcher field, was the creation of a European Space Research Organization (ESRO),<sup>4</sup> an intergovernmental organization that drew its inspiration from CERN and not from Euratom. For launchers, the European Launcher Development Organisation (ELDO)<sup>5</sup> was set up with a membership of the EEC States (minus Luxembourg), the United Kingdom and Australia (because of the

<sup>3</sup> See, especially, E. Amaldi, *Créons une organisation européenne pour la recherche spatiale*, L'EXPANSION DE LA RECHERCHE SPATIALE 6-7 (Dec. 1959), reprinted in translation as *Why We Need a European Organisation for Space Research*, EUROPE: TWO DECADES IN SPACE (N. Logsdon and D. Guyenne eds.), ESA SP 1060, at 9-11 (1984).

<sup>4</sup> Convention for the Establishment of a European Space Research Organisation, UKTS no. 56 (1964), CMND 2489.

<sup>5</sup> Convention for the Establishment of a European Organisation for the Development and Construction of Space Vehicle Launchers, UKTS no. 30 (1964), CMND 2391.

Woomera launch site).

The treaties establishing ESRO and ELDO were signed in 1962 and entered into force in 1964. These two organizations were in 1963 joined by a third body, the Conference Européenne de Télécommunications par Satellite (CETS), which was an offshoot of the Conférence Européenne de Postes et Télécommunications (CEPT) and was intended to formulate Europe's response to the US initiative to set up a global satellite telecommunication system. CETS acted as Europe's voice in negotiations with the US Government and Comsat to set up Interim Intelsat, while also providing a forum to investigate European communications satellite proposals.

With three quite independent space bodies on the scene, some coordination was necessary and this came in the form of a ministerial level European Space Conference (ESC), created in 1966. The essence of the ESC was to provide a badly-needed framework at a sufficiently high level for the elaboration of space policy, chiefly through acting as a broker for the budgetary and programmatic problems facing ELDO and addressing the need for an appropriate applications satellite program. As time passed, it had become evident that the absence of telecommunications, meteorological and similar programs was a major deficit in Europe's space arrangements that no single country could remedy.

With ESC's creation, one can say a consolidated "space Europe" came into being, even though one should remark that ESC remained a fairly informal body for the nine years of its existence. It was through ESC that, eventually, the problems of organizational form and program arrangements were ironed out. Inputs to the ESC's deliberations were provided by fora such as the Western European Union Assembly and the Council of Europe Consultative Assembly but, in fact, the most productive source of ideas on future programs was ESRO. The result of the ESC's efforts was agreement to establish a European Space Agency in which ESRO's management mechanisms were continued and extended to optional launcher, manned space and applications programs alike, with the possibility for the Member States participating in a program to decide upon the particular modalities for that program. ELDO was "merged" into ESA, but in effect this meant that its personnel and assets were integrated into the ESRO structure. Having acted as midwife to ESA's birth in 1975, the ESC too passed out of existence, its policy-making function having been assumed by the ESA Council under Art. XI. 2 of the ESA Convention, with the Council, like the ESC, meeting at ministerial level where appropriate.

The other provisions of the 1975 ESA Convention reflect and amplify the political character of Europe's new space authority, and one may mention here Art. II (Purpose), under which ESA is to provide for and promote peaceful space activities, *inter alia*, by:

"elaborating and implementing a long-term European space policy;"

"concerting the policies of the Member States with respect to other

national and international organizations and institutions;"

"integrating [national programmes] progressively and as completely as possible into the European space programme;"

"elaborating and implementing the industrial policy appropriate to its programme;"

as well as by recommending a "coherent industrial policy to the Member States."

These were generous goals, particularly when seen together with ESA's wide R&D (and operational) mandate under Article V, which leaves ESA free to undertake any space activities, including commercial ones, so long as internal approval requirements and Art. II's supreme condition of "exclusively peaceful purposes" are met. Moreover, Art. VII, which enlarges upon ESA's industrial policy, takes account of the far-reaching structural effects that implementation of ESA's program will have in the European space industry and provides rules applicable to the placing of ESA contracts. When ESA distributes work, Art. VII and Annex V of the Convention state that ESA is to meet its industrial requirements cost-effectively but, at the same time, is to promote European industry's international competitiveness and its rationalization, and to ensure a fair return to Member States which contribute to an activity.

Working within this framework, and the other provisions which ensure that the Director General has sufficient powers for the efficient management of programs, ESA has made Europe the Third Space Power, by progressing since 1975 through its early Ariane and applications satellite programs toward, with Spacelab's first flights, manned space experience and thereafter to the era of the present Long-Term Plan (LTP), adopted by ESA ministers in 1987, whose main feature is the development of a European In-Orbit Infrastructure (IOI) composed of Ariane 5/Hermes, Columbus and the Data Relay Satellite (DRS).

Recently, the ESA Ministerial Council at Munich in November 1991 affirmed the LTP, although steps were initiated to take account of a radically changed international situation and to encourage international cooperation in the IOI's execution.

While ESA's success in hardware development is generally considered one of the outstanding examples of what European integration can achieve, a space policy must also be judged according to the effectiveness with which that hardware is put to use, especially in the applications satellite sector. Here, ESA's approach has been to transfer competence where it can to structures better adapted to commercialization than ESA itself, so restricting ESA mainly to its prime area of practical competence, R&D. It has thus encouraged the formation of a range of

different utilization bodies, being Eutelsat<sup>6</sup> (grouping Europe's public communications entities in a public international organization), Eumetsat<sup>7</sup> (similar to Eutelsat, but this time serving the meteorological community and using ESA Meteosat satellites), Arianespace, a private company responsible for Ariane's marketing and production, and Eurimage and other companies to which remote-sensing data is passed for marketing and distribution.

## *2. The EC Europe and Space Affairs*

### *2.1 Early Developments*

The EEC's first involvement with space affairs (other than procuring aerospace industry surveys) was in 1970, when the Belgian Government hosted an ESC session in Brussels and invited the President of the EEC Commission to attend as observer. This invitation was repeated for each ESC session thereafter, a tradition which has been extended to ESA Council meetings at ministerial level. The EEC thus was able to follow ESA's genesis, birth and the highlights of its development afterwards at first hand.

That the Commission played a marginal role at the time of ESA's formation has to be understood in the context of the EEC's general competence in science and technology (S&T) affairs, which was acquired only gradually and with considerable difficulty from 1974 onwards. As science and technology projects came to be recognized as a legitimate domain of activity, however, the European Parliament began to show specific interest in space matters, and began to add its own contribution to the flow of reports and recommendations already coming from the Council of Europe and WEU's assemblies.

The content of the Parliament's reflections was nonetheless fairly unexceptional up to the 1985 Report of the Parliament's Committee on Energy, Research and Technology. This report<sup>8</sup> contained criticisms of ESA's Long Term Plan, fearing undue dependence on the United States through Europe's participation in the international Space Station project. It instead proposed that an autonomous lunar base program should be Europe's long-term aim, and that a "budgetary and administrative locus" should be established within the EC. Finally, it indicated that the Parliament should henceforth monitor space activities more actively.

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<sup>6</sup> Convention establishing the European Telecommunications Satellite Organisation ("Eutelsat"), CMND 9069, Misc. no. 25 (1983)

<sup>7</sup> Convention for the Establishment of a European Organisation for the Exploitation of Meteorological Satellites ("Eumetsat"), CMND 9483, Misc. no. 2 (1985).

<sup>8</sup> Reference: PE 95.639/fin ; doc. A2108/85, prepared by Mr. Toksvig as Rapporteur.



## 2.2 *The 1988 Communication from the Commission to Council*

Thereafter, the next significant move came in July 1988 from the side of the EC Commission. It published a Communication to Council, entitled "The European Community and Space: A Coherent Approach".

The 28-page Communication (with annexes) responds to a request of the European Parliament made originally in 1981 (although the EC's Research Council was the actual recipient of the Communication). It is an informal document and its role should be seen in the perspective of EC policy formation and monitoring generally, where a summary of the state of affairs in a field of developing interest to the Community is provided in some detail in such a paper, frequently based on research accomplished by outside consultants. At the same time, the Commission avails itself of the opportunity to air initiatives it may like to see taken in that field. It thus acts mainly as an information paper, by focusing attention on a given field, but also partly as a discussion paper, containing seminal elements of a policy already being considered by the Commission but upon which no definite view has been reached. Over time, and this can mean over a period of several years, a paper of this kind will recede in importance as the Commission puts forward more and more concrete ideas and measures, including the eventual creation of specialized Commission services and, finally, decision-making structures to take matters further.

Seen within this tradition, "A Coherent Approach" falls into two parts, one programmatic and the other institutional.

### *(a) Programmatic Aspects*

This part provides a survey of programs and spending profiles in the space field in Europe and beyond, drawing mainly on ESA and consultants' inputs. All the main user segments (telecommunications, Earth observation, microgravity) are covered there in some depth. The user sector is, indeed, where the report's emphasis lies, relatively little attention being given to launch services (a field nonetheless, where European industry commands the international market) or to ESA's In-Orbit Infrastructure, the dominant item on ESA's agenda for the next several years.

Various assessments are made in this part. Europe's space program is, thanks essentially to ESA, "altogether positive." But European space spending is still too low when judged by international standards, project fields are, perhaps as a result, too "selective", and European industry is still not thought to be sufficiently competitive. Further, no framework exists for security applications and, more serious, space applications generally have slipped behind the undoubted successes made in space R&D. In sum, as the report puts it: "Europe still lacks a cogent overall policy. . . which incorporates economic, social, industrial and even defence considerations . . . a policy which helps to ensure that better use is made of

the technological and industrial expertise acquired both within and outside the Community."

The passage just quoted deserves particular attention since, for the first time really since the late 1960s, it put the finger on space as an integral part of European society and the attendant need -- not altogether satisfied by ESA's space-policy mandate -- to deal with the full range of implications of space activities on Earth.

The Communication was able to point, especially in this regard, to regulatory deficiencies in both the DBS and satellite communications ground equipment sectors. Earth observation, an infant sector, for its part suffers from variant approaches towards exploitation and weakness in developing ground equipment. Furthermore, even though Europe is making good progress in the microgravity sector, additional means are needed to foster the user community's growth. Finally, the report highlights the fragmentation of the European space telecommunications market and insufficient promotion on ESA's behalf of commercial applications (compounded by ESA's *juste retour* principle).

These are all fair comments. ESA, while its emphasis under its Convention is on developing the space segment, has in fact long been aware of the deficiencies in the ground segment sector in particular and is currently considering steps to improve the situation within the framework of its (telecommunications) Payload and Spacecraft Development Programme. More will, however, remain to be done. Deregulation of the satellite telecommunications market is, of course, a matter for the Community in conjunction with other interested bodies such as CEPT and Eutelsat. Further afield, extra measures of course can be taken, but one may remark that regard has always to be paid to the incremental nature of civil space investment in Europe (as opposed to the more global pattern in the superpowers, due to their military requirements), which has thus far dictated a gradual, carefully phased increase in spending profiles.

*(b) Institutional Aspects*

It is interesting that most of the document's executive summary is connected not with programmatic matters but with a recapitulation of this part, so pointing to its importance. It proceeds from the proposition that "Community action in space is both possible and desirable." It then observes that the contribution the EC should be to provide "specific added value," noting though, that "the Community must naturally be mindful of the need for consistency between its own activities and those of the ESA and of other European organizations in this field, which have primarily specialised in the development of space systems or operational system management." The EC's role is, therefore, to be a complementary one.

Within this context, the report offers ideas on what shape EC involvement may take. They are in brief:

- putting the "full weight of [the EC's] democratic legitimacy and its

established role in European society" behind ESA's programs, and also to enhance Europe's "political credibility" here by "strengthening its links with ESA;"

- framing "favorable" policies for exploitation and for integration of space applications in the "socio-economic framework of the Community;"
- creating "organic consultation mechanisms" for ensuring that ESA and other European space organizations act consistently with Community law on competition, trade policy, [and] opening up of public procurement, etc."

The reference to "democratic legitimacy" under the first item seems partly to be a genuflection in the direction of the European Parliament (and should surely not be taken as meaning that the Parliaments of ESA's Member States do not play a democratic or legitimate role). But its rather grand words perhaps obscure the more profound point that the Community's political weight should be made available when circumstances demand, including when space matters intersect with broader foreign policy considerations. The second item can only be cause for general satisfaction, while the third has its roots in the completion of the Single European Market by the end of 1992 and explains the desirability for consistency with the law applicable in that market. One may add that the scope for inconsistencies is in fact largely theoretical although both ESA and the EC should clearly seek to avoid any that may arise (see further, below).

In terms of future action, the report sets the following goals:

- regular information exchanges with ESA, including EC assistance in spin-off commercialization;
- project coordination and cooperation, for example in strengthening Earth-observation and telecommunications applications and those in microgravity. This would include addressing not only the relevant regulatory frameworks but also the establishment of market research and user group support;
- study of the potential economies-of-scale and other implications of the Single European Market;
- definition of a trade policy for space goods and services, and attention to developing legal security for space-based activities;
- improving training.

As to implementation of these goals, greatly expanded consultation

is called for, particularly with ESA. A "policy and coordination" unit was foreseen within the Commission for in-house and external consistency of position.

### *2.3 The 1991 Gibson Report*

Both of the main implementation goals just referred to were quickly met, and the consultation mechanisms established with ESA will be discussed specifically below (Section 3.2). Here, matters will be brought up to date by mentioning the most recent policy development on the EC's side that specifically relates to space. This was the publication, in September 1991, of "The European Community, Crossroads in Space: Report by an Advisory Panel on the European Community in Space."

The 33-page report is known by the name of its Chairman, ex-ESA Director General, Roy Gibson. The 11-member Advisory Panel included representatives from ESA, the Commission, industry, the German space establishment and the academic sector.

Like the Communication, the report seeks to review the state of the European space sector and offer thoughts on the EC's future role. But its content and direction is significantly different. It begins with a review of perhaps the kernel of the space sector in functional terms, launch services capacity, and there, while the presently funded generations of Ariane vehicles provide Europe with a good competitive profile, the report makes the observation that it is not too early to develop a "flexible strategic framework" for the period after Ariane 5 (whose first launch is due in 1995). On science, another key element, the suggestion is made that a good role for complementary action exists in the funding of space science experiments. On Earth observation, greatly enhanced inner-European and external cooperation and coordination is urged, and ESA is gently encouraged to consider including this segment in ESA's mandatory program (at present limited to science and basic technology programs). In fact, this was a proposal taken up for further consideration both within the ESA Executive and by ministers at the 1991 Ministerial Council, with the strong support of the relevant user community. For the EC, a number of areas of interest are highlighted in Earth observation, a field seen by the Panel as the main area for developing EC action. The most important is the proposal for planning to be commenced that would lead to an operational Earth observation capability for environmental protection purposes. This idea links in with a proposal that the EC develop a flagship activity rather than spread resources too thinly.

Regarding telecommunications, recognition is given that a good deal of study still needs to be made in the field before the finer points of EC policy can or should be addressed. One line of possible action already offered, though, is to target second-generation ground systems, having learnt from experience that the market in and for Europe in first-generation systems has already largely been lost to the US and, increasingly, Japan.

As to in-orbit infrastructures and microgravity, greater EC involvement is, as elsewhere, foreseen, but guidelines of policy (e.g. avoiding isolating microgravity into a separate discipline) rather than structural changes are mentioned. On general R&D, however, more specific lines for action are advanced, perhaps the most interesting idea being to monitor space technology development in the much broader context of the space-related sector. This would represent a real enhancement on what ESA has so far been able to achieve and sits well with the areas of the EC's proven expertise.

Under a section entitled "General Considerations," longer-range thinking is amplified. The Leitmotif is clearly one of encouraging, stimulating and supporting the main lines of space activity in a strategic manner, which should be the product of ever closer coordination and cooperation in Europe, and most especially between the EC and ESA. Sensitivity is shown to the requirements for "fair return" in ESA's industrial policy, though short of endorsing its application de rigueur. The EC's role here is acknowledged as best when kept indirect as, for example, in its actions within the framework of the GATT negotiations and through encouragement of consortia of world-class competitive scale. Furthermore, on security, where ESA has evident constraints in light of its dedication to "exclusively peaceful purposes," a limited contribution of ESA capacity is mooted but decisive (non-ESA) development of ground segment capacity is advocated. Finally, on the theme of cooperation and coordination, there are questions raised as to how to tackle this on the basis of existing structures; some new mechanisms will in the short or long term be needed. The same equally applies within the Commission itself.

In conclusion, the Gibson report reflects the growing sophistication of the EC in coming to grips with space issues. The report was prefaced by an admission that the space field is one of "intimidating complexity" and this observation undoubtedly led the panel to tread warily, but well.

Subsequent to the report's publication, the European Parliament again debated space policy in October 1991. The resultant Resolution invited the Commission to define and implement a global and balanced European space policy, paying particular attention to the optimal exploitation of space applications (Earth observation and telecommunications). A series of studies and other actions should be initiated on this.

### *3. The Development of ESA-EC Cooperation and Coordination*

Having surveyed above how events have evolved within ESA and the EC respectively, we turn now to the course mutual relations have taken. Not included in this discussion are the dispositions of the 1991 Maastricht accords which, despite their reinforcement of the SEA on European political, social and economic union, have not thus far raised new issues specific to the space sector. It is an obvious though that, when achieved,

European political and economic union will require new solutions to be found in the space domain in common with many other fields.

### 3.1 *Project Cooperation*

Already in 1978, ESA and the EC Commission concluded a Memorandum of Understanding on an Experimental Project for High-Speed Data Transmission by Satellite. Its object was to serve the needs of the Commission, CERN and organizations with similar technical requirements, by providing data links over capacity on ESA's Orbital Test Satellite (OTS), the first telecommunications satellite the Agency had launched. The then 'Interim' Eutelsat was to coordinate the experiments that would be conducted. Each participant contributed its own equipment and resources for the 4-year project's realization. Shortly afterwards, the EEC, represented by the Commission, and ESA entered into a Cooperative Agreement whereby the EEC paid ECU 420000 to cover the costs of supplying experimental ground equipment which would then be operated by CERN.

A second project was established on 31 July 1985 when the CEC and ESA signed an Agreement on Cooperation in ESA's Apollo Programme. This program aimed at exploring advanced electronic delivery of documents using high speed digital satellite links provided by the ECS system built by ESA and run by Eutelsat. Under the cooperative arrangements, the Commission committed itself to purchase 20 ESA-developed receive-only Earth stations and to put these stations at the disposal of national authorities for experimental purposes. The Commission, however, felt that continued sponsorship of such a project might be at odds with its policy of deregulation as expressed in the Green Paper on Satellite Communications and decided in 1987 to abandon its participation in Apollo so as to avoid the potential for any conflict of interest.

A further ESA-EC cooperation of note, which was successful and began in 1990, related to the EC program "Lutte contre la faim dans le monde" (Sahel). The Commission there agreed to upgrade the ESA Maspalomas (Canary Isles) ground station in order to acquire Landsat Multispectral Scanner data from over West Africa, while ESA agreed to acquire and process the data and place them at the disposal of the Commission. In the meantime, the Maspalomas station has been again upgraded under an amendment to the Agreement so as to allow it to receive French Spot satellite data. A similar arrangement to permit Sahel's use of ERS-1 data is currently under discussion.

### 3.2 *Institutional Coordination: Joint ESA-EC Working Groups*

Significant coordination activities were initiated following a meeting between Prof. Reimar Luest, then Director General of the European Space Agency, and CEC President Jacques Delors on 7 February 1989.

The meeting was aimed at presenting the organizations to each other

at the highest level, and resulted in a declaration of solidarity concerning future cooperative relations which would be instituted on the basis of respect for one another's competences. It was recognized that cooperation was particularly desirable in the fields of Earth observation, telecommunications and microgravity.

The meeting permitted the establishment in late 1989 of five joint ESA-CEC working groups on:

- international relations (I);
- industrial competitiveness and the internal market (II);
- telecommunications (III);
- Earth observation and the environment (IV); and
- research and technology (V).

All of the groups were charged with exchanging information and views. Among the points of interest under Working Group I was international launch services policy, although the practical aspects of this matter continue to be dealt with outside that group. A further subject was joint assistance that the EC and ESA could offer the ASEAN countries, while a major topic of current discussion is relations with East European countries. In Working Group II studies were performed on the competitiveness of European space industry and information was exchanged on procurement policies in both organizations. Under Working Group III, considerable discussion has focused on the land-mobile market for satellite telecommunications, VSATs and research being conducted under the EC's RACE and other programs. In Working Group IV, the EC was able to learn in detail about the performance characteristics of ESA's ERS satellite series and thus to assess how better it could integrate this capability into its research planning. ESA and the Commission have also defined here the goals for a future ERS-1 pilot project aiming at studying the problems of the tropical forests through use of ERS-1 all-weather radar survey techniques. Finally, Working Group V has succeeded in acquainting ESA and the Commission with the status of each other's projects, thus avoiding duplication, especially on materials (Brite-Euram) and robotics (Teleman).

### 3.3 COST

Parallel to the previously-mentioned kinds of cooperation, ESA became involved in parts of the wide-ranging set of programs the Commission is now promoting under its post-SEA science and technology competence pursuant to a June 1990 Communication to the Council on European Cooperation in the field of Scientific and Technical Research (COST).

Such cooperation extends broadly to the OECD and EFTA countries and may cover fields such as biotechnology, nuclear physics, global change or, of course, space. Criteria applied for approving funding of a project on the EC's side are public interest or the reinforcement of the science

community or of existing R&D initiatives like Eureka, ESPRIT, BRITE and RACE. The range of projects so far undertaken by international agreements (known as "Cost Actions") merits its own discussion in another place, but it is the multilateral rather than bilateral projects under COST in which ESA has been involved under Agreements with the Commission and other parties.

The Cost Actions in this group to which ESA is a signatory are as follows:

- Cost 207 European research project on digital mobile radiocommunications;
- Cost 204 Project on phased array antennae;
- Cost 205 Project on the influence of the atmosphere on radiopropagation on satellite-Earth paths at frequencies above 10 GHz;
- Cost 213 Project on antennae in the 1990s (electronically steered antennae for future satellite and terrestrial telecommunications);
- Cost 223 Project on antennae in the 1990s (Active Array Antennae for future satellite and terrestrial communications);
- Cost 226 Integrated space and terrestrial networks for fixed telecommunications;
- Cost 227 Integrated space and terrestrial networks for mobile telecommunications.

It will be noted that all relate to telecommunications in one form or another. As with COST generally, participation in any of these COST Actions implies the pooling of data among the signatories.

#### 4. *The Single European Act and its Consequences for ESA*

At the beginning of this article, it was mentioned that the EC's new competence in science and technology R&D is contained in the Single European Act. Having now described the EC's post-SEA moves in the space field and the development of EC-ESA relations, we shall turn the SEA around and recount how ESA has taken account of the SEA's potential consequences from its own point of view.

For some time, it has been obvious that the expanding web of competences that is the supranational European Community can have significant effects on entities that do not actually form part of the Community itself. Much literature exists especially on the aspects of this question relating to third countries, and most particularly to those of the EFTA grouping. Regulation of these external effects was one of the key objectives of the Oslo-Brussels negotiations of previous years leading to agreement on a "common European economic area." But the phenomenon does not end there, and, despite being an international organization that is



fully independent from the Community under public international law, questions began to be raised in ESA as to what the consequences of such a profound change as the passage into law of the Single European Act would be on the wider European environment, in particular in relation to ESA's own area of European integration.

Analysis of these questions was initiated by the Agency's Legal Department, which produced an internal study in 1989 setting down the various sectors that would be affected by the move from a still nationally demarcated EC to a single market. The list was impressively long. Account was taken, for study purposes, of the exposure of ESA contractors to the legal measures of the new environment. Visits by representatives of the Commission revealed the gigantic scale of the law-making enterprise the EC faced in implementing the SEA: the drafting and implementation of a thousand distinct new instruments of Community law.

These were early moves but, once a sufficient picture had been formed, the ESA Executive reported its preliminary findings and views to the relevant deliberative bodies within ESA, prompting several Member States to initiate their own studies which were provided to the Executive and other Member States.

By February 1990, a consensus had emerged that increasing economic integration at EC level did require a fresh look at ESA's industrial system as well as greater insight into the practical functioning of EC law. Guidelines on any necessary action could then be considered after this educative process. A special working group was thus set up by a decision of the Agency's Council in March 1990 to study the post-SEA landscape. The group met on six occasions. It began by singling out just which parts of EC law might be relevant to ESA and space activity in general. Next, independent studies were presented on points at which the EC and ESA orders met or were likely to meet each other. On these foundations, the Executive then entered a conceptual comparison of EC economic law with ESA's industrial system. Of particular importance here was the distinction between primary and secondary EEC law and the necessary inference according to public international law that the assumptions necessary to bring ESA activities under primary law were not fulfilled, even though EC Member States in ESA might eventually face certain responsibilities individually which derive from primary law. Apart from this conclusion, it was further established that ESA, as an international organization, was anyway specifically exempted from the vast bulk of secondary law, and it was precisely under that secondary law that most of the questions raised during earlier studies had been posed.

Among the other doctrinal ground explored in this phase of the working group's life was the fundamental asymmetry between the EC and ESA. This consists of a basic concern on the EC's part to generate a European system from adjusting the juridical conditions which prevail at the bottom of the economic system, i.e. at the level of the individual citizen or enterprise, and then leaving market forces to do their work without further substantial intervention. ESA, by contrast, is an active agent in

forming industrial structures from the top downwards. It is for this reason that it has, and must have, an industrial policy founded in treaty law. This top-down approach leads to all European industrial arrangements for executing ESA programs, along with the necessary degree of functional specialization geographically. It also matches up with the need, under internal ESA rules which ensure that a balance is achieved among all Member States, to provide a sufficient recompense ("juste retour") to those Member States which contribute public funds to such programs.

Since ESA and the EC are fundamentally unlike each other at this conceptual level, the working group was satisfied that the postulate of complementarity was well founded theoretically, and that conflicts of law between the two systems were unlikely. A greater sensitivity towards the potential policy difficulties which could arise in relation to the doctrine of state aids under Art. 92 of the Treaty of Rome did, however, emerge where ESA R&D is concerned in a field that is already close to commercialization. This happens to be the main area where the EC is advocating further spending, and the availability of the coordination mechanisms between the two organizations will therefore be valuable for addressing any questions of consistency in policies in this or other regards.

### 5. *Conclusion*

The creation of "Europe" as a functioning entity in the economic, technological and political domains has been and continues to be a process which draws upon the energies of European States, groupings and citizens at many levels and in a multitude of forms. Far from being monolithic, therefore, this complex process entails both sophistication in political thought -- whence comes concepts such as "subsidiarity" and now "complementarity" -- and suppleness in approach. Without these elements, indeed, one wonders if the project of European integration itself would not founder on the reefs of particularism.

In the case of the paths towards European integration whose meeting has been recounted in this article, we are now witnessing in the space field the early stages of a new relationship between the European Space Agency and the European Community. Its bywords are synergy and complementarity, words which, like much of the emerging European vocabulary mentioned at the outset, have an abstract ring about them but which, in reality, boil down to everyday imperatives. Preeminent among them is the necessity of neighbors first getting to know each other, and then cooperating according to what each can offer. And there is every incentive in so doing to seek a broader relationship than in the past. On the one hand, space technology has become relevant to so many areas of industrial and social life in Europe that promotion of its fuller utilization merits the Community's active attention. On the other, the changing orientation of space technology towards global concerns, including environmental monitoring, provides an opportunity for both ESA and the EC to make a substantial contribution farther afield. Beyond this, it is clear

that, where ESA acts to form and implement a long-term European space policy, its overall effectiveness can only be enhanced through the addition of the EC's growing political weight.

Thus, from the standpoint of Europe achieving the best spread and use of resources, the entry of the EC into the space field is to be welcomed and may lead to yet a further boost in the fortunes of Europe as a major space power.\*

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\* **Editor's note:** The present article was prepared in May 1992. Since then, the EC Commission has issued a further Communication which the authors plan to discuss in a future issue of the Journal of Space Law.

## A. Past Events

*Reports**United Nations Committee on the Peaceful Uses of Outer Space Holds Annual Meeting in New York*

The United Nations Committee on the Peaceful Uses of Outer Space held its thirty-fifth annual session at United Nations Headquarters in New York from 15 to 26 June 1992 and continued its consideration of questions relating to international cooperation in space activities. Following the trend of recent years, the old East-West conflicts have essentially disappeared, while North-South differences on economic issues remain but are discussed in a less confrontational spirit. The Committee marked 1992 as International Space Year (ISY), with the theme of Mission to Planet Earth. The Committee session began, on 15 June, with a special ISY commemorative meeting on the theme, "New approaches to international cooperation in space in a changing world."

The Committee is made up delegations from 53 States, with the Russian Federation this year taking over the seat of the former Soviet Union. The Committee's proceedings also reflected recent changes in Eastern Europe in a number of other ways. The Russian Federation announced that it would respect the international commitments made by the Soviet Union and that it had established a civilian space agency to coordinate its space activities. Ukraine, which became a member of the Committee in 1990 replacing East Germany, and Kazakhstan, which attended the session as an observer, announced that they had established national space agencies, and Ukraine announced that it would participate in the joint space programme of the Commonwealth of Independent States continuing some of the former Soviet programmes. Concerning the Yugoslavian seat in the Committee, Western Europe and the United States expressed reservations about the legitimacy of the government of Serbia and Montenegro occupying the seat, but no Yugoslavian delegation attended the session. In September, the General Assembly formally decided that the government of Serbia and Montenegro could not occupy the seat of Yugoslavia in the United Nations, leaving the seat vacant for the time being.

The principal items on the Committee's agenda were its annual reviews of the work of its two subcommittees, the Scientific and Technical Subcommittee, which met in February, and the Legal Subcommittee, which met in March-April. The Committee also considered two items specific to its meeting, spin-off benefits of space technology, and "ways and means for

maintaining outer space for peaceful purposes." The latter item has in past years seen divisive debates over military space activities, but this year, while some concern was expressed over continuing military space activities, the debate was very civil.

#### Nuclear Power Sources in Outer Space

The major achievement of the Committee this year was the completion of a set of principles relating to the use of nuclear power sources in outer space. Beginning in 1986, following many years of debate on the subject, negotiators in the Legal Subcommittee began to reach agreement on a number of draft principles. In 1990, agreement was reached on the most complex issue, a set of scientific and technical criteria for the safe use of nuclear power sources in space. In 1991, agreement was reached on two more principles, but the United States announced that the scientific and technical criteria agreed in 1990 needed to be revised. Other delegations insisted that negotiations on the agreed criteria should not be reopened. Negotiations in the two subcommittees this year made some progress towards resolving the impasse, but were unable to reach full agreement.

At the final meeting of the Committee's session, a compromise solution was agreed and the complete set of principles approved and sent to the General Assembly for formal adoption as a resolution. As part of the compromise, a preamble was added to the principles specifying that they applied only to nuclear power sources comparable to those currently in use for generating electric, non-propulsive, power. The principles would, therefore, not constrain the development of nuclear propulsion systems or any other new and different nuclear systems. It was also agreed that discussion would continue in the two subcommittees in 1993 to consider "future revision in view of emerging nuclear power applications and of evolving international recommendations on radiological protection." In addition to the criteria for safe use, the principles provide for publication of safety assessments of space nuclear power sources, procedures for notification in case of re-entry of radioactive materials, and clean-up assistance and compensation in case of contamination or damage.

At the end of October, the Special Political Committee of the General Assembly drafted and approved a General Assembly resolution containing the principles. Formal adoption by the General Assembly is expected on December 11.

#### United Nations Programme on Space Applications

Reviewing the work of the Scientific and Technical Subcommittee, delegations expressed their satisfaction with the United Nations Programme on Space Applications carried out by the Office for Outer Space

Affairs. The Committee approved the proposed programme for 1993, including eight seminars, training courses, workshops and conferences for personnel from developing countries, fellowships for advanced study in space institutions, technical advisory services, and dissemination of information on space applications for development. The Committee also reviewed and expressed its satisfaction with efforts to establish a series of regional centres for space science and technology education in developing regions. This year, as in the past, developing countries expressed concern over the lack of adequate resources for the Programme to meet the needs of the developing countries and to carry out the recommendations of the Second UN Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82, Vienna, 1982).

India, following consultations with other delegations, proposed that a third United Nations space conference, a UNISPACE III, should be held in 1995, preferably in a developing country, in order to review the progress since UNISPACE 82 and to continue and strengthen the international cooperative activities of International Space Year. The Committee agreed to consider the question at its 1993 meetings.

#### Legal Status of Outer Space and The Geostationary Orbit

The ongoing debate on the topic of the geostationary orbit made some progress this year as the equatorial countries, notably Colombia and Ecuador, dropped their claims of sovereignty or special rights over the portions of the orbit above their countries. Those countries and other developing countries, however, continued to call for some form of preferential rights for developing countries and countries with no previous geostationary satellites. These special rights would be embodied in some form of special legal regime to be elaborated for the geostationary orbit. by the Committee on the Peaceful Uses of Outer Space. Western countries continued to oppose any special regime for the geostationary orbit, arguing that the 1967 Outer Space Treaty and the existing coordination procedures for geostationary satellites through the International Telecommunication Union (ITU) were quite adequate. This issue was also a topic of discussion in the General Assembly's Special Political Committee in October

There was again no progress on the question of the definition of outer space, with developing countries calling for an agreed boundary between airspace and outer space, and western countries arguing that a formal definition would not be productive. A number of delegations expressed interest in discussing the question of the legal status of hybrid aerospace planes, as proposed in a working paper submitted by the Russian Federation. The paper raised the question as to whether such vehicles should be considered as space vehicles for their entire flight, as aircraft during non-orbital flight and spacecraft in orbital flight, or under some new special regime for such vehicles. Western delegations were unconvinced that the proposed aerospace vehicles constituted a new

situation that required new legal definitions or regimes.

### Space Debris

Discussion continued on the question of space debris and whether the question should be added to the agenda of the Scientific and Technical Subcommittee. Most delegations expressed growing concern over the issue and felt that it was time to begin formal discussions in the Subcommittee. The United States, however, continued to feel that formal consideration at the international level would not be appropriate until further research had been carried out at the national level. Nonetheless, the Committee agreed that information on the subject should be provided to the Subcommittee to allow it to follow the subject more closely.

### Remote Sensing and Environmental Monitoring

The major United Nations meeting of 1992 was the UN Conference on Environment and Development, or "Earth Summit," held in Rio de Janeiro in June. The Conference adopted Agenda 21, containing recommendations for action in a wide variety of fields relating to the environment and development, as well as a Framework Convention on Climate Change and a Convention on Biological Diversity. Much discussion has taken place since then regarding the financial and organizational means for implementing the programme, with important decisions to be taken by the General Assembly at its current session.

While practical problems of environmental monitoring, and in particular the applications of space technology for that purpose, were hardly mentioned at the Conference, the Committee on the Peaceful Uses of Outer Space, meeting immediately after the Conference, agreed that satellite remote sensing was important for environmental monitoring and particularly for studying and monitoring global change. It requested the Office for Outer Space Affairs to examine the results of the Conference, to request the views of member states, and to prepare, for consideration at the Committee's 1993 session, a report on how the Committee could contribute to the implementation of the decisions and recommendations of the Conference on Environment and Development.

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*Prevention of An Arms Race in Outer Space: Developments in the Conference on Disarmament in 1992*

In 1992, the Conference on Disarmament continued its business on this item as in the previous years. In reestablishing the Ad Hoc Committee on this item, the Conference on Disarmament requested the Committee to continue to examine and identify, through substantive and general considerations, issues relevant to the prevention of an arms race in outer space. Though the Committee was reestablished at the early stage of the annual session, it became a hostage of its unprecedented workload in the Chemical Weapons Committee which consisted of drafting a Convention prohibiting the production, storage, and use of chemical weapons. As a result, the Committee held only 13 formal meetings, as compared to 17 last year. After relatively short consultations on the organization of its work the Committee adopted basically the same program of work as in the previous years: "1. Examination and identification of issues relevant to the prevention of an arms race in outer space; 2. Existing legal regime; and 3. Existing proposals and future initiative." However, in 1992, in order to strengthen the modest achievements of 1991 and at the request of the Group of 21, it was agreed to add to the Programme that the "Committee would take into account relevant proposals, initiatives, and developments since the establishment of the Committee in 1985, including those presented at the 1991 session of the CD aimed at enhancing the work of the Committee as reflected in the work of the Friends of the Chairman." The Committee continued to enjoy the assistance of the Friends of the Chair who dealt, without prejudice to positions of delegations in open-ended consultations, with the following issues: (a) terminological aspects; (b) issues related to verification of ASATs (antisatellite weapons); and (c) confidence-building measures in space activities.

Many delegations expressed their regret that the mandate of the Committee remained the same, and that no substantive change had been added to its programme of work. China and some delegations pointed out that the Ad Hoc Committee should as early as possible conduct substantive negotiations on the conclusion of a comprehensive legal instrument on the prevention of an arms race in outer space.

The Committee followed an interdisciplinary approach to the subject in addressing political and legal questions as well as technical factors. In the course of the debates, many delegations indicated that, in the post Cold-war period, preventing an arms race in outer space was one of the principal tasks facing the Conference on Disarmament. In this age of high technology and qualitative increases in weapons precision, outer space stood out as an environment vulnerable to militarization. In this connection some delegations stressed that action by the Conference on Disarmament in preventing an arms race in outer space was not only timely, but essential for ensuring that the province of all mankind was indeed explored and used exclusively for peaceful purposes. For those



delegations weaponization of outer space was a potential hazard to the space activities of mankind and the peaceful use of outer space. In their view it would be too late to set about once such weaponization became a fait accompli.

In the view of several delegations, the most promising directions of work of the Committee appeared to be in the areas relating to: CBMs; the development of a code of conduct/rules of the road; the establishment of "keep-out zones;" the legal protection of satellites and an agreement on their immunity; the creation of an international trajectography center and of a satellite image processing agency.

Once again, the issue of "Global Protection Against Limited Strikes" (GPALS) was addressed by several delegations. Thus, China indicated that although the world had undergone major changes, the research and development of space weapons had not come to an end. In its view, the new anti-ballistic missile system was not totally defensive in nature and also had an attacking capability and hence the development of such a system would inevitably give rise to mutual suspicion among the states and contribute to more tensions in the world. It could also provoke countries with the ability to develop a BM system to speed up such eventuality. China stated that the implementation of GPALS would surely violate the ABM Treaty which would have to be either terminated or amended.

During the debates on the existing legal regime a majority of the members of the Committee pointed out that by itself it did not guarantee the prevention of an arms race in outer space and that there was a need to consolidate and reinforce that regime and enhance its effectiveness. Limited in scope, existing legal instruments were utterly inadequate in forestalling an arms race in outer space as they contained no clear-cut provisions on the prohibition of deployment of various types of space weapons, except that of nuclear weapons and other weapons of mass-destruction. According to some delegations, it was therefore necessary to conclude a legal instrument, acceptable to all states, on the dewatering of outer space and on the prohibition of all types of space weaponry. Some delegations of the Western group maintained that the existing legal regime provided an equitable and balanced response to the need to promote peaceful uses and arms control in outer space. They emphasized that what was really in question was compliance with the existing legal regime. They underlined that there were many nations that have not ratified or acceded to the existing international agreements pertaining to outer space and, for this reason, cooperative efforts could not be pursued on this subject in an effective manner.

Some interesting ideas were presented by Canada which argues that the legal regime could be reinforced by improved state practice under existing conventions. For example, with respect to the Registration Convention, it suggested that the United Nations Secretariat might devise some standard form of automatic dispatch of notices to remind states of their obligations under the Convention. This would strengthen the role of

the Secretary-General in the pursuit of greater transparency in outer space activities. The Conference on Disarmament might also recommend to the Security Council that it adopt a resolution both requesting the Secretary-General to send out automatic reminder notices, and setting up a committee of the Council to review periodically any failures of States to register their launches. Canada also suggested that more frequent use of Article IX of the Outer Space Treaty of 1967, might well serve as a consultative mechanism to expand the kind and amount of information to be provided under the Registration Convention. Article XI of the Outer Space Treaty could serve as a basis for requiring data beyond that which is currently routinely provided under the Registration Convention. It would also underline the more active role which the Secretary-General might play and indeed seemed already authorized to play in serving a data-collection function.

The discussions and consultations on the existing proposals and future initiatives once again demonstrated a clear preference of the majority of the delegations to provide the Committee with a negotiating mandate. Thus the Group of 21 held the position that the Committee should focus on concrete proposals for measures with a view to conducting negotiations for the conclusion of an agreement or agreements, as appropriate, to prevent an arms race in outer space in all of its aspects. Venezuela recalled its proposal to amend Article IV of the Outer Space Treaty so as to fill in an important juridical vacuum in the Treaty and to prevent the stationing in outer space of weapons other than nuclear and mass destruction weapons.

Several delegations once again addressed the question of the functioning of the Registration Convention and ways of strengthening the regime established by it. The suggested improvements included the provision of more timely and specific information concerning the function of satellites, including whether the satellite was fulfilling a civilian or military mission.

In connection with the legal protection of satellites, some delegations indicated that both the questions of ASAT weapons and of immunity of space devices should be addressed in order to achieve an ASAT prohibition and to guarantee legal immunity for satellites performing definitive peaceful functions. The United States of America recalled that it had not found any measure in the field of ASATs that would be verifiable or equitable. The inability to construct a suitable and effective verification system could prevent agreements from being finalized. On the subject of "keep-out zones", (the idea actively pursued by Germany, Canada, and some other delegations), it had concluded that the physical characteristics of space and spacecraft motion, coupled with the sheer number of objects that would need to be tracked, would make it difficult, if not impossible, for most space nations to monitor compliance with "keep-out zones". In its view keep-out zones would not be practical for providing protection to satellites. France indicated that verification

and monitoring of observance of such zones would be a delicate task and hence would inhibit the usefulness of a trajectography tracking centre.

A substantial part of the discussions was devoted to confidence-building measures and ensuring greater transparency in space activities. Many delegations were of the view that CBMs was one of the areas where some degree of certainty and convergence of views existed and could form part of a negotiating process with a view to reaching agreements. Several delegations favored the approach centered on noninterference with nonaggressive activities and CBMs which would support that objective. The Chinese representative emphasized that while the CBMs contributed to the positive development in international relations, the discussions on CBMs should not obstruct the creation of a substantive and legally binding treaty banning all space weapons. In the view of that delegation some of the CBMs already on the table could be considered as verification measures for a future treaty, among them the establishment of an appropriate international supervisory body to inspect objects before they are launched into space.

For the fourth consecutive year the Committee benefitted from the scientific and technical contributions of experts from various delegations. Some well-known personalities and newcomers addressed specific issues and initiatives under consideration in the Committee. Thus, Professor V. *Kopal* shared his ideas on the issues involved in defining Outer Space, Space Objects and Space Debris. Dr. H. *Feigl* of Germany presented some remarks on Keep-Out Zones in a Code of Conduct Regime for Outer Space. Mr. R. *Tetu* of Canada and *Luciano Anselmo* of Italy spoke on nuclear power systems in space and a set of principles which would govern the reentry of nuclear power sources in the atmosphere. The Italian expert stressed that a realistic approach forbidding the use of nuclear power sources in low Earth orbit (appropriately defined) requiring strict safety standards on all the nuclear devices leaving our planet for deep space mission, could improve global security and safety perceptions, without harming the development of an important, and often irreplaceable, technology. Another two experts, Dr. S. *Rama Rao* (India) and *Andrew Young* (United Kingdom) touched some legal issues under discussion in the Committee.

The Committee was very careful in selecting the language for the consensus part of its annual report. In their final form, the conclusions read as follows:

It was agreed that substantive work on this agenda item should continue at the next session of the Conference. It was recommended that the Conference on Disarmament re-establish the Ad Hoc Committee on the Prevention of an Arms Race in Outer Space with an adequate mandate at the beginning of the 1993 session, taking into

account all relevant factors, including the work of the Committee since 1985.

Vladimir Bogomolov  
Secretary of the Ad Hoc Committee  
Conference on Disarmament

*The 35th Colloquium on the Law of Outer Space, Washington, D.C., 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 harmonization 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. Gál (Hungary)* and dealt with the "Role of International and Municipal Space Law in the Regulation of Economic Space Activities". Dr. Gál 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. Gál'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) addressed 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), 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. Kuskavelis* 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. Kuskovelis* (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.\*

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

*Space Technology in Developing Countries*

The United Nations, International Astronautical Federation, Committee on Space Research, and American Institute of Aeronautics and Astronautics co-sponsored a three-day symposium on August 28-30, 1992 just prior to the week-long World Space Congress, held in Washington, D.C.

The U.N. Symposium focused on the use of space technology in developing countries, and on "making it happen"-- the "it" being the applications of space technology in development. One specific goal of this special symposium was to come up with specific proposals and plans to use space technology, that could be implemented within a country or region. Robert Kinzie, CEO of IRIDIUM, in his address on "Modernization through Communications," referred to the Symposium's theme, "Making it Happen" as "Getting it Done," thereby appropriately summing it all up.

The symposium itself consisted of two parallel "tracks": one on "Sustainable Development of Natural Resources," the application or use of remote sensing data to food production and preservation of natural resources; the other, "Modernization Through Communications," centered on disaster and safety communications issues, as well as on building the communications infrastructure.

Dr. N. Jasentuliyana, Director of the UN. Office for Outer Space Affairs, noted in his opening address that these two areas are key in demonstrating the practical benefits of space applications, benefits which inure to developing countries as well.

This was the second symposium held in conjunction with the IAF Annual Congress (the first one was held in Montreal in 1991). Although one of its aims was to increase participation of developing countries in IAF/COSPAR meetings, like its predecessor, it lacked sufficient publicity to attract the wider audience that was on hand for the World Space Congress. (Attendance was open to all, but only a fortunate few seemed to know about it. They came away with much information, and hopefully a new understanding of many of the difficulties besetting developing countries' space activities and applications.)

The symposium's structure (conferences in the morning, followed by workshops in the afternoon) allowed ample time for in-depth

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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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presentations, and for meaningful dialogue and exchange of views on many of the issues raised during the morning sessions. This structure set the symposium apart from the rest of the World Space Congress, where some speakers were given barely enough time to read the title and abstract of their papers.

Many eminent scientists, academicians, and professionals associated with their national space organizations, such as the Brazilian, Canadian, Indian, Pakistani and organizations, spoke on the experiences they have had with the application of space technology in their respective countries. They spoke of the programs and the efforts being made to use or apply state-of-the-art technology in their national development programs.

Two leitmotifs were present. One theme, stressed by most, if not all the speakers, was the importance of having good telecommunications systems as a basic requisite for development programs. The other was the lack of financial and human resources to sustain these programs. (Ironically, one of the symposium sessions was entitled "Sustainable Development" ).

During the symposium, another trend became apparent: the converging uses of satellites: the same spacecraft is used for monitoring weather, transmitting TV or voice messages, or for educational purposes, or application of data gathered by remote sensing satellites to health-related programs. At the end of the two-day symposium, it was obvious that the persons working in the "remote-sensing" area and those involved in "communications," despite their diverse training or professional backgrounds, share many areas of interest, and could benefit from additional "input" from each other.

I. The "Sustainable Development of Natural Resources" sessions focused on the experiences or programs that apply data obtained from remote-sensing spacecraft in some of the countries of Africa (Kenya, Niger, Nigeria) and Asia (India and Malaysia), ranging from the creation of specialized data bases for food production, to tracking the migration of the desert locust. The second session on sustainable development leaned more on the experiences in India and Brazil, such as monitoring changes in the rain forest, as well as monitoring weather conditions during monsoon season, to give warning of impending disasters.

In both sessions on Sustainable Development, the cooperation of the developed countries was noted; for example, the role that NASA's remote sensing satellites have played in predicting outbreaks of malaria and other diseases, or ESA's programs in Africa, in conjunction with the Food and Agriculture Organization.

II. The "Modernization Through Communications" sessions focussed on the development of telecommunications, primarily, telephony. The experience of two developing countries with their national satellite systems, India and Mexico, demonstrated the multiple uses to which the spacecraft can be put.

Dr. K. Narayanan, of the Indian Space Research Organization (ISRO),



and INSAT Program Director, explained that a distinctive feature of INSAT is that much of the technology used on the spacecraft and on the ground has been developed locally, to meet national needs. INSAT could serve as a model for many a country that seeks to launch a national satellite system, since the spacecraft is used for voice, data, weather, education, disaster warning, and several other types of transmissions.

Dr. E. Mendez, Director General of the Institute of Communications in Mexico, noted that Mexico is the first Spanish-speaking Latin American country to have a national satellite, and is also the "first" in several respects. For example, it is the first developing country satellite to use both C and Ku Bands. Its second-generation spacecraft will operate in 3 frequency bands: C, Ku, and L, the latter to be used for national mobile communications. The coverage area of this satellite includes many parts of the United States, with a large Spanish-speaking population. It also covers most of Spanish-speaking Latin America, from Mexico to Argentina.

Whether to lease capacity from existing satellite systems, or to launch a national bird, is a question subject to much debate. Pakistan concluded that, although it wanted to have its own satellite, economically it was more feasible for that country to lease transponders from ASIASEAT, a satellite communications consortium based in Hong Kong. Some countries in two other regions are also planning on leasing satellite capacity from INTELSAT, as an interim step to launching their regional satellites. These are the Andean Pact countries (Bolivia, Colombia, Ecuador, Peru and Venezuela), as well as over twenty countries in Africa, currently participating in the "RASCOM" (Regional African Satellite Communications) project.

Present technologies, as well as future low earth orbit satellite systems, such as IRIIDIUM and GLOBALSTAR, which would be ideal for disaster and remote communications were discussed in these sessions.

While developing countries are cognizant of the fact that they need to strengthen and not only develop their telecommunications sector, there are two main impediments to accomplishing these goals: lack of funds, and lack of trained personnel. Several organizations (mostly not-for-profit groups) have been studying, and promoting space communications that would require minimal investments, since they make use of resources /technologies already available in most countries. In this respect, the packet-radio communications system, developed by the U.S. based Volunteers in Technical Assistance (V.I.T.A.) merits to be studied by developing countries that want to expand their telecommunications networks, using technology at hand, and requiring minimal training of people in its use.

Interestingly enough, "developing countries" (DCs) are no longer only those in the southern hemisphere: the many republics in the former Soviet Union are now in that category. In some respects, their needs are even more urgent than those of the "traditional" DCs, since in many new countries, the infrastructure is even more meager than in some of the

African or Latin American countries. However, only one speaker, Y. Wexler of INTELSAT, spoke on the needs of these new nations during the "Modernization through Communications" session.

The session entitled "Building a Communications Infrastructure" dealt with several issues, ranging from the development of earth station networks, opportunities for on-the-job training, the legal framework as part of the infrastructure, to the need for flexibility. Dr. *Golden*, former chairman of TELESAT, Canada, spoke on institutional biases that exist (terrestrial cables versus satellite technology) that may slow down application of new technologies. He mentioned that in countries like Canada, the former Soviet Union, and other large geographic areas, satellites or other wireless technology should be the technology of choice. Cost-wise, satellites are more effective than cables, at least in many countries.

The successful undertaking and completion of any program, whether for training or expansion of the infrastructure, depend on national policies as well. That the regulatory framework should be considered as one of the basic elements of the infrastructure, as suggested by one speaker, S. *Ospina*, was a novel idea to some of the Symposium's participants.

In addition to addressing issues of national telecommunications development, regional development plans were also mentioned. Thus, the African experience in establishing a regional satellite communications system, RASCOM, focussed on questions from its financing to international cooperation, in making it happen.

While the regulatory aspects involving legal and policy issues, whether of remote sensing activities or telecommunications, were mentioned in passing, they were not the focus of any particular session. (These issues are usually addressed during the Colloquium of the International Institute of Space Law). However, during the three-day Symposium, several speakers acknowledged that some regulation of space activities may be needed, and should be considered.

R. K. *Doetsch* of the Canadian Space Agency, suggested the creation of a space agency for developing countries, an idea that has been proposed previously. Many national and regional space agencies exist, but there is none that encompasses all countries. With the growing recognition of the benefits of space technologies, as well as the convergence of remote-sensing and telecommunications satellite activities, perhaps the time is arriving for the creation of an international space agency that would encompass both communications and remote-sensing activities.

For this to happen, however, several factors need to be considered. For one, several differences exist between remote-sensing satellite systems, and those dedicated primarily to telecommunications. Some of these may stem from the fact that remote-sensing activities seem to be concentrated in governmental entities, whereas satellite telecommunications are not exclusively in the hands of governments.

For example, in addition to national and privately owned satellite

systems, several international, intergovernmental telecommunications organizations, such as INTELSAT, INMARSAT, INTERSPUTNIK, EUTELSAT, and ARABSAT, provide voice, data and television services. However, there are no comparable international intergovernmental organizations for the gathering and dissemination of remote sensing data or imagery. Further, most countries have earth stations for their telecommunications by satellite, but very few have facilities to receive and interpret images from remote-sensing satellites. Dissemination of remote-sensed data seems to be restricted, or less widely available. Even within the U.N., COPUOS has kept itself at the margin of telecommunications issues, leaving these to other organizations, such as the International Telecommunication Union instead. However, it has played a central role in drafting the Principles governing remote sensing activities.

While reliable telecommunications are considered fundamental to development, and most people require telephones to communicate, not all people need to have remote-sensing data at their disposal. The other side of this "coin", however, is that countries need reliable data obtained from remote-sensing satellites, to ensure and sustain their development efforts - one of the themes, if not goals, of this year's symposium.

The UN/IAF/COSPAR/AIAA three-day symposium was very valuable, in that the people who attended had the opportunity to speak with each other at length, and benefit from the "success stories" (and some less successful experiences) of and in developing countries. This was possible, because of the limited number of speakers in each session, and the workshops in the afternoons, allowing sufficient time to delve more deeply into substantive issues.

There were two drawbacks to the symposium. First, its objective - to make concrete and specific proposals and take specific actions to implement them - may not have been met. If it was, those plans for action should have been made known more clearly and more extensively. Second, the symposium failed to draw a bigger audience from the participants at the World Space Congress.

Since representatives from developed and developing countries can benefit from the sort of exchange provided by the UN Symposium, the event should be more widely publicized and made an integral part of future IAF Congresses.

*Sylvia Ospina, J.D., LL.M.*

*International Telecommunications/Space Law Consultant*

*International Law Association (ILA) Continues Work on Draft Instrument to Protect Environment from Damage Caused by Space Activities*

The International Committee on Space Law held a meeting, chaired by Lady Fox (United Kingdom), on April 22, 1992 at the 65th ILA Conference in Cairo, Egypt, to discuss the Third Draft of an "International Instrument Concerning the Protection of the Environment from Damage

Caused by Space Activities," prepared by the Rapporteur, Prof. *Maureen Williams* (Argentina).

In his introductory remarks, the Chairman of the Committee, Prof. *Karl-Heinz Böckstiegel* (Germany), noted that the ILA, through the Space Law Committee, had permanent observer status at UNCOPOUS since June 1990. This was the only ILA committee that enjoyed such a status with the United Nations. Prof. *Böckstiegel* then recalled the major steps in preparing the draft instrument since the 1986 meeting of the Committee in Seoul, including the international interdisciplinary symposium held in Cologne in 1988, the 1988 session of the Committee in Warsaw, and the 1990 meeting in Australia where the Committee was given the mandate by the ILA Queensland Resolution to commence drafting the instrument. The First Draft, prepared by Prof. *Williams*, was sent to the scientists Professors *L. Perek*, *D. Rex* and *H. Ricciardi* in February 1991 for comments. The Second Draft was circulated to the Committee members in May 1991 and comments were received from Professors *Cocca*, *Gorove* and Mr. *Chowdhury*. In addition, the Space Law Working Group of the Netherlands Branch of the ILA, under the chairmanship of Prof. *Peter Malanczuk*, submitted comments on the basis of a thorough study on the matter prepared by *Marjon Kroes*. Other comments were made by Prof. *Ricciardi* and Dr. *Vladimir Kopal*.

In introducing her report, Prof. *Williams* noted that there was consensus on a number of fundamental principles to be included in the instrument, such as a general obligation to cooperate; an obligation to negotiate in good faith; an obligation to ensure that space activities cause no harm to persons, objects or the environment of other states, or to the environment in areas beyond national jurisdiction; an obligation to inform and exchange information, to consult, to prevent, control and reduce contamination, pollution and space debris, as well as inactive satellites precluding the use of orbital facilities by active systems; and an obligation to make every effort to settle disputes promptly and peacefully. Prof. *Williams* recorded that there was still no agreement on the definition or description of relevant terms such as "contamination", "pollution" and "space debris." She referred to the parts of the Third Draft dealing with definitions, the scope of application, which was intended to be as wide as possible, general and particular obligations, and the settlement of disputes, where a time-limit for compulsory third-party settlement should be set. She finally noted that, at the proposal of *Malanczuk*, the possibility of addressing issues of responsibility and liability had now been included in addition.

In response to a question raised by Dr. *H.H. Almond* (USA), Prof. *Williams* explained that the term "environment" in the report was meant to include both the outer space environment and the earth environment. Prof. *Böckstiegel* suggested to clarify the matter expressly when drafting the full text in order to avoid any misunderstanding. He further explained that the draft instrument covered both areas within international

jurisdiction as well as areas under domestic jurisdiction.

In view of the suggestion by Dr. *H. Hohmann* (Germany) that it was artificial to differentiate between "contamination" and "pollution" in the definitions, Prof. *Williams* noted that, although there was no consensus in the Committee, nevertheless there was a strong trend to view these terms as being synonymous. With regard to Dr. *Hohmann's* further detailed observations on a number of provisions of the draft instrument, Professors *Williams* and *Böckstiegel* noted that at this stage the idea was to establish general principles and not to enter into detailed drafting. However, participants were invited to submit such comments in writing so that they could be taken into consideration in the further process of drafting.

There was agreement at the meeting that it was unrealistic to require states to prevent any pollution. Such a strict approach would not be acceptable to them. Rather a compromise must be reached by seeking to reduce the amount of pollution. Lady *Fox* suggested to consider terminology such as "no significant harm," "no harm" or "unacceptable harm" to ensure that pollution was unarmful. Prof. *Williams* noted that this would lead back to the question of Article IX of the Outer Space Treaty and the problem of determining when contamination becomes "harmful." This should be left to judges to decide. In this connection, Dr. *H.G.H. Post* (Netherlands) proposed to include a specific rule dealing with (the prevention/reduction of) "harmful effects or significant risk". Both Dr. *Post* and *Malanczuk* emphasized that special regard should be given to the relevant work of the UN International Law Commission.

Another issue raised by Dr. *Almond* concerned the relevance of the provisions for the protection of the environment during wartime as laid down in the 1977 Geneva Protocols and other instruments, i.e. the Environmental Modification Convention. Noting that states differed in defining what amounted to "severe and long-lasting pollution", Dr. *Almond* suggested that a similar approach might be adopted with regard to pollution caused by space activities. This was rejected by Dr. *Post* and *Malanczuk* who argued that those instruments only applied in cases of armed conflict with a lower level of protection than acceptable as regards peaceful activities.

*Malanczuk* suggested that, with regard to responsibility and liability issues, it might be necessary to distinguish between different regimes for the environment on earth and in outer space. Agreeing with this, Prof. *Böckstiegel* noted that there was indeed a different approach of states to the protection of the outer space environment and the protection of the earth environment. States engaged in space activities were more interested in the space environment issues and in reaching an agreement to solve the space debris problem and less in the earth environment aspects.

Prof. *S. Murase* (Japan) suggested that the Committee consider establishing a proper linkage between the proposed instrument and domestic law to ensure effective implementation. He also stressed the need to control the activities of multinational enterprises.

A number of other questions were raised by Mr. S. R. Chowdhury (India), including the removal of inactive satellites, the more precise formulation of definitions, the content of obligations and dispute settlement where in case of failure to settle a dispute an impartial authority should be called upon to intervene.

Finally, the discussion focused on the scope of the draft, consistency of terminology and liability aspects. Prof. *Gorove* noted that the draft did not use the terms "damage" and "harm" in a consistent way. He proposed to either use "harm" or "damage", bearing in mind that "harm" was probably the broader term. While Prof. *Williams* inquired whether Prof. *Gorove* wanted to go a step further than the Liability Convention, Lady *Fox* stressed the need to think about the legal consequences and perhaps consider different types of damages. Prof. *Böckstiegel* said that it was very delicate for states to accept liability which must be kept in mind.

Prof. *Gorove* agreed that the Committee had to look at what was acceptable. However, legal obligations should be binding and lead to consequences. This could wait until starting with drafting the convention. Although it was better to start on a lower level in the draft because states were still reluctant to take up the discussion, the Committee could nevertheless indicate its preferences.

Mr. *F.G. van der Dunk* (Netherlands) suggested to focus on state responsibility for obligations relating to cooperation and negotiation and potential violations of these obligations while retaining the terms "harm" and "risk" in view of their wider scope. The concept of "damage" and obligations resulting therefrom could be reserved for another draft instrument.

Referring to Prof. *Böckstiegel's* remark that states were reluctant to accept liability principles, Dr. *Hohmann* pointed out that the Institute of International Law had been confronted with the same problem and nevertheless proceeded to propose liability. Dr. *Hohmann* cited a number of provisions on responsibility and liability which he considered pertinent.

*Malanczuk* observed that there were a variety of questions related to responsibility and liability, including the concept of "damage," the distinction between direct and indirect damages, the different issue of the standard of liability, which were more appropriately addressed in the further process of drafting. In this connection, in addition to the two other relevant projects of the International Law Commission, this Committee would have to consider the recent work of Prof. *Arangio-Ruiz* who, in dealing with the legal consequences of internationally wrongful acts, as the Special Rapporteur for the draft articles on state responsibility, had also looked at the experience with Cosmos 954.

The meeting concluded by unanimously adopting a resolution introduced by Prof. *Williams* at the request of Prof. *Böckstiegel* which endorsed the Report and recommended that the Committee conclude the final text of the Instrument for presentation to the 66th ILA Conference to be held in 1994 in Buenos Aires. The Committee was requested to deal

with the following substantive matters:

- (1) the definitions of contamination, pollution and debris;
- (2) the scope of application of the Instrument, which should be as wide as possible;
- (3) a general obligation to cooperate, incumbent on States and international organizations engaged in space activities, in order effectively to implement the Instrument;
- (4) in addition, more precise obligations, such as obligations to prevent, to inform, to consult, and to negotiate in good faith when there are reasons to believe that a certain space activity is likely to be detrimental to the environment;
- (5) the questions of responsibility and liability;
- (6) methods of dispute settlement, including provision for compulsory third-party settlement of disputes should no agreement be reached within a specified time limit.

Prof. Peter Malanczuk  
University of Amsterdam

*Manned Space Flight: Legal Aspects in the Light of Scientific and Technical Development*

Research on the legal problems of manned space flight has been on the agendas of the Cologne Institute of Air and Space Law for a long time. In late 1990, as a result of a common research project among the Institute, the Research and Study Center of Space Law and Policy of the University of Mississippi Law School, represented by Prof. *Stephen Gorove*, and the Institute of State and Law of the former USSR, represented by Prof. *Vladlen Vereshchetin*, a "Draft for a Convention on Manned Space" was presented to the public (published in volume 18 of the *Journal of Space Law* in 1990, at pp. 211ff). More than one year after the publication of this "Draft Convention" the Cologne Institute organized an expert colloquium in Cologne on May 19-22, 1992 to discuss the legal problems of manned space flight and review the draft.

The colloquium - organized in cooperation with the German Space Agency (DARA) and the German Aerospace Research Establishment (DLR) and sponsored by the Northrhine-Westphalian Ministry of Science and Research and the Deutsche Forschungsgemeinschaft - was in a way exceptional as it had an interdisciplinary approach. Speakers as well as participants were not only lawyers but technicians, natural scientists and astronauts, which gave the colloquium a very practical basis.

After a welcome reception at the evening of May 19, the colloquium started for the approximately 120 participants on May 20 with an introduction by Prof. *Karl-Heinz Böckstiegel* and a welcome address by Prof. Dr. *Bernhard König*, Rector of the University of Cologne.

The first panel (The Astronauts' View: Experiences and Demands) was chaired by Prof. Dr. *Walter Kröll* (DLR). The astronauts *Jean-Loup Chrétien* (first western astronaut who flew to the Russian space station MIR) and Dr. *Ulf Merbold* (German astronaut who flew on two Space Shuttle missions) gave an overview on the working conditions in space. Both stated, that although there is a crisis in manned space flight because of the budgetary problems that all space faring nations have to suffer, manned space flight is an essential for further research in space. There is a large volume of experiments and research that cannot be operated by robots and therefore needs human support in a space flight. *Merbold* also mentioned the philosophical aspect of manned space flights that gives a new perspective on the life on planet Earth.

The afternoon session was chaired by *George van Reeth* (President of the International Space University). The first subject was devoted to "Astronauts and Cosmonauts in International Cooperation." Dr. *Stephen E. Doyle* (USA, until 1991 President of the Association of U.S. Members of the International Institute of Space Law) explained in detail the planning and execution of a Space Shuttle flight that involves international cooperative efforts and examined the legal framework of the U.S. national laws and regulations pertaining to international manned space flight. The second speaker was Prof. *Yuri Kolossov* (Russian Federation, Moscow State Institute of International Relations). He gave an overview of the international regulations governing manned space flight and stated that International cooperation will be expanded in the future. One of the issues in the following discussion was, whether the term "manned" space flight, as used in the Draft, should be replaced by the term "crewed" space flight. Especially *Doyle* suggested the use of this expression, because it is less sexist and more neutral than "manned" space flight.

The second subject in this session was "Formation of Astronauts - The European Example." The first speaker was Dr. *Andres Ripoll* (Head of the European Astronauts Centre of the European Space Agency, ESA/EAC at Cologne) who explained in detail the European Astronaut Policy of selecting and training the European astronauts for the International Space Station. The legal regulation of this selection and training was the subject of the following presentation by Dr. *Kevin Madders* (ESA Legal Department). Main subject of the discussion was that astronauts, in preparation for and during the space flight, are used as test objects for medical experiments and analysis. Madders stated that the former consent of the astronaut for such experiments is required and a committee would suggest "yes" or "no" if a test should be taken.

Next day's morning session, chaired by Dr. *Wolfgang Grillo* (Managing Director for commercial and administrative affairs and Vice Chairman of the German Space Agency DARA) was devoted to "in-Flight Personnel Regime." Dr. *Michel Bourély* (President of the Société Française de Droit Aérien et Spatial, former Legal Adviser and Head of the Legal and Intellectual Property Department of the European Space Agency, ESA)



described and commented on the solutions given by the parties to the Intergovernmental Agreement on the Permanently Manned Civil Space Station (I.G.A.) to the problems resulting from the presence of astronauts living and working in the International Space Station. The following presentation by Prof. Dr. *Vladimir Kopal* (Charles University, Prague, CSFR and former Chief of the Outer Space Affairs Division of the United Nations) focused on the definition of the "manned space object." *Kopal* examined the problems of jurisdiction and control with respect to international manned space objects and definitions relating to the powers of the "director of manned space flight" versus the competences of the "commander" of a manned space flight. The following discussion focused on the problem of whether the regulations for "astronauts" and "crew" should also apply to "passengers" of a space flight or whether this term and the related legal regulations (e.g. the status of astronauts as "envoys of mankind") should only apply to persons with professional responsibilities for the space flight. A conclusion to this problem could not be found, so this issue will be subject of further discussions.

The afternoon session - chaired by Prof. Dr. *Michael Milde* (Director of the Institute of Air and Space Law of McGill University, Montreal, Canada) was devoted to intellectual property rights. At the beginning an introduction titled "Research in Space" was made by Prof. Dr. *Ernst Messerschmid* (Director of the Space System Institute of Stuttgart University and payload specialist on STS-61 A SpaceLab D1) and Dr. *Samuel T. Durrance* (Johns Hopkins University, Baltimore, Maryland, U.S.A. and payload specialist on STS-35). The two speakers described the factual and legal conditions under which a research and study in space is performed during a Space Shuttle flight and how the scientific data produced by a NASA space flight are available to the public domain. The next speaker Dr. *Dieter Stauder* (European Patent Office, Directeur de la Section Internationale du Centre d'Etudes Internationales de la propriété Industrielle of Robert Schuman University, Strassbourg, France) gave a presentation titled "Intellectual Property Regime for Scientific Research." *Stauder* gave an overview on the differing national patent laws and described some interesting issues of patent law in connection with space flights by the example of the case "Hughes International versus The United States." "Regime for Commercial Applications" was the subject of the paper of *René Oosterlinck* (Head of Personnel Management at the European Space Agency ESA) that was presented - due to an unexpected absence of the author - by *Anna Maria Balsano* (Administrator of the Intellectual Property of the European Space Agency ESA). The paper especially dealt with the provisions of the Intergovernmental Agreement of the Permanently Manned Space Station regarding intellectual property rights and the protection of remote sensing data. The last presentation of this day was given by Prof. *Sylvia-Maureen Williams* (University of Buenos Aires, Argentina) on "Intellectual Property - Benefits for Third Countries." She pointed out that it is imperative to establish a legal framework within

which the rights and obligations of both the spacefaring nations and the developing countries are clearly defined.

After the end of session the participants visited the Deutsche Forschungsanstalt für Luft- und Raumfahrt DLR in Cologne-Porz and received an impression of the astronauts' training facilities and research laboratories at DLR. The day ended with a reception held by DLR.

The last day of the colloquium started with a session on "Safety and Rescue", chaired by Prof. *Nicolas M. Matte* (Director Emeritus of the Institute of Air and Space Law, McGill University, Montreal, Canada). Prof. *John H. Carver* (Director of the Research School of Physical Sciences and Engineering at the Australian National University, Canberra, Australia and Chairman of the Scientific and Technical Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space, UNCOPUOS) focused on the factual issues of this subject and gave an overview of the risks that occur during manned space missions and the steps that are required to improve the safety of space flights. The legal aspects of safety and rescue of manned space flight were then discussed by Dr. *Nandasiri Jasentuliyana* (Director of the Office for the Outer Space Affairs of the United Nations) who pointed out that by declaring the astronauts to be "envoys of mankind" who shall be rendered "all possible assistance," States made humanitarian principles an integral element of international space law. He examined relevant articles of the Outer Space Treaty and the Agreement on the Rescue and Return of Astronauts.

The afternoon session was devoted to the Draft Convention on Manned Space Flight and chaired by Prof. *Kolossov* (Russian Federation) and the authors of the draft, Professors *Böckstiegel* and *Gorove* examined particular issues of the draft. *Gorove* focused on definitional problems and stressed the importance of keeping the provisions in harmony with the existing space treaties while *Böckstiegel* concentrated on commercially relevant issues such as responsibility and liability, inventions and intellectual property, and the settlement of disputes. He pointed out that the draft must not be understood as a purely academic instrument but as an attempt in an effort to eventually achieve an instrument acceptable in state practice. Since the authors of the draft came from countries with different legal and economic backgrounds, concession by the authors had to be made to reach agreement on the draft. *Gorove* then explained the steps of drafting by using the example of jurisdiction and control over the crew members.

The colloquium brought up many suggestions for further work on the law of manned space flight. Primarily, the interdisciplinary approach of the colloquium proved very helpful for the lawyers to understand the needs of the astronauts and technicians for a legal framework regarding their activities in space. Also, the Draft Convention was found to be a useful tool for the development of a future international agreement on that subject.

The proceedings of the colloquium will be published as soon as possible in the Series on Air and Space Law of the Institute of Air and

Space Law by Carl Heymanns Publishers, Cologne, Germany.

Prof. Dr. Karl-Heinz Böckstiegel\*  
and Knut Focke\*\*

*Third Satel Conseil Symposium, Paris - Sept. 28-30, 1992*

The biannual Satel Conseil Symposiums are the most prestigious satellite communications conferences held in Europe. The most recent Symposium focused on the implications of the last World Administrative Radio Conference (WARC-92) which was held under the auspices of the U.N.-affiliated International Telecommunication Union during February and March 1992 in Torremolinos, Spain.

Conference speakers emphasized that WARC-92 frequency allocations provide a great number of possibilities for mobile satellite service (MSS). From a techno-regulatory point of view, these services are usually called Radiodetermination Satellite Service (RDSS), low-earth-orbit (LEO) MSS, and geostationary (GEO) MSS. The LEO MSS services are often subdivided into "little LEO" and "big LEO" categories, the former using small satellites at frequencies below 500 MHz and the latter operating via larger satellites above 1.5 GHz. Because MSS satellites may also use orbits between GEO and LEO, a third broad category of non-GEO MSS may also be defined. This third category, also enabled at WARC-92, includes concepts such as high elliptical orbits (HEO) and medium earth orbits (MEO), as well as LEO MSS. Finally, the WARC-92 retained provision for different types of GEO MSS, such as Aeronautical Mobile Satellite Service (AMSS), Maritime Mobile Satellite Service (MMSS) and Land Mobile Satellite Service (LMSS).

Symposium speakers also observed that from a business and marketing point of view, WARC-92 enabled a broad array of new mobile telecommunications services to be delivered to the public via satellite. These services include portable wide area telephony, low-cost mobile asset tracking, and mobile data communications across continental and inter-continental distances.

Specific markets are addressed by each of these new services. Markets addressed by wide area portable telephony include globe-trotting executives, public mobile communications outside of cellular coverage, and defense or government needs for remote area communications. Markets addressed by low-cost mobile asset tracking include hazardous shipment monitoring (nuclear, chemical, biological, munitions), national and international just-in-time transportation and logistics management, and stolen vehicle recovery. Markets addressed by continent-wide mobile data

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communications include, datacasting and switched non-voice services. These markets are mostly represented by large corporate or organizational communication networks extending themselves from in-building or inter-building to global, mobile, ubiquitous coverage.

#### Players for WARC-92 MSS Frequencies

A large number of players have announced plans at the Third Satel Conseil Symposium to use the techno-regulatory possibilities opened at WARC-92 to capture some share of the markets just described. By quantity, the overwhelming number of these players were American. However, the globally-owned Inmarsat organization seemed uniquely positioned to most rapidly take advantage of WARC-92.

The Americans developed a unique tool called a "cut-off date" as a first step in giving out licenses to use MSS spectrum. By virtue of this tool, the U.S. Federal Communications Commission (FCC) announces a date, usually some 30-60 days off, as the deadline for applications to get a no-cost license to use MSS spectrum. Not surprisingly, this technique encourages a large number of companies to apply.

Today they range from mobile communications giant Motorola to newly capitalized Constellation, and from rocket pioneer Orbital Sciences to "intelligent vehicle" innovator Leosat. Major entries from Europe include Russia's Gonets and France's S-80 (both VHF-band LEO) and Inmarsat's p-21 L-band system.

None of the U.S. applicants have anything but experimental licenses from the U.S. FCC. Nevertheless, following past FCC precedents, the FCC will likely authorize all the applicants and leave them to work out technical inter-system coordination arrangements among themselves.

The WARC-92 frequencies have been targeted by the U.S., France and Inmarsat, although Eutelsat or ESA, Japan, Russia, Australia, Mexico and Canada will likely expand into the frequencies before too long. Inmarsat is the only specific satellite system to have laid formal claim to the choicest MSS frequencies created at WARC-92 by a formal, legal filing before the International Telecommunications Union (ITU) (a similar such filing by the U.S. was a hybrid concoction of several companies' plans).

Inmarsat is the leading contender to first use the WARC-92 MSS frequencies because it has legally claimed the right to use them, it is continually building satellites using evermore bandwidth, and it and Qualcomm are the only two existing MSS operators in the world.

Qualcom has no direct interest in the MSS frequencies (although it is a shareholder in U.S. LEO MSS applicant GlobalStar) because its Omnitrac system is designed to operate at non-MSS frequencies in the Ku-band, a frequency band where many television satellites already operate with spare capacity. Both Qualcomm and Inmarsat have over 20,000 existing users.

Since Inmarsat has a regular, ongoing program of building and

launching satellites for MSS, it is logical to expect they will rapidly absorb the WARC-92 MSS frequencies into upcoming satellites so as to expand their markets.

Undoubtedly, other countries and other players will also grasp for WARC-92 MSS spectrum. The U.S. FCC has yet to set a "cut-off date" for WARC-92 MSS spectrum above 1.8 GHz. Once it does, many companies are sure to apply. As observed by more than one speaker, other countries will soon see that if they do not claim MSS spectrum very soon, it will all be gone.

#### Key Factors for Assessing WARC-92 MSS System Prospects

Several speakers highlighted various key factors that will bear on the relative success of all the different players for WARC-92 MSS. These key factors were (1) compatibility, (2) financeability, and (3) flexibility.

(1) Compatibility means the ability of a system to share the frequency spectrum with other MSS systems and with non-MSS radio links. Virtually all of the spectrum allocated to MSS at WARC-92 is already in use in one or more large portions of the world. It is a multi-decade process to evict existing spectrum users. Hence if a system is not compatible, it is unlikely to succeed. Two key indicators of compatibility are "spread spectrum" and "frequency-agility".

(2) Financeability refers to the ability of a system to get funded through satellite construction, launch, and operations.

The history of satellite communications is littered with examples of companies, large and small, which found that their satellite visions were not financeable. Among them are: Comsat's DBS, Geostar's RDSS, and Federal Express' Faxesat, to name but three.

Failure of financeability is inevitably due to an analysis that the profit from the satellite system will be less than its costs, when the profits are discounted by a time-value factor.

The time-value factor for satellites should be high, for the risks of not ever getting to profits are large. The financeability factor therefore works especially hard against expensive satellite systems and protracted implementation schedules, assuming that the profits from all the satellite systems are commensurate. This last assumption may not be valid, however, because a system sponsored by an existing MSS operator (Inmarsat or Qualcomm) or mobile communications manufacturer (Motorola) may be able to achieve much faster customer ramp-up than could a new player such as, for instance, TRW and Orbital Sciences.

(3) Finally, flexibility is a crucial parameter to look for in any MSS system. Flexibility is crucial because the entire MSS environment is likely to change over the 1990's. There will be more spectrum-allocating WARC's, possibly even as soon as 1995. There will be changing patterns of terrestrial competition (rural cellular; personal communications networks). Where there are people, either in cities or on highways there

will be cellular. MSS is engaged in the very same kind of footrace against cellular that DBS fought, and still fights, against cable.

There will be breakthroughs in satellite terminal technology such as electronically steerable arrays at low-cost. Premature lock-in to a specific frequency band, service concept or satellite system could spell doom when the key assumptions change at a new WARC or as a result of breakthroughs akin to Qualcomm's MSS at Ku-band. Flexibility as to technology, markets, even basic business plan may be essential to survive in the MSS arena.

In summary, the Third Satel Conseil Symposium made clear that WARC-92 empowered several new satellite technologies for mobile communications. The differential ability of these technologies and their promoters to succeed depends on frequency compatibility, financial sensibility, and product/service flexibility. MSS initiatives with millions of dollars already spent are in play from Russia's Gonets, France's S-80, America's Orbcom, Inmarsat's Project 21, and Motorola's Iridium. Many other contenders are not far behind. If this type of competition benefits consumers, the mobile communicating public appears to be a very lucky group indeed.

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President, MARCOR, Inc.

*First European Practitioner's Forum, Paris, November 18, 1992*

The European Centre for Space Law held their First Practitioner's Forum on November 18, 1992, at the European Space Agency Headquarters in Paris. The Forum consisted of two panels: the morning's panel offered an overview of actual space law developments and the afternoon's focused on issues in space contracts.

Dr. Karl-Heinz Böckstiegel, Director of the Institute of Air and Space Law at Cologne University, introduced the Forum, noting that it would be a yearly meeting of European practitioners of space law with practice-type topics chosen and substantial time left for general discussion. Mr. Phillip Dann, from the law firm of Bird & Bird, London, began the first panel with an overview of recent developments in Mobile Satellite Communications. He noted that what is happening in the U.S. would have an impact on the rest of the world, particularly in terms of the Federal Communications Commission's unilateral allocation of spectrum for one Low Earth Orbit ("LEO") Satellite System. He queried whether this would mean that the U.S. would have one system and the rest of the world another, since the available spectrum for this type of system cannot accommodate more than two systems. In addition, he foresaw changes in the competitive market structure; competition between existing and future geostationary orbit ("GSO") satellites; between GSO and LEO satellites, and between satellites and existing or potential terrestrial systems. He noted that currently there is a lot of overlap in the various services each is

providing or plans to provide. He also pointed out some of the regulatory problems, for example of allocating radio spectrum for services to users who wish to take equipment from place to place. Dr. *Sa'id Mosteshar*, from the firm of Mosteshar, London, followed with a talk on current happenings in Satellite Telecommunications, noting the U.K. position on class licensing and access to the public switch network, and comparing that to some other nation's positions.

Dr. *Tim Howell*, the Deputy Head of the Space Telecommunications Policy Unit within DG XIII of the European Commission, discussed regulatory and policy developments in the European Community. First, he noted that the directive on mutual recognition of type approval for equipment throughout the Community should probably be approved within a week of the conference and that it would also be applicable to the European Economic Area as well. Second, he discussed the European Court of Justice's ruling which upheld the Commission's ability to make a directive under Article 90 with respect to opening the markets for terminal equipment and for services. Normally directives are passed by the Council of Ministers pursuant to Article 100 of the Treaty of Rome but when state-owned company regulation is in question, Article 90 allows the Commission to make such directives. Third, the directive on mutual recognition of satellite services and network licenses will probably be ready in draft form in January, which would mean that it should be acted upon and in force by the first half of 1993, and then put into effect in 1994. Fourth, he discussed briefly the report on access to the space segment, noting that some countries were pushing to allow direct access to the space segment, instead of forcing private companies to work through member states. Fifth, he noted a report on the industrial impact of liberalization of space-related activities. Sixth, he discussed the politics of the LEO satellites, particularly the FCC's unilateral licensing of a system and also noted that recently five American companies had brought proposals over to the Community for the offering of such services. Seventh, he noted the progress in terms of the liberalization of satellite communication. For example, France and Germany had mutually agreed to recognize licenses between themselves. Moreover, he noted that the United Kingdom, Germany, France, and the Netherlands are allowing "multiple access" to the space segment. In other words, users are not required to use only the national supplier, permitting a choice of space segment suppliers. He also mentioned that some countries were studying the concept of separating the signatories affairs office from the commercial operations offices. Lastly, he discussed some of the suggestions that have been made with respect to possible modifications to EUTELSAT. For example, allowing more than one signatory per country or fully privatizing EUTELSAT and allowing the private companies that provide services to join, *i.e.*, since TELEPORT, Europe, uses 3 transponders, more than some member countries use, TELEPORT, Europe, should perhaps be permitted to join EUTELSAT directly.

Dr. *Winfried Thoma*, the Head of the Contracts Department at the European Space Agency spoke on developments in European Space Agency contracts. He pointed out that one area under current consideration was intellectual property rights, where contracts could provide that the invention and property rights are kept with the contractor, but that the European Space Agency and the Member States would have free rights to use it. Secondly, he noted some of the problems faced at present in terms of cooperation with Russia. For older contract, the law and arbitration situation is unclear, since the arbitrators were to be nominated by the Supreme Soviet. The new contracts between ESA and Russia are now placed in ECUs and Swedish law and the Stockholm Arbitration Rules are applicable. Thirdly, he noted that in terms of the procurement rules, there needed to be incentives for private entrepreneurs. A major problem is not having an index for cost escalations in the space industry. Lastly, he discussed procedure changes which would expedite payment by ESA to contractors and sub-contractors.

At the end of his presentation, a lively discussion ensued on various points raised by the morning panelists. One of the most interesting remarks was the fact that ESA in 25 years has never had to arbitrate a dispute.

The afternoon panel on space contract issues was introduced and moderated by Mr. *Dann*. He framed the questions to be considered as follows. Should law be made by contract or should contractors look to national and international norms? To what extent is contract an adequate mechanism to determine the relations between two parties for outer space matters or do we need national and international law to underlay the space contracts? The panel began with Dr. *Michael Schmittmann*, a partner with the law firm of Heuking Kuhn, Düsseldorf, focusing on various aspects of transponder leases. First, he stated that the applicable law used to be the country that receives the transmission, but that this standard was changing to one where the law would be the country that received the transmission (for example, with respect to transfrontier television transponders within the Community). Second, he turned to the legal nature of the transponder lease: can a user claim "ownership" to a specific transponder or is a transponder lease merely a service agreement. On one hand, it is unimportant for a customer exactly which transponder is used and the customer expects a back-up transponder if problems arise. On the other hand, the customer should identify the exact transponder in the lease. He then gave a quick overview of provisions included in these types of leases: (1) subject matter and term; (2) territorial purview; (3) technical mandates for each of the parties; (4) interruption and monitoring (for service, etc.); (5) the satellite operator warrants that signal power and other technical aspects sufficient for meeting the user's requirements; (6) the satellite operator indemnifies in case of third party claims; (7) force majeure clause; (8) sub-leasing; (9) impact of changes in national and international law on the agreement; (10) jurisdiction; (11) taxation (normally it is not



taxable as long as there are no assets in the country of reception).

Dr. *Steve Kahn*, Head of Rules and Procedures for the Contracts Department of ESTEC, Noordwijk, lectured on public procurement issues. He was of the opinion that there could be a co-ordinated move to standardize government procurement requirements in various areas (not only space) which, in turn, could standardize contracts. Moreover, he noted that public procurement was becoming a separate field in Europe for the first time, although it had been a field in the U.S. for some time. Dr. *Ralph Kroner*, from the firm of Trenite van Doorne, Rotterdam, expounded on the recent case law on problems surrounding launches, summarizing the American cases of *American Satellite Co. v. U.S.* (1991), *American Satellite Co. v. U.S.* (1992), and *Hughes Corp. v. U.S.* (1992).

Dr. *Ian Awford*, from the firm of Barlow, Lyde & Gilbert, London, spoke on Liability Clauses in Space Contracts. He gave a brief overview of the international law on the subject, but opined that generally contracts govern the liability relationship between parties. He discussed waivers, indemnities, subrogation, and other issues that had been raised in several American cases, focusing particularly on *Appalachian Insurance Co. v. McDonnell Douglas* (1984) where the Court enforced a no-fault clause. He stressed that these types of clauses should specify that regardless of negligence, the clause is still operative. Otherwise, the case ends up in court with one party trying to argue that the clause is not operative, because there was extreme negligence.

Finally, Dr. *Jacques Masson*, an insurance broker with Gras Savoye, Paris, explained some important issues in insurance contracts. He provided a summary of the various phases of a launching, pre-launch, launch, and in-orbit, and identified the events and corresponding exposure from an insurer's perspective. He highlighted some contractual aspects of satellite procurement, including: the ground risk being placed on the manufacturer; launch and in-orbit risks being placed on the operator; when the transfer of title takes place; incentive payments for manufacturer depending on satellite's performance in orbit and insurance on those incentives; and reciprocal cross-waivers of liability. He then emphasized some contractual aspects of launch services: best efforts clause, defining precisely the exact point when launching services are complete, third party insurance, and inter-party waiver. Other facts dealt with the insurance policy itself, claim handling, the role of a broker, and the need with respect to each contractual obligation to ascertain that launch insurance begins the second pre-launch coverage stops. In addition, Dr. Masson underscored that insurers have been paying relatively quickly because of reciprocal cross waivers, often within sixty days.

Further discussion ensued at the end of the afternoon panel, and the consensus of those attending the conference was that the speakers and

group discussion had been of an extremely high quality setting a high standard for the future yearly conferences.

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### Comments

#### *The Minsk Space Agreement: A 'Commonwealth in Space'?*

##### 1. Introduction: the CIS and the Minsk Space Agreement

One of the first agreements signed within the new Commonwealth of Independent States (CIS), which was created by the Minsk Agreement of December 8, 1991<sup>1</sup> and the Alma Ata Protocol thereto of December 21,<sup>2</sup> concerned the continuation of the presence of the former Soviet Union in outer space.

The space industry of the former Soviet Union was spread over almost the whole of its territory, covering the area of most of the presently independent republics.<sup>3</sup> Russia is still by far the most important among them. It accounts for the largest part of the industry which is heavily concentrated around Moscow and consists of launchers, satellites, equipment and other items to be used in outer space activities as well as most ground tracking stations, spacecraft control centers and design bureaus. Nevertheless, Ukraine has a significant space industry plus two ground tracking stations at Ternopol and Evpatoria. Kazakhstan is even more important. Although Russia has two launching facilities at Plesetsk and Kapustin Yar, by far the biggest and best placed cosmodrome is that of Bajkonur in Kazakhstan. Other republics are of lesser importance in terms of space activities but their existence in principle for the purpose of space activities must nonetheless be acknowledged.

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<sup>1</sup>. Agreement Establishing the Commonwealth of Independent States (hereinafter "Minsk Agreement"), of Dec. 8, 1991, effective immediately (cf. Arts. 1, 11 and 14). For text, see 31 I.L.M. 143 (1992).

<sup>2</sup>. Protocol to the Agreement Establishing the Commonwealth of Independent States, of Dec. 21, 1991, effective for each of the parties from the moment of ratification (cf. 2nd para.) (which noticeably lacks conformity with the provisions of the Minsk Agreement of which the Alma Ata Protocol is to form an integral part according to the 4th para.). For text, see 31 I.L.M. 147 (1992).

<sup>3</sup>. See e.g. V. Kiernan, *Five Space Agencies Emerge From Soviet Chaos*, SPACE NEWS Dec. 16-22, 1991, at 3, 21; L. David, *The Rush to Buy Russian*, 32 AEROSPACE AMERICA (No. 6, 1992), at 39; S. Chenard, *Twilight of the Machine Builders*, 7 INTERAVIA SPACE MARKETS (No.5, 1991), at 14; C. Covault, *Russians Forge Space Pact, But Military Transition Chaotic*, AVIATION WEEK & SPACE TECHNOLOGY, Jan. 13, 1992, at 21.

Nine of the eleven states participating in the CIS within a week of the final demise of the Soviet Union concluded the Minsk Space Agreement,<sup>4</sup> whereas Ukraine joined in July 1992.<sup>5</sup> The Agreement went into effect instantly,<sup>6</sup> which is rather unique and points to the importance attached by the states concerned to continuation in principle of conducting space activities together. It is within the framework of this Agreement that the future of the space program of the former Soviet Union will be analyzed in legal terms. The following major elements are especially worthy of attention: (a) the organizational structure possibly arising from the Minsk Space Agreement, (b) the programs to be covered by it, (c) the financial framework (both on the expenditure and on the income sides), (d) the question of the infrastructure and the use thereof, (e) some important issues of space law insofar as reflected (and, so far as not reflected, with the consequences thereof) and, finally, (f) the question of accessions to the Agreement.

## 2. The organizational structure

The Minsk Space Agreement does not, to any extent, create an international organization, with independent legal personality at least in terms of municipal legal systems and powers distinct from those of the totality of the 'member states.' At the same time, it must be noted that the Commonwealth of Independent States as such has not developed as yet into a clearly distinguishable international entity either, and seems to present more of a framework for further cooperation and for the respective agreements, than a device itself regulating such cooperation in any considerable measure.

Yet, an embryonic structure is present in the Minsk Space Agreement, just as it is in case of the Commonwealth at large. This embryonic structure is represented by the Interstate Space Council, "which is being formed from empowered representatives of the State-Participants of the present agreement."<sup>7</sup> The statute of the Interstate Space Council is to be ratified by a decision of the heads of government<sup>8</sup> - which at present therefore leaves the embryo somewhat of an empty shell since it is nowhere else to be found in the Minsk Space Agreement.

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4. Signed on December 30, 1991 in Minsk by Azerbaijan, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan and Uzbekistan. Ukraine (at that time) and Moldova abstained from participation. For text, see AEROSPACE DAILY Jan. 7, 1992, at 31-2; *ECSL News* Sept. 1992, at 6-7. See e.g. V. Kiernan, *Minsk Accord Struck On Space*, SPACE NEWS, Jan. 6-13, 1992, at 1, 20; C. Covault, *Russians Forge Space Pact, But Military Transition Chaotic*, *supra* note 3.

5. See E. Kamenetskaya, *Space Activities of Russia and Member States of the Commonwealth of Independent States*, *ECSL NEWS*, Sept. 1992, at 4.

6. Art. 12.

7. Art. 2, 1st sentence.

8. See art. 2, 2d sentence.

However, in view of the actual interdependence of the former Soviet Union's space endeavors and the resulting interdependence in space activities of the states concerned, a kind of community-of-necessity is in existence which is more or less covered by the framework developed in the Minsk Space Agreement. This community could be called a 'Space Commonwealth.' Whether it really is or will eventually develop into such a Commonwealth, in the sense of a juridically structured framework for cooperation in space and space activities, remains to be seen.

### 3. The space programs

The basis of future space research and exploitation within this 'Space Commonwealth' is to be formed by interstate programs,<sup>9</sup> to be coordinated by the Interstate Space Council.<sup>10</sup> This does not mean that states can be active in outer space only in the framework of the Space Agreement: their right to have independent space programs is explicitly confirmed<sup>11</sup> although the states pledged to bring all activities concerning rocket technology within the ambit of the interstate programs.<sup>12</sup> What remains unclear, however, is whether and to what extent programs can be undertaken by less than all ten states of the 'Space Commonwealth' and still fall under the Space Agreement, or whether they rather fall under the term "independent programs."<sup>13</sup>

Moreover, all military and dual purpose (meaning both military and civilian) space research and exploitation programs are to be "ensured by the joint strategic armed forces,"<sup>14</sup> an ambiguous formula which most probably would mean that these joint strategic armed forces ultimately retain responsibility and jurisdiction over such operations, rather than the Interstate Space Council. At the same time, the former would use and cooperate with the latter non-military body in the framework of the Space Agreement.<sup>15</sup> Nevertheless, a precise evaluation on this point will have to await practical or theoretical elaborations.

Finally, as to the activities which are envisaged under the Space Agreement, a difference is made between "interstate programs for space research and exploitation" in Article 4, and "the exploitation of existing and the setting up of new space systems for economic, scientific and military purposes

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<sup>9</sup>. See art. 1.

<sup>10</sup>. See art. 2, 1st sentence.

<sup>11</sup>. See art. 2, 3rd sentence.

<sup>12</sup>. See art. 10, 2d sentence.

<sup>13</sup>. See, e.g., art. 2, 3rd sentence; art. 4, 2d sentence.

<sup>14</sup>. Art. 3.

<sup>15</sup>. Kiernan, *Minsk Accord Struck On Space*, *supra* note 4, at 20, seems to voice such an evaluation more explicitly and less hesitantly. See also Covault, *supra* note 3, at 20.

and the maintenance of the unique testing base" of Article 5.<sup>16</sup> The former seemingly covers a wide range of activities both on the ground and in outer space itself, those of a drawing table and testing character as much as those of an application character, while the latter apparently focuses on large launchers, launching facilities, satellite systems and the "Mir" space station.

In order to draw a clear legal delineation between the programs envisaged under Articles 4 and 5, and account, for instance, for the reappearance in the latter Article of the term "military purposes" which apparently indicates that the Minsk Space Agreement provides for some principles to be followed even by the joint strategic armed forces, it is suggested that the cases under Article 5 be considered, for the time being, as exceptions to those under Article 4.

#### 4. The financial framework

The distinction thus introduced becomes especially important when we turn to the financial issues of interstate cooperation. The costs of programs under Article 4 are to be "financed by means of proportionate contributions by the states participating" in the Minsk Agreement.<sup>17</sup> What proportions would be chosen? The states concerned are committed "to make mutually agreed decisions determining the procedure for assigning proportional financing."<sup>18</sup> However, this commitment does not resolve the question of how, in terms of figures, costs are to be apportioned among the various states. Nor is it entirely clear, from a joint reading of Articles 4 and 7, whether one scheme of distribution of costs (for instance based on the respective GNP's of the states concerned) is to apply, or whether various schemes may be envisaged for different interstate programs or different kinds of interstate programs.

Undoubtedly, for reasons of simplicity and clarity, the first option would be the most preferable. Nonetheless, it is to be noted once more that it remains unclear whether the possibility is envisaged for interstate programs for space research and exploitation to be undertaken by less than the ten states party to the Minsk Space Agreement. In this respect, it certainly is important how the statute on the council, to be ratified by a decision of the heads of government,<sup>19</sup> will look like. It is highly unlikely that anything other than a unanimous vote on a specific program will be allowed to make it an interstate program under the Agreement, since otherwise under Article 4 it would seem that states voting against such a program may yet be forced to pay their share under the prevailing system of distribution of expenditures.

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16. According to the AEROSPACE DAILY version; ECSL NEWS translates this phrase somewhat differently.

17. Art. 4.

18. Art. 7.

19. See art. 2, 2nd sentence.

The aforementioned legal uncertainty has been avoided with respect to programs under Article 5. In such cases, on a specific program "expenditure (...) [is to be] distributed in accordance with the proportionate participation"<sup>20</sup> in the particular program. This would almost be a superfluous tautology, if it did not also cover potential profit gained from such exploitation activities - a clause missing with regard to the other kind of programs, where apparently no profit has been envisaged to arise. Alternatively, the provisions of Article 5 could be seen to apply to Article 4 on this point, too. However, such an application would destroy any clear legal distinction between the two cases covered by the two Articles: the formula "profit gained from space projects"<sup>21</sup> could easily apply to cases under Article 4 as well.

##### 5. The special issue of the infrastructure

If independent programs of states, the only alternatives to interstate programs as defined under the Agreement, are planned to make use of the infrastructure of other states, the interested parties have to determine such use by separate agreements,<sup>22</sup> no doubt providing for a different financial settlement than envisaged under the Minsk Space Agreement. Experience so far seems to confirm the logical financial settlement when a state uses the infrastructure on such occasions: it pays for all expenses plus a little extra.<sup>23</sup> With respect to the interstate programs envisaged, provision is made that they are to be "implemented on the basis of existing space complexes and space infrastructure facilities," just as are those programs which are "being set up."<sup>24</sup> In this respect, the states concerned obligate themselves "not to make decisions or carry out actions which entail the cessation (impediment) of the normal functioning of space centers and facilities in the space infrastructure sited on their territories"<sup>25</sup>.

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<sup>20</sup>. Art. 5. ECSL NEWS translates this phrase as "expenditure (...) [is to be] allocated proportionately among the States Parties to the present Agreement".

<sup>21</sup>. Art. 5.

<sup>22</sup>. See art. 4, 2d sentence.

<sup>23</sup>. See already e.g. V. Kiernan, *Mir Crew Sets Record While Fetching Experiments*, SPACE NEWS, Febr. 24-Mar. 1, 1992, at 1, mentioning that Kazakhstan had, since the demise of the Soviet Union, insisted on payment for the use of search and rescue teams during landings, while adding that for the landing of Mir in March of 1992 charges would amount to 1.5 million rubles, approximately US \$15,000, at the present rate. Moreover, the same writer summarily points to a report by Moscow Radio of February 18 stating that the costs of operating Bajkonur will indeed be shared by republics in the Commonwealth.

<sup>24</sup>. Art. 4; ECSL NEWS translates the second phrase here as "being established." Moreover, according to AEROSPACE DAILY and ECSL NEWS, Article 4 even mentions Bajkonur and Plesetsk by name.

<sup>25</sup>. Art. 10, 1st sentence. ECSL NEWS translates "cessation" as "interruption" on this

## 6. Space law

Space law and, especially, its important responsibility and liability regimes, are also dealt with in the Minsk Space Agreement, though in a summary fashion. The states of the 'Space Commonwealth' are to develop their activities "in accordance with existing international legal norms."<sup>26</sup> While their state responsibility is acknowledged in general, the contents need elaboration in a special agreement.<sup>27</sup> The procedure for assigning "compensation for damages associated with the use of space equipment"<sup>28</sup> also depends upon further decisions. Reference in this respect may be had to the Preamble although this does not provide for a binding legal obligation.<sup>29</sup> However, in view of the dissolution of the Soviet Union, it remains to be seen to what extent the consequences of existing general legal obligations under space law can be changed by the aforementioned provisions. As a preliminary remark, it may be observed that the general principles of state responsibility for national activities which are not in conformity with international space law<sup>30</sup> and liability of a state for damage caused by objects launched by it, with its help, or from its territory or facility,<sup>31</sup> will also apply to these ten states of the 'Space Commonwealth'.<sup>32</sup> The general principles will apply irrespective of the precise content of the Minsk Space Agreement which can only define and modify relations among the ten states themselves.<sup>33</sup> It will also be clear that, the CIS not being a state or a state successor to the Soviet Union, it can never be held responsible or liable under space law for material breaches of obligations or damage occurring, nor will it be able to act as a state of registry and exercise some kind of quasi-jurisdictional authority so long as it

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point.

26. Art. 6.

27. See art. 5, 2d sentence.

28. Art. 7.

29. The Preamble of the Minsk Space Agreement speaks *inter alia* of confirmation of "the need for rigorous observation of international agreements and obligations in the sphere of space research and exploitation earlier taken upon itself by the U.S.S.R." See also Kiernan, *Minsk Accord Struck On Space*, *supra* note 4, at 20.

30. See art. VI, Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (hereinafter Outer Space Treaty), of Jan. 27, 1967, entered into force Oct. 10, 1967; 18 UST 2410, 610 UNTS 205.

31. See art. VII, Outer Space Treaty.

32. Cf. also art. 12, Minsk Agreement: "[t]he High Contracting Parties undertake to discharge the international obligations incumbent on them under treaties and agreements entered into by the former Union of Soviet Socialist Republics."

33. Cf. also art. 13, Minsk Agreement.

does not at least become an international organization.

Also, it is to be observed that both Russia and Kazakhstan, the only two republics with launching facilities and therefore very prone to becoming liable as launching states,<sup>34</sup> are among the ten parties to the Minsk Space Agreement. Their international obligations under Articles VI and VII of the Outer Space Treaty which are of special importance in this respect, are thus reinforced at least in principle by the commitments under the Minsk Space Agreement, especially those in Articles 6 and 7. As to Moldova, although not a party to the Minsk Space Agreement, it is nevertheless bound by the international obligations arising, for instance, under Articles VI and VII of the Outer Space Treaty. The reasons for this are that, firstly, those articles are codifications of customary law valid outside of the treaty framework, and secondly, Articles 12 and 13 of the Minsk Agreement confirm a general duty to abide by international legal obligations applicable to the former Soviet Union. For those four former Soviet republics remaining outside of the Commonwealth framework and its subframework for space activities, namely, Georgia, Lithuania, Latvia and Estonia, even apart from questions concerning state succession to obligations of the former Soviet Union, at least the first remark on customary validity of the Outer Space Treaty's principles would apply.

#### 7. The question of accession

Article 1 of the Minsk Space Agreement allows for accession by other states, though in such a general way<sup>35</sup> that it is not clear whether accession can only be in respect of "the present agreement" as a whole, or whether "the consent of the participating states" would allow for adherence to specific programs only. The latter would point to a considerable measure of flexibility in the setting up of international programs within the CIS which should be judged favorably. So far, nothing has become clear regarding the actual circumstances surrounding the aforementioned accession of Ukraine in July 1992, and the legal form in which it took place. This only reminds us once more that the Minsk Space Agreement is perhaps rather to be seen as a first step toward 'juridification' of the actual developments in the former Soviet Union and as a treaty providing for some broad metajuridical principles, rather than as a clear-cut cooperation agreement. A definitive conclusion in this respect will probably have to wait until things have sorted themselves out and the structure of post-Soviet space activities has become crystallized to a greater extent. This preliminary conclusion becomes all the more forceful in the light of developments that followed the conclusion of the Minsk Space

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<sup>34</sup>. See the definition of art. I(c), Convention on International Liability for Damage Caused by Space Objects (hereinafter Liability Convention), of March 29, 1972, entered into force Sept. 1, 1972; 24 UST 2389, 961 UNTS 197, 10 I.L.M. 965 (1971);

<sup>35</sup>. Art. 11 provides: "[o]ther states can join the present agreement with the consent of the participating states".



Agreement.

### 8. Developments in 1992

The most important developments in terms of space activities since the conclusion of the Minsk Space Agreement on December 30, 1991, roughly fall into three categories: internal-institutional, actual-internal and international-cooperational.

As to the institutional developments taking place on the territory of the former Soviet Union, the most fundamental was the establishment of five space agencies.<sup>36</sup> Three of those were Russian, and on closer look only one of those would qualify as a 'real' (national) space agency: the Russian Space Agency (RSA), the Statute of which was approved by a Decree of April 9, 1992 by the Government of the Russian Federation.<sup>37</sup> It confirms the preponderance of the military while, at the same time, it leaves the question of what role private organizations can play rather unclear. Two other organizations, NPO Energia and Glavkosmos, are somehow supposed to take care of the commercial aspects of Russian space endeavors under the aegis of the RSA; but it remains to be seen to what extent they can be called private companies.

Outside Russia, already in September 1991, the Kazakhstan Space Agency (KSA) was formed,<sup>38</sup> also dubbed Kazakhstan Kosmos.<sup>39</sup> However, little can be said as to its role and functions, as the main Kazakh asset, Bajkonur, still does not appear to be operated under its authority or even by it. Furthermore, in May 1992 the National Space Agency of Ukraine (NSAU) was established.<sup>40</sup> The NSAU's budget and direction will be discussed in the Ukrainian parliament in October 1992. With respect to the latter issue, a similar relationship between NSAU and NPO Yuzhnoye (the factory of Zenit ballistic missiles in Dnepropetrovsk) may be envisaged as between the RSA and NPO Energia/Glavkosmos but, here too, final analysis will have to await later developments.

In general, it may be concluded that the setting up of these agencies and their elaboration in theory, although important, is really no more than a first step on the road toward the creation of a true 'Commonwealth In Space' along

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36. V. Kiernan, *Five Space Agencies Emerge From Soviet Chaos*, *supra* note 3, at 21.

37. For an abbreviated version of the text, see 20 J. SPACE L. 106 (1992). See also *New Russian Space Agency to Compete for Power with Industry*, EUROPEAN SPACE REPORT Febr. 10, 1992, at 1, 5; M.Y. Marov, *The new challenge for space in Russia*, 8 SPACE POL'Y 269, at 273-5 (1992); E. Kamenetskaya, *supra* note 5, at 3-4.

38. V. Kiernan, *Five Space Agencies Emerge from Soviet Chaos*, *supra* note 5, at 21.

39. *New Russian Space Agency to Compete for Power with Industry*, EUROPEAN SPACE REPORT, Febr. 10, 1992, at 1.

40. A. Lawler, *Ukraine Struggles To Keep Its Space Program Alive*, SPACE NEWS, Aug. 17-23, 1992, at 11.

the lines of the Minsk Space Agreement. The example of the RSA<sup>41</sup> points in an interesting direction insofar as military authorities and activities seem to remain inseparable from civilian ones in the CIS framework.

Actual developments in this field likewise seem to provide us with ambiguous conclusions. Thus Ukraine, by its later accession to the 'Space Commonwealth,' has evidently recognized the impossibility to be active in space without its traditional partners in Russia and the launching base in Kazakhstan. On the other hand, historical and psychological reasons (as evidenced, for instance, by the Black Sea Fleet controversy)<sup>42</sup> as well as economic and financial reasons may very well force Ukraine to look elsewhere in terms of cooperation.<sup>43</sup>

Moreover, the most important issue of controversy within the 'Space Commonwealth' seems to have been dealt with in a rather haphazard and reactive fashion. This relates to the preponderance of Russia at the Bajkonur site in Kazakhstan and the apparent absence so far of any substantial Kazakh authority over the base. Meanwhile, it should be noted that for the time being, one way or another, it will remain the military, i.e. the joint strategic armed forces, which will be in control of Bajkonur.<sup>44</sup> In connection with this in May 1992 an agreement was signed in Tashkent by all CIS member states, except Moldova, on the rights pertaining to ground infrastructure, in conformity with the provisions of Articles 5 and 10 of the Minsk Space Agreement. From what is known so far, the strategic forces of the CIS basically remain in control of all ground segment elements, although the property thereof legally has been 'transferred' to the respective republics on whose territories they are situated.<sup>45</sup>

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41. The RSA has at least a well known Director now - Yuri Koptev - and has been provided with a budget for 1992 of about 10 billion rubles (US \$ 100 million), according to V. Kiernan & A. Lawler. See *Koptev Confident About Russian Space Program*, SPACE NEWS, June 15-21, 1992, at 20.

42. This controversy was seen by some as one important reason for Ukraine's not directly joining the 'Space Commonwealth' in the first place. In that sense see, e.g., G. Ojalehto, *In a changing world, civil space pursuits continue*, 32 AEROSPACE AMERICA (No. 6, 1992), at 15.

43. See, once more, Lawler, *supra* note 40.

44. In Tashkent, on May 25, 1992, Russia and Kazakhstan signed an agreement on Bajkonur, more or less transferring the right of property over Bajkonur to Kazakhstan. Cf. Kamenetskaya, *supra* note 5, at 3. However, since no further details have been made public so far, e.g., as to exactly whose (military) forces will be in control, and in view of the fact that Russia will be paying for 94% of Bajkonur's operating costs and earning 85% of eventual profits from trips of foreigners to "Mir" (as against 6% respectively 15% for Kazakhstan), it still remains to be seen what this right of property actually means. See, e.g., P.B. de Selding, *Republics To Share Profits From Mir*, SPACE NEWS, Aug. 10-16, 1992, at 4, 21.

45. See E. Kamenetskaya, *supra* note 3, at 3; De Selding, *supra* note 44, at 4, 21.

### 9. A 'Commonwealth In Space'?

The most undisputed conclusion that can be drawn from actual developments within the CIS in 1992, as revealed by the foregoing summary analysis of the Minsk Space Agreement, is that the traditional interlinkage of various parts of the former Soviet Union, leading to the present dependence of the CIS republics on each other, is a very important, if not indeed the most important aspect of whatever direction the development of the 'Commonwealth In Space' will take. The preponderance of the military, crucial to all the former Soviet Union's space activities, is a forceful example of the reason why little evidence may be found as yet of an emerging framework which consistently conforms to the spirit and principles of the Minsk Space Agreement or its individual articles. *Mutatis mutandis*, the same applies to relations with non-'Space Commonwealth' and non-CIS member states. So far experience has shown, that whatever international cooperation efforts were devised, the partner for third states was not the CIS or the 'Space Commonwealth,' but rather the Russian Federation and its Russian Space Agency and, exceptionally, other individual member states of the CIS. For all practical purposes, Russia and not the Commonwealth of Independent States appears to have taken the place of the former Soviet Union. This conclusion may seem a little rash and not very juridical, but the neglect shown by both US and ESA space officials, for instance, with respect to Ukraine's hardware, efforts and plans,<sup>46</sup> in spite of the potential of that state in terms of its Zenit rockets, scientific satellites and instruments, seems a little too strange to be overlooked. In any case, it is far too early to speak of a true 'Commonwealth In Space' as yet.

On the other hand, at least one positive element can be noted in juxtaposition to these problems: so far, space law did not have to be invoked by third states in order to remind CIS states that their international obligations under Articles 5, 6 and 7 were not kept. The promise apparently made to Kazakhstan<sup>47</sup> on refunding any damage to that republic, arising as a consequence of launching activities from Bajkonur, is a first confirmation of these fundamental principles. Therefore, in the final analysis an evaluation of the importance and meaning of the Minsk Space Agreement and an attendant judgement regarding the existence of a 'Commonwealth In Space' boils down to the old distinction between an optimist and a pessimist: whether a glass is half-

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<sup>46</sup> Cf. Lawler, *supra* note 40.

<sup>47</sup> V. Kiernan, *Minsk Accord Struck on Space*, *supra* note 4, at 20.

empty or half-full, ultimately depends upon your point of view and the comparison you make.

Frans G. von der Dunk

Co-Director

International Institute of Air and Space Law,  
Leiden University, The Netherlands

### Case note

#### *Martin Marietta Corporation v. International Telecommunications Satellite Organization\**

Martin Marietta ("Marietta") contracted to launch a satellite for the International Telecommunications Satellite Organization ("INTELSAT"). As a result of Marietta's faulty wiring, the satellite failed to properly separate from the launching device. Although INTELSAT ultimately achieved separation, the process of doing so (which involved the separation of the satellite from its booster rocket) placed the satellite in a useless orbit. In accordance with the contract, Marietta successfully performed a second launch of another satellite.

Martin Marietta sought a declaratory judgment disavowing any liability arising out of the unsuccessful launch, and INTELSAT counterclaimed for breach of contract, negligence, gross negligence, and negligent misrepresentation. Marietta subsequently filed a motion to dismiss the counterclaims for failure to state a claim upon which relief can be granted. The district court agreed, and dismissed all of INTELSAT's claims.

#### I. *Relevant Contractual Provisions*

Article 21 provided the contract to be governed under Maryland law. In Article 2, Marietta agreed to "make its Best Efforts to furnish Launch Services for the purpose of delivering INTELSAT's payload into orbit." Article 1.2 defined best efforts as "diligently working in a good and workman-like manner as a reasonable, prudent manufacturer of launch vehicles and provider of Launch Services." Article 6.1 stated "INTELSAT may request a Replacement Launch in the event that following any Launch under this contract, the Titan III Mission or the Payload Mission has not been accomplished for any reason." Under Article 6.7, a replacement launch was to be "the sole and exclusive remedy of the Buyer from Martin Marietta in the event the Titan III mission fails for any reason." Article 17 involved the allocation of certain risks between INTELSAT and Marietta.

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\* 1992 U.S. App. LEXIS 26918

Article 17.5.1 provided:

Martin Marietta and INTELSAT agree that, with respect to injury to or death of persons involved in, or damage to property used in connection with, Launch Services to be furnished under this Contract, neither Party will make any claim against the other..., and each Party shall bear its own risk of loss with respect to injury to or death of its own employees or damage to its own property howsoever caused.

Article 17.6, entitled "Limitation of Liability," stated:

Martin Marietta's liability to INTELSAT ... whether or not arising under contract, or in negligence, strict liability, or under any other theory of tort or liability, shall not include any loss of use or loss of profit or revenue or any other indirect, special, incidental or consequential damages. In no event shall Martin Marietta's liability to INTELSAT for any claim arising out of a particular launch Services exceed the price for that Titan III Launch Services to be paid by INTELSAT ..., provided however that nothing in this paragraph shall affect any right on INTELSAT to a Replacement Launch ... under Article 6 ...

## II. *Breach of Contract Claim*

The court rejected the lower court's finding that failure of the satellite to separate from the rocket was a "mission failure" limiting INTELSAT's remedy to a replacement launch. The court found no definition of "mission failure" in the contract. In light of both this and INTELSAT's argument that its claim was not for mission failure, but for failure of separation of the Titan III payload and booster, the court concluded that the meaning of "mission failure" was subject to ambiguities.

The court also rejected the lower court's finding that the "Limitation of Liability" provision in Article 17 unambiguously barred any contract claim other than the replacement launch remedy in Article 6. INTELSAT argued that since Article 17 recognized the possibility of other claims, an Article 6 replacement launch could not be a sole remedy, especially when Article 17 governed the allocation of risks between the parties "notwithstanding any other provision." Marietta's justification for this discrepancy was that Article 6 applied only to post-launch damages, because Article 6 only applies "following any launch.", whereas Article 17 applied only to pre-launch damages. However, the court noted that the contract never referred to "pre-launch" or "post-launch" damages, and concluded that the discrepancy between the two articles along with the

uncertain meaning of "mission failure" created ambiguities precluding dismissal of INTELSAT's breach of contract claim.

### III. *Gross Negligence Claim*

The lower court agreed with INTELSAT that, under Maryland law, a party to a contract cannot waive liability for gross negligence. However, the lower court held that the Congressional intent in enacting the 1988 Amendments to the Commercial Space Launch Act ("CSLA") was to preclude claims of gross negligence in contracts such as the one at issue. The court rejected this conclusion, noting that the contract was signed in 1987, more than one year before Congress passed the CSLA Amendments. Even if the Amendments could apply retroactively, the court said, neither the language or the legislative history of the CSLA Amendments reflected a Congressional intent to protect parties from liability for gross negligence. Therefore, the court overturned the dismissal of INTELSAT's gross negligence claim.

### IV. *Negligence and Negligent Misrepresentation Claims*

The court upheld the dismissal of INTELSAT's negligence and negligent misrepresentation claims. As for INTELSAT's negligence claim, Maryland law does not create a tort duty of due care independent from the parties' contractual relationship where no relationship of special trust exists and both parties are equally sophisticated. As for INTELSAT's negligent misrepresentation claim, INTELSAT put forth two arguments, both of which were rejected by the court.

First, INTELSAT argued that the "Replacement Launch" remedy should not be applied because "misrepresentation" included "negligent misrepresentation", and under Maryland law contractual limitations on liability will not be enforced upon a showing of fraud, misrepresentation, or other unconscionable conduct. The court dismissed this argument, stating "negligent misrepresentations do not rise to the level of fraud, overreaching, or unconscionable conduct."

Second, INTELSAT argued that Maryland law invalidates an exclusion of remedy provision when one party's misrepresentations influence the other to take an action which causes the provision to take effect. Since INTELSAT's consent to separate the satellite from its booster rocket activated the "Replacement Launch" provision and was made in reliance on Marietta's post-contract misrepresentations, INTELSAT argued that the provision should be invalidated. The court rejected INTELSAT's interpretation of Maryland law, stating that such a provision is invalidated only where the misrepresentation induced the other party "to enter" a contract. Since INTELSAT relied on statements made after the parties contracted, the court concluded that INTELSAT's negligent misrepresenta-

tion claim was without support and was properly dismissed.

Michael A. Gorove\*

## Congressional Developments

### *Legislative Highlights*

Before its adjournment, Congress enacted the Land Remote Sensing Policy Act of 1992.\*\* which provides for the transfer of the Landsat program from the Department of Commerce to an integrated program management involving the Department of Defense and NASA and appropriates funds for Landsat 7, slated for launch in 1997. While Eosat's role as commercial marketer of Landsat 4, 5 and 6 imagery remains basically unaffected, the legislation ensures that Landsat remains an unclassified program that operates according to the principles of open skies and nondiscriminatory access. Accordingly, unenhanced data from Landsat 7 is to be made available to all users at the cost of fulfilling user requests. Development of the remote sensing market and the provision of commercial value-added services based on remote sensing data is to remain exclusively the function of the private sector. Congress also determined that it was in the best interest of the United States to maintain a permanent comprehensive Government archive of global Landsat and other land remote sensing data for long-term monitoring and study of the changing global environment.

In another action also just before its adjournment, Congress passed the 1993 NASA authorization bill\*\*\* which, *inter alia*, extended to January 1, 2000 U.S. government insurance coverage for damage caused by launch accidents, a provision which was to run out in 1993 under the 1988 Amendment to the Commercial Space Launch Act. Currently, the Department of Transportation sets the amount of private insurance that a company must have for commercial launches and the government pays the cost above that amount up to a limit of \$1.5 billion.

In order to protect proprietary rights of companies that work with NASA, the law authorizes the Agency to deny release of information that would be a trade secret. Furthermore, the legislation grants NASA and the National Oceanic and Atmospheric Administration authority to assure private companies that they will be paid termination liability if the government terminates a service contract for its convenience. This is to make financing and insuring easier.

Problems with the Hubble Space Telescope prompted Congress to

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\* Boston University Law School.

\*\* The bill was signed by the President on Oct. 28, 1992. See P.L.102-555.

\*\*\* The bill was signed by the President on Nov. 4, 1992. See P.L.102-588.

call on NASA to assess the need for negative fee incentives and warranties to protect the government in case of unsatisfactory work by contractors. Also, NASA is to begin a two-year demonstration program to award vouchers for the payment of commercial launch services for the purpose of launching payloads funded by the Office of Commercial Programs within NASA.

### Short Accounts

#### *International Academy of Astronautics Academy Day*

A special Academy Day was held by the International Academy of Astronautics (IAA) on August 27, 1992, prior to the official opening of the World Space Congress. Convening at the U.S. National Academy of Sciences, more than 180 registered participants listened with interest as *George Mueller*, President of the IAA, announced the formation of an International Space Exploration Institute (ISEI). Because of the wide contacts of the IAA's members through all of the spacefaring nations and the leadership positions that many of them hold, it was felt that the Academy was in a unique position to initiate such an Institute. The purpose of the ISEI is "to advance the exploration of the solar system, to foster international cooperation in the political and societal implications of space exploration, to provide a forum for the coordination of international space activities, to formulate viable strategies for sharing work between international partners and to provide unbiased objective advice and critiques to the agencies and governments involved in Space Exploration."

Reviews on the status of on-going cosmic studies were presented by *Hermann Koelle* (Germany) regarding an international lunar base, by *George Morgenthauer* (USA) on Mars, by *Arnoldo Valenzuela* (Argentina) on small satellites, and by *Walter Flury* (Switzerland) and *Darren McKnight* (USA) on space debris. *Michael Yarymovych*, IAA Vice President, then provided a review and discussion of the IAA long range plan. The twelve scientific committees of the IAA projected their goals and objectives through 1997 and the reports were provided to the participants.

During the afternoon, following opening remarks by *Frank Press*, President of the U.S. NAS and *George Mueller*, President of the Academy, the 10th IAA Scientific Lecture on "Human Adaptability to the Space Environment" was jointly presented by *Carolyn Leach-Huntoon*, (USA), a Life Scientist at the Johnson Space Flight Center, and *Oleg Gazenko* (Russia). That evening the annual IAA Awards Presentation took place at which Book Award Citations were presented to Professors *Carl Q. Christol* for Space Law, Past, Present, and Future (Kluwer) and *Stephen Gorove* for Developments in Space Law - Issues and Policies (Nijhoff).

Prof. Margaret J. Gorove  
Corresponding Member, IAA



*Moot Court Competition Highlights World Space Congress Special Activities Day*

The Association of the U.S. Members of the International Institute of Space Law (AUSMIISL) sponsored a Moot Court Competition on September 2, 1992 during the World Space Congress in Washington, D.C. This event was the brainchild of the late *John T. Stewart, Esq.*, a partner in the Washington law firm of *Zuckert, Scoutt, and Rasenburger*.

The competition dealt with a hypothetical space law problem. The final round took place at the Georgetown University Law Center. The court was judged by a tribunal from the International Court of Justice, consisting of IISL President Judge *Manfred Lachs*, Judge *Gilbert Guillaume* and Judge *Stephen Schwebel*. The winning team consisted of *Stanimir Alexandrov* and *Tod Cohen* of the National Law Center, Washington. The other team, also from the same school, was composed of *Stephen Hawk* and *Peter Borys*. Since this was a pilot program, the competition was open only to Washington area schools. Georgetown, George Washington, and American Universities took part in the initial round.

The preliminary briefs were judged by Professors *Hamilton DeSaussure*, *Glenn Reynolds*, *Paul Uhler*, *Bruce Kraselky*, and *Janice Bellucci*. The results were very close.

Given the popularity of this competition, plans have been made to continue the moot courts in the future. Teams representing the United States and Europe should compete during the next IISL colloquium.

*F. Kenneth Schwetje*  
President, AUSMIISL

*"Law and Outer Space," Fourth Annual Symposium*

This Symposium, which has become a part of annual events focusing on business opportunities related to space activities, was held October 16-17, 1992 in Washington D.C. under the sponsorship of the Georgetown University Law Center Space Law Group, the Federal Bar Association and the ABA Aerospace Law Committee.

*Irving Goldstein*, the recently appointed Director General of INTELSAT, was the keynote speaker. He described the comprehensive global satellite communications services provided by INTELSAT. He also noted the increasing criticism of the international organization which has a mandate to operate in a businesslike way. The unique nature of INTELSAT as an international organization is viewed by some as being anticompetitive. However, Mr. *Goldstein* responded to this criticism by pointing to INTELSAT's mandate to make satellite communication available to all nations on a global and nondiscriminatory basis. He also noted that INTELSAT is a major customer of manufacturers of satellites and launch

companies. INTELSAT recently solicited proposals for new launch vehicle services for additional satellites.

Four panels followed Mr. *Goldstein's* speech:

(1) *Paul G. Dembling* moderated a panel on current regulatory, legislative and litigation issues. *Phillip B. Bostwick* discussed recent litigation regarding reciprocal waiver provisions and the early terminations of Westar IV and V. *June W. Edwards* described recent legislative and regulatory developments creating a new attitude at NASA which favors cooperation with the private sector.

(2) *Pamela Meredith* moderated a panel on "the legal and business steps a U.S. company must take to place a commercial telecommunications satellite in operation." *Martin Rothblatt* spoke about satellite business planning. *James G. Ennis* talked about FCC licensing and ITU registration. *Michael F. Fink* addressed procurements of satellites and launches. Finally, Dr. *Darren McKnight* described the business dangers of space debris.

(3) *John E. O'Brien* moderated a panel on futuristic contracting approaches to doing business in space. *Edward A. Frankle* talked about new procurement contracts in global change research, and *Don G. Bush* discussed future procurement contracting in space exploration initiatives.

(4) *Jennifer A. Smolker* moderated a panel on aerospace trade issues. The panelists included representatives of typical parties in international trade contracts. *Douglas Heydon* described the European perspective, *Kenneth M. Peoples* presented the perspective of the State Department, Office of Trade Controls. *William B. Wirin* described the Russian trade perspective, and *Jerold S. Howe* discussed the U.S. industry point of view.

The luncheon address was given by *Donald K. "Deke" Slayton* who described experiences typical to new space business enterprises.

Unique to these annual symposia is the second day program, a competition sponsored by COMSAT which this year was named in honor of *John T. Stewzart, Jr.*, who had been the program director of the first three annual symposia. It was moderated by *F. Kenneth Schwetje* and included presentations of selected student papers on various space law topics before a panel of three judges, consisting of Professors *Hamilton DeSaussure*, *Stephen Gorove* and *Paul B. Larsen*.

*Paul B. Larsen*

Coordinator

Fourth Annual Symposium  
on the Law of Outer Space

#### *Other Events*

"World Space Programs and Fiscal Reality" was the theme of the 30th Goddard Memorial Symposium of the American Astronautical Society held April 9-10, 1992 in Alexandria, Virginia.

Aerospace planes, space stations, aerospace education, unmanned space exploration, and lunar and Mars projects were the topics for discussion at The International Aerospace Convention held in Huntsville, Alabama, July 16-20, 1992.

Europa Telecom 92 took place in Budapest on October 12-17, 1992.

The first Telecommunication Development Conference for the Arab states was held in Cairo from October 25 to 29, 1992 with the participation of 17 countries in the region. It adopted the Cairo Declaration\* which established a number of telecommunication goals for the Arab states.

The Centro de Investigacion y Difusion Aeronautico - Espacial (CIDA-E) organized an international space law Colloquium October 30, 1992 in Montevideo on the occasion of the International Space Year. Presentations were made by Professors *Carl Q. Christol*, *Aldo Armando Cocca*, and *Manual A. Ferrer*.

The Centre for Research in Air and Space Law of McGill University in Montreal sponsored a Symposium on "Outer Space in the 1990s: The Role of Arms Control - Security, Technical and Legal Implications" on November 11-13, 1992. The program of the 3-day event was organized by the Institute's Director Emeritus *Nicolas M. Matte* and expected legal participants included Professors *Paris Arnopoulos*, *Stephen Gorove*, *Ram Jakhu*, *Mikhail T. Lyssenko*, *Ivan Vlasic* and Dr. *Lucy Stojak*.

The Asia-Pacific ISY Conference - The Earth in Space was held on November 16-20, 1992, in Tokyo, Japan. Among its objectives was to demonstrate how space data can provide information on global change and to discuss possibilities for space activities in the 21st century.

#### *Brief News*

A newly discovered galaxy, located 2 billion light years from the Milky Way radiates as much energy as a trillion suns and may have a black hole at its center with a mass of 100 million suns.

There were 138 satellites launched in 1991...**Discovery's** most recent flight on December 1, 1992 may be the last of military satellites. On board experiments include those relating to space made antibiotics and the risks created by space junk. When **Atlantis** returned to earth last spring it had two craters on its right wing which is thought to have been caused by impact with a relatively large piece of debris. The "NASA Management Instruction 1700" which sets out internal policy on space debris may eventually serve as a model for discussion on the international level...The **Mars Observer**, the first U.S. Mars probe since Viking 2 in 1975, was launched on September 25, 1992 by a Titan III rocket and is expected to reach Mars late next August....The space shuttle **Endeavor** retrieved, repaired and deployed a stranded INTELSAT communications satellite and

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See Current Documents in this issue of the JOURNAL OF SPACE LA.W.

made history with a first three-person spacewalk....On the space shuttle **Columbia's** recent mission in October, the astronauts deployed a small satellite, built by the **Italian Space Agency**, to reflect laser beams as an aid for scientists on the ground to measure movements of the Earth's crustal plates and better understand earthquakes. NASA's **Space Exploration Initiative** involving two lunar missions became victim of Congressional freeze....**Spacehab**, a commercially developed pressurized compartment to carry people and equipment, is slated to fly on the shuttle in April 1993....NASA and the **Russian Space Agency** signed agreements on human space flight and Mars exploration.\*

**INTELSAT** is looking at possible use of inter-satellite links in LEO and GEO....**INMARSAT 3** is expected to be launched in late 1995 on a Russian Proton booster at less than half the price of a Western launcher....The organization plans to move ahead with handheld telephone services by 2000....ESA priorities are focused on earth observation for environmental purposes....Azerbaijan, Bosnia, Croatia, Estonia, Herzegovina, Moldova, and Slovenia joined the **I.T.U.**, bringing its membership to 174 countries.

A **Swedish** satellite which carried a U.S.-built sensor and instruments from Sweden, Germany, Canada and France was launched by a **Chinese Long March 2-C** rocket....Hispasat IA, **Spain's** first commercial satellite, was launched Sept. 10, 1992 on an Ariane 4 booster....By 1995, demand for the use of small satellite dishes (**VSATs**) for the exchange of business data and communications is expected to grow substantially in **Europe**. Cost saving DBS service could begin by mid-1994....The University of Rome is suing the **Italian Space Agency** for money the University claims the Agency owes in connection with the former's plans to upgrade existing Scout rockets.

#### *B. Forthcoming Events*

The First European Conference on **Space Debris** organized by **ESA** will be held on **April 5-7, 1993** in **Darmstadt, Germany**.

**Singapore** will host the **Asia Telecom 93** event on **May 17-22, 1993**.

The **1993 Colloquium** on the Law of Outer Space will be held **October 16-22, 1993** in **Graz, Austria**. Topics to be discussed include: (1) Legal aspects of space activities of organizations of the U.N. system and other international organizations (e.g. ICAO, WMO, WHO, FAO, IAEA, ITU, etc.); (2) Adjudication and arbitration of disputes regarding space activities; (3) Legal aspects of space insurance; (4) Recent legal developments with special emphasis on nuclear power sources.

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## Reviews

*Peaceful and Non-Peaceful Uses of Space - Problems of Definition for the Prevention of an Arms Race*, edited by Bhupendra Jasani. United Nations Institute for Disarmament Research. Taylor and Francis, New York 1992, pp. 179.

The United Nations Institute for Disarmament Research (UNIDIR) was established by the U.N. General Assembly in 1980 as an autonomous institution within the framework of the United Nations for the purpose of conducting independent research on issues of disarmament and related problems. This book follows UNIDIR's 1987 publication entitled "Disarmament: Problems related to Outer Space" which dealt with the then current military uses of outer space, the possibilities of space arms development, the governing legal regime and proposals by states to prevent an arms race in outer space.

This collection of individual essays, as suggested by its title, deals with definitional problems and addresses such vital issues as the meanings of "outer space," "peaceful purposes," "space weapons," including their "components and subcomponents," "non-dedicated space weapons," and the various forms and modes of "testing." Lastly, the book touches upon "international verification" as an indicator of "peaceful" uses of outer space.

It is not possible within the brief confines of a book review to provide a detailed assessment of a collection of essays on such a difficult but vitally important topic as arms control in outer space. However, a few observations in the spirit of constructive criticism may be in order. For instance, as to the discussion of the meaning and delimitation of outer space, it is surprising to find no appropriate reference to the generally accepted customary rule international space law that earth orbiting satellites move in outer space, therefore that area, and the area beyond it, is recognized as being a part of outer space. Inasmuch as this area starts at a height of about 100 kilometers, a greater degree of precision with respect to delimitation may not be essential for the categorization of most weapons.

In relation to the discussion of "peaceful purposes," the conclusion arrived at is that in future agreements the phrase should either be defined or its use entirely avoided. As noted by one of the contributors, Prof. I. Vlasic (p.47, n.), this reviewer proposed at the ILA's Warsaw Conference (and many times before that) that it would be much better to identify both the permissible and the prohibited activities, a practice which had in part been followed in the 1960-s by the drafters of the Outer Space Treaty who enumerated certain activities as prohibited and others as permissible in relation to the Moon and other celestial bodies. This practice was also

followed, in part, by the drafters (including the space powers) of the Moon Agreement which, mostly for reasons unrelated to arms control, has not been ratified by them. In this connection, one may certainly wonder why no serious suggestion or attempt appears to have been made to revive interest in the respective arms control provisions for possible consideration, as frequently suggested in the past by this reviewer.

Notwithstanding its negative aspects, the book contains competently written essays dealing with a vital area and, as such, should be of interest to both the specialist as well as the general reader.

Prof. Stephen Gorove  
Chairman, Ed. Bd.,  
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*Space Safety and Rescue 1990*, edited by Gloria W. Heath, American Astronautical Society, Science and Technology Series, vol. 78. Univelt, San Diego 1991, pp. 222.

*International Space Year in the Pacific Basin*, edited by Peter M. Bainum and others. American Astronautical Society, Advances in the Astronautical Sciences Series, vol. 77. Univelt 1992, pp. 782.

These volumes published in two different series of the American Astronautical Society (AAS) do not deal with legal issues of space exploration and use. They are addressed to the scientific community. Nonetheless, they are important for lawyers and policy makers in dealing with issues where interdisciplinary understanding is not only helpful but is frequently a must.

The first book contains the papers presented at a Symposium on Space Safety and Rescue of the International Academy of Astronautics held in conjunction with the 1990 IAF Congress in Dresden and covers various aspects of safety concern as they relate particularly to manned spacecraft. For instance, it is pointed out that for the Space Station Freedom, fire represents a very serious hazard and requires an understanding of its behavior in low gravity environment which is quite different from that under normal conditions. Apart from safety issues, the book also deals with issues of more immediate interest to lawyers and policy makers, such as those relating to the impact of space activities on the environment and the dangers, including collision hazards, arising from orbital debris.

The second book covers the proceedings of the Fourth International Space Conference of Pacific Basin Societies, entitled "International Space Year in the Pacific Basin," held November 17-20, 1991, in Kyoto, Japan. Among the topics discussed were: the International Space Year and national space programs; benefits from space for society; Pacific spaceports; manned space programs; Moon and Mars exploration; space debris; space transportation; guidance control and communications; remote sensing; astrodynamics and large space structures. Also included are the papers presented at an international student conference. While several topics, such as space debris, manned space flight, spaceports, moon and Mars

explorations, remote sensing, etc. discussed in the two AAS books, have clear-cut legal relevance to much of the scientific discussion, it is unfortunate that there has been virtually no legal input to determine what the relevant laws are and how they should be adjusted if necessary in light of the scientific and technological developments. It is hoped that future symposia will not lose sight of the interdisciplinary nature of many of the issues that outer space presents as well as of the importance of joint international programs and policies which should be paid more attention to, especially when the conference is to commemorate the International Space Year.

Prof. Stephen Gorove  
Chairman, Ed. Bd.  
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*Space Policy: An Introduction*, by Nathan C. Goldman. Iowa University Press/AMES 1992, pp. X, 321.

The author, an adjunct professor at the University of Houston School of Law, examines in six parts of this book the political and technological setting in which the history and development of space policy takes place. Covering both the international and the domestic developments, he gives a broad overview of space policy formation in light of societal, technological and political underpinnings. Focusing on the history of space development, he examines the environment in which space policy is made, the roles of government agencies, the civilian and military implications and the space development programs that result from policy making.

While the book provides a good introductory reading to newcomers in the field of space policy, it is somewhat of a drawback that little attention is given to the environmental effects of space activities which have become of increasing concern to scholars, scientists, and policy makers.

*Die Transatlantische Raumstationskooperation - Der rechtliche Rahmen einer langfristigen multinationalen Zusammenarbeit*, by Birgitta Staudt. Europäische Hochschulschriften, European University Studies. Peter Lang, Frankfurt am Mein 1992, pp. 149.

This paperback, an outgrowth of a doctoral dissertation at the Faculty of Law of the University of Cologne, deals with the legal framework of multinational transatlantic cooperation relating to the development of a permanently manned civil space station. It traces briefly the background and negotiating history, the European, U.S., Canadian and Japanese contributions and reviews the provisions of the relevant international legal instruments, including the Intergovernmental Agreement (IGA) and the memoranda of understanding, as well as the latter's form and legal nature. Topics include issues of management and decisionmaking, responsibility, "exclusively peaceful uses," patents, jurisdiction and

control, intellectual property, responsibility, criminal law, transportation, communication, settlement of disputes, financing, treatment of dates, goods in transit, consultations and settlement of disputes.

While the book contains a bibliography and extensive annotations, it has no index nor does it include the text of the IGA or some of its relevant provisions. Also, the potential saleability of the book would likely have increased in the Anglo-Saxon community, if a brief English summary of each section had been included.

*The Future of Satellite Communications*, by George A. Coddington, Jr. Westview Press 1990, pp. 208.

This paperback, an outgrowth of a research project at the Center for Space and Geosciences Policy of the University of Colorado, starts out with a discussion of the advantages of satellite communications and the challenges posed by fiber optic cable. It goes on to review relevant policies during the early years of attempted global U.S. monopoly and its aftermath of global competition. The remainder of the book deals with the international allocation by the I.T.U. of space resources and their domestic assignment. This informative and well annotated study also includes a list of frequencies assigned to satellite communication and a 1989 satellite performance chart.

*The United Nations' Efforts to Outlaw the Arms Race in Outer Space - A Brief History with Key Documents*, by P.K. Menon. Studies in World Peace, vol. 1. The Edwin Meller Press 1990, pp. 209.

Following a bird's eye glance at "Disarmament in Perspective" in which the author distinguishes "disarmament" from "arms control," the book sketches the military uses of outer space and their legality before reviewing some of the relevant treaty provisions, UN attempts and U.S.-U.S.S.R. bilateral discussions on space arms control in the earlier part of the 1980-s. Unfortunately, the textual discussion, including citations, is limited to 87 pages. The rest of the book is taken up with the bibliography, appendices and index.

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*Interavia Space Directory 1992-93*, edited by Andrew Wilson. Jane's Information Group 1992, pp. 654.

This directory contains a powerhouse of extremely useful information concerning a multitude of public and private entities and their activities pertaining to outer space.

The book opens with a chronology of space events in 1991-92. It continues by providing essential data concerning satellite launches, U.S



and CIS/USSR astronauts and cosmonauts and their extravehicular activities. It adds a chronology of solar system exploration and a listing of geosynchronous satellites. These space logs are followed by a review of national and international space programs, military space, launchers, and communications. Also covered are Satcom ground segment and contractors, navigation, earth observation, and microgravity. Lastly, a lot of useful information on World Space Centres, the solar system and space industry and a host of illustrations round out the picture.

*European Space Directory 1992, Seventh edition.* Sevig Press, Paris 1992, pp. 478.

This is a handy directory for people involved in the space business and those needing quick information about Who's Who. in Space, including space companies and institutions in Europe and North America. The book has a buyer's guide, an alphabetical listing of companies and institutions as well as an index to advertisers.

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*CONGRESS*

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### Errata

The Current Document's page number in the Table of Contents of Vol. 20, No. 1. should be 102 and not 202, and the running head on pp. 36-88 should be Vol. 20, No. 1. and not Vol. 20, No. 2.

I.

Set of principles recommended for adoption by the  
General Assembly at its forty-seventh session

Doc. A/47/20

PRINCIPLES RELEVANT TO THE USE OF NUCLEAR POWER  
SOURCES IN OUTER SPACE

Preamble

The General Assembly,

Recognizing that for some missions in outer space nuclear power sources are particularly suited or even essential due to their compactness, long life and other attributes,

Recognizing that the use of nuclear power sources in outer space should focus on those applications which take advantage of the particular properties of nuclear power sources,

Recognizing that the use of nuclear power sources in outer space should be based on a thorough safety assessment, including probabilistic risk analysis, with particular emphasis on reducing the risk of accidental exposure of the public to harmful radiation or radioactive material,

Recognizing the need, in this respect, for a set of principles containing goals and guidelines to ensure safe use of nuclear power sources in outer space,

Affirming that this set of Principles applies to nuclear power sources in outer space devoted to generation of electric power on board space objects for non-propulsive purposes, which have characteristics generally comparable to those of systems used and missions performed at the time of the adoption of the Principles,

Recognizing that this set of Principles will require future revision in view of emerging nuclear power applications and of evolving international recommendations on radiological protection,

Adopts the Principles Relevant to the Use of Nuclear Power Sources in Outer Space as set forth below.

Principle 1. Applicability of international law

Activities involving the use of nuclear power sources in outer space shall be carried out in accordance with international law, including in particular the Charter of the United Nations and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. a/

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a/ General Assembly resolution 2222 (XXI), annex.

Principle 2. Use of terms

1. For the purpose of these Principles, the terms "launching State" and "State launching" mean the State which exercises jurisdiction and control over a space object with nuclear power sources on board at a given point in time relevant to the principle concerned.
2. For the purpose of principle 9, the definition of the term "launching State" as contained in that principle is applicable.
3. For the purposes of principle 3, the terms "foreseeable" and "all possible" describe a class of events or circumstances whose overall probability of occurrence is such that it is considered to encompass only credible possibilities for purposes of safety analysis. The term "general concept of defence-in-depth" when applied to nuclear power sources in outer space considers the use of design features and mission operations in place of or in addition to active systems, to prevent or mitigate the consequences of system malfunctions. Redundant safety systems are not necessarily required for each individual component to achieve this purpose. Given the special requirements of space use and of varied missions, no particular set of systems or features can be specified as essential to achieve this objective. For the purposes of paragraph 2 (a) of principle 3, the term "made critical" does not include actions such as zero-power testing which are fundamental to ensuring system safety.

Principle 3. Guidelines and criteria for safe use

In order to minimize the quantity of radioactive material in space and the risks involved, the use of nuclear power sources in outer space shall be restricted to those space missions which cannot be operated by non-nuclear energy sources in a reasonable way.

1. General goals for radiation protection and nuclear safety

(a) States launching space objects with nuclear power sources on board shall endeavour to protect individuals, populations and the biosphere against radiological hazards. The design and use of space objects with nuclear power sources on board shall ensure, with a high degree of confidence, that the hazards, in foreseeable operational or accidental circumstances, are kept below acceptable levels as defined in paragraphs 1 (a) and (c).

Such design and use shall also ensure with high reliability that radioactive material does not cause a significant contamination of outer space.

(b) During the normal operation of space objects with nuclear power sources on board, including re-entry from the sufficiently high orbit as defined in paragraph 2 (b), the appropriate radiation protection objective for the public recommended by the International Commission on Radiological Protection shall be observed. During such normal operation there shall be no significant radiation exposure.

(c) Nuclear reactors shall use only highly enriched uranium 235 as fuel. The design shall take into account the radioactive decay of the fission and activation products.

(d) Nuclear reactors shall not be made critical before they have reached their operating orbit or interplanetary trajectory.

(e) The design and construction of the nuclear reactor shall ensure that it can not become critical before reaching the operating orbit during all possible events, including rocket explosion, re-entry, impact on ground or water, submersion in water or water intruding into the core.

(f) In order to reduce significantly the possibility of failures in satellites with nuclear reactors on board during operations in an orbit with a lifetime less than in the sufficiently high orbit (including operations for transfer into the sufficiently high orbit), there shall be a highly reliable operational system to ensure an effective and controlled disposal of the reactor.

### 3. Radioisotope generators

(a) Radioisotope generators may be used for interplanetary missions and other missions leaving the gravity field of the Earth. They may also be used in Earth orbit if, after conclusion of the operational part of their mission, they are stored in a high orbit. In any case ultimate disposal is necessary.

(b) Radioisotope generators shall be protected by a containment system that is designed and constructed to withstand the heat and aerodynamic forces of re-entry in the upper atmosphere under foreseeable orbital conditions, including highly elliptical or hyperbolic orbits where relevant. Upon impact, the containment system and the physical form of the isotope shall ensure that no radioactive material is scattered into the environment so that the impact area can be completely cleared of radioactivity by a recovery operation.

### Principle 4. Safety assessment

1. A launching State as defined in principle 2, paragraph 1, at the time of launch shall, prior to the launch, through cooperative arrangements, where relevant, with those which have designed, constructed, or manufactured the nuclear power source, or will operate the space object, or from whose territory or facility such an object will be launched, ensure that a thorough and comprehensive safety assessment is conducted. This assessment shall cover as well all relevant phases of the mission and shall deal with all systems involved, including the means of launching, the space platform, the nuclear power source and its equipment and the means of control and communication between ground and space.

2. This assessment shall respect the guidelines and criteria for safe use contained in principle 3.

3. Pursuant to article XI of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, the results of this safety assessment, together with, to the extent feasible, an indication of the approximate intended time-frame of the launch, shall be made publicly available prior to each launch, and the Secretary-General of the United Nations shall be informed on how States may obtain such results of the safety assessment as soon as possible prior to each launch.

### Principle 5. Notification of re-entry

1. Any State launching a space object with nuclear power sources on board shall in a timely fashion inform States concerned in the event this space object is malfunctioning with a risk of re-entry of radioactive materials to the Earth. The information shall be in accordance with the following format:

(a) System parameters:

(i) Name of launching State or States including the address of the authority which may be contacted for additional information or assistance in case of accident;

(ii) International designation;

- (iii) Date and territory or location of launch;
- (iv) Information required for best prediction of orbit lifetime, trajectory and impact region;
- (v) General function of spacecraft;
- (b) Information on the radiological risk of nuclear power source(s):
  - (i) Type of nuclear power source: radioisotopic/reactor;
  - (ii) The probable physical form, amount and general radiological characteristics of the fuel and contaminated and/or activated components likely to reach the ground. The term "fuel" refers to the nuclear material used as the source of heat or power.

This information shall also be transmitted to the Secretary-General of the United Nations.

2. The information, in accordance with the format above, shall be provided by the launching State as soon as the malfunction has become known. It shall be updated as frequently as practicable and the frequency of dissemination of the updated information shall increase as the anticipated time of re-entry into the dense layers of the Earth's atmosphere approaches so that the international community will be informed of the situation and will have sufficient time to plan for any national response activities deemed necessary.

3. The updated information shall also be transmitted to the Secretary-General of the United Nations with the same frequency.

#### Principle 6. Consultations

States providing information in accordance with principle 5 shall, as far as reasonably practicable, respond promptly to requests for further information or consultations sought by other States.

#### Principle 7. Assistance to States

1. Upon the notification of an expected re-entry into the Earth's atmosphere of a space object containing a nuclear power source on board and its components, all States possessing space monitoring and tracking facilities, in the spirit of international cooperation, shall communicate the relevant information that they may have available on the malfunctioning space object with a nuclear power source on board to the Secretary-General of the United Nations and the State concerned as promptly as possible to allow States that might be affected to assess the situation and take any precautionary measures deemed necessary.

2. After re-entry into the Earth's atmosphere of a space object containing a nuclear power source on board and its components:

(a) The launching State shall promptly offer, and if requested by the affected State, provide promptly the necessary assistance to eliminate actual and possible harmful effects, including assistance to identify the location of the area of impact of the nuclear power source on the Earth's surface, to detect the re-entered material and to carry out retrieval or clean-up operations;

(b) All States, other than the launching State, with relevant technical capabilities and international organizations with such technical capabilities shall, to the extent possible, provide necessary assistance upon request by an affected State.

In providing the assistance in accordance with subparagraphs (a) and (b) above, the special needs of developing countries shall be taken into account.

Principle 8. Responsibility

In accordance with article VI of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, States shall bear international responsibility for national activities involving the use of nuclear power sources in outer space, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that such national activities are carried out in conformity with that Treaty and the recommendations contained in these Principles. When activities in outer space involving the use of nuclear power sources are carried on by an international organization, responsibility for compliance with the aforesaid Treaty and the recommendations contained in these Principles shall be borne both by the international organization and by the States participating in it.

Principle 9. Liability and compensation

1. In accordance with article VII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, and the provisions of the Convention on International Liability for Damage Caused by Space Objects, <sup>b/</sup> each State which launches or procures the launching of a space object and each State from whose territory or facility a space object is launched shall be internationally liable for damage caused by such space objects or their component parts. This fully applies to the case of such a space object carrying a nuclear power source on board. Whenever two or more States jointly launch such a space object, they shall be jointly and severally liable for any damage caused, in accordance with article V of the above-mentioned Convention.

2. The compensation that such States shall be liable to pay under the aforesaid Convention for damage shall be determined in accordance with international law and the principles of justice and equity, in order to provide such reparation in respect of the damage as will restore the person, natural or juridical, State or international organization on whose behalf a claim is presented to the condition which would have existed if the damage had not occurred.

3. For the purposes of this principle, compensation shall include reimbursement of the duly substantiated expenses for search, recovery and clean-up operations, including expenses for assistance received from third parties.

Principle 10. Settlement of disputes

Any dispute resulting from the application of these Principles shall be resolved through negotiations or other established procedures for the peaceful settlement of disputes, in accordance with the Charter of the United Nations.

Principle 11. Review and revision

These Principles shall be reopened for revision by the Committee on the Peaceful Uses of Outer Space no later than two years after their adoption.

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<sup>b/</sup> General Assembly resolution 2777 (XXVI), annex.

(c) To limit exposure in accidents, the design and construction of the nuclear power source systems shall take into account relevant and generally accepted international radiological protection guidelines.

Except in cases of low-probability accidents with potentially serious radiological consequences, the design for the nuclear power source systems shall, with a high degree of confidence, restrict radiation exposure to a limited geographical region and to individuals to the principal limit of 1 mSv in a year. It is permissible to use a subsidiary dose limit of 5 mSv in a year for some years, provided that the average annual effective dose equivalent over a lifetime does not exceed the principal limit of 1 mSv in a year.

The probability of accidents with potentially serious radiological consequences referred to above shall be kept extremely small by virtue of the design of the system.

Future modifications of the guidelines referred to in this paragraph shall be applied as soon as practicable.

(d) Systems important for safety shall be designed, constructed and operated in accordance with the general concept of defence-in-depth. Pursuant to this concept, foreseeable safety-related failures or malfunctions must be capable of being corrected or counteracted by an action or a procedure, possibly automatic.

The reliability of systems important for safety shall be ensured, inter alia, by redundancy, physical separation, functional isolation and adequate independence of their components.

Other measures shall also be taken to raise the level of safety.

## 2. Nuclear reactors

(a) Nuclear reactors may be operated:

- (i) On interplanetary missions;
- (ii) In sufficiently high orbits as defined in paragraph 2 (b);
- (iii) In low-Earth orbits if they are stored in sufficiently high orbits after the operational part of their mission.

(b) The sufficiently high orbit is one in which the orbital lifetime is long enough to allow for a sufficient decay of the fission products to approximately the activity of the actinides. The sufficiently high orbit must be such that the risks to existing and future outer space missions and of collision with other space objects are kept to a minimum. The necessity for the parts of a destroyed reactor also to attain the required decay time before re-entering the Earth's atmosphere shall be considered in determining the sufficiently high orbit altitude.

## II.

IMPLEMENTING AGREEMENT  
BETWEEN THE  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
of the  
UNITED STATES OF AMERICA  
and the  
RUSSIAN SPACE AGENCY  
of the  
RUSSIAN FEDERATION  
on  
HUMAN SPACE FLIGHT COOPERATION \*  
(Excerpts)

## PREAMBLE

The National Aeronautics and Space Administration (hereafter referred to as "NASA") and the Russian Space Agency (hereafter referred to as "RSA"), jointly referred to as "The Parties," have agreed to cooperate in the area of human space flight. This cooperative program consists of three inter-related projects: the flight of Russian cosmonauts on the U.S. Space Shuttle; the flight of U.S. astronauts on the Mir Space Station; and a joint mission involving the rendezvous and docking of the U.S. Space Shuttle with the Mir Space Station. These will be jointly referred to in the future as the "Shuttle-Mir Program."

The Parties have agreed as follows:

## ARTICLE I: DESCRIPTION OF COOPERATION

1. The cooperation set forth in this Implementing Agreement will be undertaken in accordance with the Agreement Between the United States of America and the Russian Federation Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes, of June 17, 1992 (hereinafter the June 17, 1992 Agreement).

2. An experienced cosmonaut will fly aboard the Space Shuttle on the STS-60 mission, which is currently scheduled for November 1993. The cosmonaut will be an integral member of the orbiter crew, and will be trained as a Mission Specialist on Shuttle systems, flight operations, and manifested payload procedures following existing Shuttle practices.

...

## ARTICLE X: EXCHANGE OF TECHNICAL DATA AND GOODS

Each Party is obligated to transfer to the other Party only those technical data and goods which both Parties agree are necessary to fulfill the responsibilities of the transferring Party under this Implementing Agreement, subject to the following:

1. Interface, integration, training and safety data (excluding detailed design, manufacturing, and processing data, and associated software) will be exchanged by the Parties without restrictions as to use or disclosure, except as otherwise restricted by national laws or regulations relating to export controls.

\* Signed at Moscow, Oct. 5, 1992.



2. In the event a Party finds it necessary to transfer technical data other than that specified in paragraph 1 above, in carrying out its responsibilities under this Implementing Agreement that are proprietary, and for which protection is to be maintained, such technical data will be marked with a notice indicating that it shall be used and disclosed by the receiving Party and its contractors and subcontractors only for the purposes of fulfilling the receiving Party's responsibilities under this Implementing Agreement, and that the technical data shall not be disclosed or retransferred to any other entity without prior written permission of the furnishing Party. The receiving Party agrees to abide by the terms of the notice, and to protect any such marked technical data from unauthorized use and disclosure.

3. In the event a Party finds it necessary to transfer technical data and goods in carrying out its responsibilities under this Implementing Agreement that are export-controlled, and for which protection is desired, the furnishing Party will mark such technical data with a notice and identify such goods. The notice or identification will indicate that such technical data and goods will be used and such technical data will be disclosed by the receiving Party and its contractors and subcontractors only for the purposes of fulfilling the receiving Party's responsibilities under this Implementing Agreement. The notice or identification will also provide that such technical data will not be disclosed, and such technical data and goods will not be retransferred, to any other entity without prior written permission of the furnishing Party. The Parties will abide by the terms of the notice or identification and will protect any such marked technical data and identified goods.

4. The Parties are under no obligation to protect any unmarked technical data or unidentified goods.

#### ARTICLE XI: CUSTOMS AND IMMIGRATION

1. Each Party will facilitate the movement of persons and goods necessary to implement this Implementing Agreement into and out of its territory, subject to its laws and regulations. The RSA will take steps to expedite such movement of persons and goods to launch facilities it will utilize to fulfill its obligations under this Implementing Agreement.

2. Subject to its laws and regulations, each Party will facilitate provision of the appropriate entry and residence documentation for the other Party's nationals and families of nationals who enter, exit, or reside within its territory in order to carry out the activities under this Implementing Agreement. The RSA will take steps to arrange for such provision for such activities at launch facilities it will utilize to fulfill its obligations under this Implementing Agreement.

3. The Parties agree to arrange for free customs clearance for entrances to, and exits from, their respective countries for equipment required for implementation of the activities described herein. The RSA will take steps to arrange for such clearances to and from launch facilities it will utilize to fulfill its obligations under this Implementing Agreement.

## ARTICLE XII: SETTLEMENT OF DISPUTES

1. The Parties will consult promptly with each other on all issues involving interpretation or implementation of this Implementing Agreement. In the case of a continuing dispute, such matters will first be referred to the Points of Contact identified in Annex 1.
2. Any matter which has not been settled in accordance with the above paragraph will be referred to the NASA Associate Administrator for Space Flight and the First Deputy of the General Director of the RSA, or their designees, for resolution. Issues not resolved at this level will be referred to the NASA Administrator and the RSA General Director.

## ARTICLE XIII: DURATION OF IMPLEMENTING AGREEMENT

1. This Implementing Agreement will terminate five (5) years following its entry into force or upon completion of all activities covered by this Implementing Agreement, whichever occurs first. This Implementing Agreement may be extended or amended by written agreement of the Parties.

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## ANNEX 2

## LIABILITY

1. With regard to activities undertaken pursuant to this Implementing Agreement, neither Party shall make any claims against the other, the other's employees, the other's related entities (e.g. contractors, subcontractors, and other participating entities associated with the Parties including any state from which RSA procures a launch to carry out its obligations under this Implementing Agreement) or employees of the other's related entities for any injury to or death of its own employees or employees of its own related entities, or for damage to or loss of its own property or the property of its related entities, arising out of activities under this Implementing Agreement, whether such injury, death, damage or loss arises through negligence or otherwise. This cross-waiver will apply only if the person, entity or property causing the damage is involved in activities under this Implementing Agreement, and the person, entity or property damaged is damaged by virtue of its involvement in activities under this Implementing Agreement.
2. In addition, each Party shall extend the cross-waiver of liability as set forth in 1 above to its own related entities by requiring them, by contract or otherwise, to agree to waive all claims against the other Party, employees of the other Party, the other Party's related entities, and employees of the other Party's related entities.
3. For avoidance of doubt, this cross-waiver of liability includes a cross-waiver of liability arising from the Liability Convention where the person, entity or property causing the damage is involved in activities under this Implementing Agreement, and the person, entity or property damaged is damaged by virtue of its involvement in activities under this Implementing Agreement.

4. Notwithstanding the other provisions of this Annex, this cross-waiver of liability shall not be applicable to:
  - (a) claims between a Party and its own related entity or between its own related entities;
  - (b) claims made by a natural person, his/her estate, survivors, or subrogees for injury or death of such natural person;
  - (c) claims for injury, death, damage or loss caused by willful misconduct;
  - (d) intellectual property claims.
5. Nothing in this Implementing Agreement shall be construed to create the basis for a claim or suit where none would otherwise exist.

### III.

#### CAIRO DECLARATION

The States participating in the Regional Telecommunication Development Conference for the Arab States (AR-RDC) convened by the International Telecommunication Union in Cairo, Egypt, from 25-29 October 1992,

##### considering

the objective of universal service to provide mankind with access to a telephone service at the beginning of the next millennium;

the relatively low average penetration of some 3.5 main telephone lines per hundred inhabitants in the region, as well as the vast investments required to at least attain an average of about 10;

the enormous differences among the countries of the region in terms of existing telecommunication services and of the financial capacity required to ensure the development of telecommunications;

the lack of adequate telecommunication services in rural areas and among the low-income population strata of a number of countries in the region;

the global trend towards liberalization which ipso facto leads to competition and private investment in the telecommunications sector;

the urgent need to expand the infrastructure, reform the sector and renew the organization and management of public and private telecommunication entities;

the information on telecommunications development in the region which was specifically gathered for and submitted to the AR-RDC and is summarized in two documents, namely, the Arab States Telecommunication Indicators and the Present Situation and Future Development Scenarios in the Arab Countries;

the vital role telecommunications plays in cases of emergency and for relief and rescue operations,

##### recalling

1. the Report of the Independent Commission for World-Wide Telecommunications Development (Geneva, 1984);
2. the decisions of the Plenipotentiary Conference (Nice, 1989),

**declares**

that telecommunications is an essential precondition and tool for socio-economic development and for technological progress which fosters competition and generates productive employment, and which contributes to economic and cultural integration, as well as to understanding between peoples, and to overall improvement in the quality of life,

**establishes**

the following goals to be achieved by the Arab States and the regional organizations concerned:

1. to strive to give all Arab States' inhabitants access to basic telecommunication services, in particular to those in least developed countries;
2. to accelerate the expansion of telecommunication networks so as to reach an average density of 10 main telephone lines per 100 inhabitants by the beginning of the 21st century which implies an investment of between 40 and 50 billion US dollars;
3. to provide telephone access to all rural communities and to low-income urban zones by means of special programmes that take advantage of the opportunities being offered by new technologies;
4. to modernize the legal, regulatory and economic framework so as to benefit from fair competition that is conducive to public and private investment in telecommunications development;
5. to accelerate within the region and with neighbouring regions the integration, harmonization and growth of telecommunication services;
6. to strengthen sound and television broadcasting systems incorporating new technologies, and to extend the coverage in order to draw greater benefit from these media for the distribution of information and the dissemination of education and culture;
7. to pursue consideration of restructuring the telecommunications sector and to coordinate the use of the frequency spectrum in accordance with regulations adopted by the ITU;
8. to develop human resources and institutional structures and thereby ensure the sustainable development of telecommunication infrastructures, as well as efficient operations and adequate quality of service.

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