

JOURNAL
OF
SPACE
LAW

VOLUME 15, NUMBER 2
1987

JOURNAL OF SPACE LAW

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

VOLUME 15

1987

NUMBER 2

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Journal of Space Law. The subscription rate for 1988 is \$49 domestic and \$54 foreign for two issues. Single issues may be ordered at \$27 per issue.

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THE JOURNAL OF SPACE LAW HONORS DR. EUGÈNE PÉPIN

It is both a distinct pleasure and a special privilege for the undersigned to dedicate issues of the JOURNAL OF SPACE LAW to one of space law's great pioneers, *Dr. Eugène Pépin*, who has not long ago celebrated the 100th anniversary of his birth.

Among his many accomplishments during his long and illustrious career, *Dr. Pépin* had the honor to serve as the President of the International Institute of Space Law. For that reason, it was thought most fitting to ask the current President of the Institute, Dr. I.H.Ph. Diederiks-Verschoor, to pay homage to him in an introductory tribute.

The contributions of many distinguished authorities who are honoring him with their writings extend beyond this issue of the JOURNAL

This writer joins the growing family of space lawyers, scholars in other disciplines and friends all around the world who are wishing him many more years of joyful and productive life.

Stephen Gorove
Chairman, Ed. Bd.
JOURNAL OF SPACE LAW



Dr. Eugène Pépin
(1987-)

A TRIBUTE TO DR. PEPIN

I consider it an honor and a pleasure to be invited to pay tribute to *Professor Eugène Pépin*, one of the most distinguished pioneers in air and space law.

His career, spanning a period of about 70 years, may be divided into several phases: *Dr. Pépin* as an officer of the French Ministry of Foreign Affairs, as a scholar and a teacher, as a Director of the International Institute of Air Law at McGill University in Montreal, as Head of the Legal Bureau of ICAO, and finally as President of the International Institute of Space Law.*

In all his long and outstanding career *Dr. Pepin* has never ceased to stress the need for new legal initiatives and solutions. Let me cite a few examples. In 1959 *Pépin* was one of the founding fathers of the International Institute of Space Law, of which he became the third Director after *Dr. Smirnoff* and *Dr. John Cooper*. He exercised this function for about ten years, laying the foundation and shaping the further course of the Institute. He also created working groups to discuss current developments in space, stimulating and promoting at the same time closer international cooperation wherever possible.

Dr. Pépin was the author of a great many publications and lectured worldwide at several universities throughout his long life. He was the first person to compile a bibliography on space law, covering the years between 1964 and 1975. An equally valuable work was his "History of the International Institute of Space Law". Who could have been better qualified to write that history than the man who had been involved in space law right from the beginning? The same applies to air law and in fact to aviation itself, *Dr. Pépin* being an experienced balloonist.

This tribute would not be complete without my also mentioning *Pépin's* sound knowledge and activities in the field of archaeology. There can be no doubt that by applying both his human and scholarly qualities in all these different areas he has greatly contributed to promoting closer relations and better understanding all over the world.

Now that he has reached his hundredth birthday the appropriate moment has come to recognize the great services he has rendered to his country and the international community.

While celebrating his centenary, *Dr. Pépin's* colleagues and friends are happy to find him still active and looking forward to the future, stimulating others as he has always done. For him to be able to continue doing so for many more years is their dearest wish.

I. H. Ph. Diederiks-Verschoor
President, International
Institute of Space Law (IAF)

* For a more detailed survey of *Dr. Pépin's* career, see the Introduction to the Proceedings of the Colloquium of the International Institute of Space Law held at Innsbruck in 1986.

SOME OBSERVATIONS ON THE ATTITUDE OF WEST-EUROPEAN GOVERNMENTS TO THE DEVELOPMENT OF DEFENSIVE WEAPONS IN OUTER SPACE

*D. Goedhuis LL. D.**

I. The West-European reaction to the fundamental principle of S.D.I.

The first question to be considered is whether, and if so to what extent, the European attitude is in conformity with that of the U.S. on this issue.

a) In answering this question, one is faced with the widely divergent views expressed in the U.S. on the needs, the feasibility and the cost-effectiveness of the S.D.I. programme. Whereas an enquiry in these divergencies would far exceed the scope of the present article, it is important to note that, notwithstanding the doubts expressed by several leading American scientists on the technological feasibility of the programme and notwithstanding the opposition of, in particular, several Democratic members of Congress to - at least the development of the *kind* of defensive weapons in space which the Administration wishes to pursue (see below) - on the basis of recent statements made by President Reagan, it can be concluded that he is determined to vigorously pursue the programme. It further should be noted that this determination has not been weakened in any sense by the continuing strong opposition of the Soviet Union to S.D.I. One of the main reasons why this opposition has been repudiated, can be sought in the American conviction that the Soviet Union, for its part, has since initiated a substantial research programme into advanced technologies for defense against ballistic missiles. In this context reference may be made to a recently published "Guide to the S.D.I. Initiative," in which it was submitted that the Soviet defense programme covered many of the same technologies involved in S.D.I., but that this programme represented a far greater investment of plant space, capital and man power.¹

In view of this conviction it is difficult to imagine that the new proposal presented by the Soviet Union to the U.S. in Geneva on 29 July 1987, in which the reduction of strategic nuclear arms is linked to strict limits on anti-missile systems, would prove to be acceptable to the American Administration. Soviet suggestions regarding such a link have been made before and have been constantly rejected by the U.S.

* Emeritus Professor of Air and Space Law at Leyden University.

1. See GUIDE TO THE SDI INITIATIVE, appendix A, (Pasha Publications, 1986.)

b) When investigating the West-European reaction to S.D.I. *in general*, attention should be drawn first to the conflicting views manifested in the European press.

As to Britain, the Editor of the "Sunday Telegraph", *Mr. Peregrine Worsthorne*, in a recent article, wrote that most West Europeans opposed S.D.I. The same view was expressed in an article of the "Economist", in which it was contended that public opinion in Western-Europe was anti-S.D.I., though it was suggested that this public was less likely to make a fuss about it, once Europeans would have the Euro-missile deal.²

Insofar as the West-German press is concerned, attention may be drawn to an article by the diplomatic correspondent of "Die Zeit", in which he observed that the West-European reaction to S.D.I. had wavered between opportunism and pusillanimity.³

On the basis of these statements, one might perhaps be inclined to conclude a general opposition in Western-Europe to the programme. But if one looks at the official attitude of West-European Governments, such a conclusion cannot be sustained.

In the first place, in October 1986, fourteen of the sixteen members of NATO, adopted a highly significant resolution supporting S.D.I. Only Greece and Denmark did not go along with this support.

Among the countries which originally took a negative position regarding the programme but later changed its mind, mention should be made of France. The Prime Minister, *Mr. Chirac*, recently declared that the French Government was strongly in favour of the development of S.D.I.

Secondly, the governments of Britain, West-Germany, France and Italy, all have given permission to companies in their countries to cooperate with the U.S. in the research of this programme.

Before proceeding to an investigation of the West European views on the *legal* aspects of S.D.I., I will refer to the following interesting comment on S.D.I., made by the former British Ambassador in Washington, *Sir Oliver Wright*, in the Annual Memorial Lecture to the David Davies Memorial Institute of International Studies, entitled "Anglo-American Relations: The Atlantic Grows Wider":

"Thank goodness we have not opted out of the S.D.I. programme; whether or not we shall create a celestial astrodome to protect us from the bomb, the technologies involved in finding out whether we can, will certainly affect the lives of successive generations, just as the microchip of the moonshot influences our lives today"⁴

2. See The Economist, 18 October 1986.

3. See The International Herald Tribune, 14 November 1986, p. 1.

4. See Lecture by Sir Oliver Wright, Annual Memorial Lecture, David Davies Memorial Institute of International Studies 4 (Dec. 9, 1986).

II. The West European views on the kind of defensive weapons in space which are legally permissible

a) Again on the issue, some observations should be made first on the continuing conflicts between the American Administration and Congress on this matter.

The most crucial issue which - in this context - has arisen, concerns the interpretation of the ambiguous provision laid down in Agreed Statement D, annexed to the ABM Treaty of 1972, which provides that, in the event of ABM systems based on other physical principles, are created in the future, limitations on such systems would be subject to discussions. Can this provision be interpreted in the sense it allows the testing of exotic weapons in space?

Although *President Reagan*, until 1985, took the position that, on the basis of this stipulation, advanced testing of these kinds of weapons would be allowed, he declared that the Government would not conduct such testing.

However, in the beginning of February 1986, *Mr. Schultz* stated that S.D.I. had yielded considerable progress even under the narrow interpretation of the Treaty that the Administration embraced, but that it was clear now, giving the progress that had been made, that one would be able to pursue this progress much more effectively - and perhaps only - if a different pattern of testing was permitted.

The most important and recent challenge to the broad interpretation of the Treaty has come from *Senator Sam Nunn*, Chairman of the Senate Armed Services Committee. In the week of March 12 1987, he submitted to the Senate an analysis in which he stressed that after weeks of examining the classified negotiating record of the Treaty, of the open ratification debates and subsequent practice, he had not uncovered a single statement confirming that testing and development of space-based exotic technologies is allowed.

Though *Senator Nunn* has not yet declared where the ABM debate should go next, he predicted a serious constitutional confrontation if the Administration persisted in rewriting history with its implied disrespect for Congress in its Treaty-ratifying role.⁵ It should be noted, however, that the Senator has supported the President's S.D.I.

As to the latest developments of the American S.D.I. research programme, it was reported in July 1987 that the S.D.I. managers had shifted the programme followed up till now, in favour of a crash programme for early development of a relatively unsophisticated minimal missile defense. The near-term deployment of this system, which the managers have in mind for 1994-95, would have no lasers or beam weapons

5. See Kevin L. Kennedy, *Treaty Interpretation by the Executive Branch: The ABM Treaty and Star Wars Testing and Deployment*, AM. J. INT. L. 854 (October 1986).

but only a token deployment of space-based kinetic kill vehicles. It has been suggested that such a crash effort was aimed at a "fait accompli", that would narrow the options of future Administrations, likely to have more knowledge of scientific prospects and Soviet responses.

At the time of writing the present article, no information has as yet become available on the reaction of the Administration to this crash programme. However that may be, as was mentioned above, the Administration appears to press forward with S.D.I. testing under the broad interpretation of the ABM Treaty and on 22 July 1987, a senior U.S. official declared that President Reagan had rejected suggestions by the Soviet Union and by arms control adviser, *Mr. Paul Nitze*, to negotiate what tests could be permitted under the Treaty.⁶

Attention should also be drawn to an article published in the New York Times on 21 August 1987 by *Mr. Weinberger* in which he expressed the view that with adequate funding for S.D.I. research "we would confidently anticipate that phased deployment could begin as early as 1994 or 1995."

In view of these latest developments, it seems highly unlikely that in the short remaining time before the election at the end of 1988, the present confrontation between the Administration and the majority of the Democratic members of Congress can be solved. It can be assumed that it will be the new Administration which will have to try and arrive at a solution of this controversial issue.

Though great caution is required if one wishes to try and speculate on the possible reaction to the development of the S.D.I. programme of a new Administration, there have been some recent statements which show that the Democratic members of Congress, as yet, have not reached a consensus on the way the S.D.I. programme should be pursued.

According to a recent article in the "Washington Post", an analysis of the views expressed by the Presidential candidates of the Democratic Party shows that all of them, though being inclined to be in favour of a ban on the testing of Defensive space weapons outside the laboratory, wish to continue with research on these weapons. However, in an article published in the British journal "The Economist" on 1 August 1987, reference was made to a declaration of *Senator Paul Simon* (who entered the Presidential race in May) according to which he would be inclined to do away with S.D.I.

But as a majority of the Democratic members of Congress appear to share the conviction of the present Administration that a continuation of the research on space weapons is essential in view of the substantial Soviet research programme of these weapons, can one really expect that a Democratic Administration would be prepared to abandon the S.D.I. programme altogether?

b) When one now assesses the attitude of the West European countries on the interpretation of the provisions of the Treaty, reference

6. See The International Herald Tribune, 19 June 1987, p. 1.

should be made first to a letter which *Lord Carrington*, Secretary General of NATO, sent to the American Administration in which NATO's great concern of the implications of some form of deployment of S.D.I. was expressed, and in which he asked for the Alliance to be consulted before a decision on this issue was made.

Britain, West Germany, France, the Netherlands and Belgium all let it be known that they considered the present Administration's broad interpretation to be legally unjustified and, moreover, that the testing of new space defensive weapons would have a serious political effect.

In this context, some remarks may be made on the criticism expressed by *Mr. Kenneth Adelman*, Head of the U.S. Arms Control and Disarmament Agency, on the European rejection of a broad interpretation of the Treaty. During a conference of American Military Veterans, held at the end of January 1987, he censured this rejection, first because the interpretation of the Treaty was a matter which concerned only the two Parties of the Treaty, the U.S. and the Soviet Union, and second because the Europeans had not seen the classified negotiating record. As regards the first point, I should like to submit that, as the testing of defensive weapons in space inevitably will have a profound effect on the strategic balance in the world, it is difficult to deny the right of American Allies to express their opinion on an interpretation of the Treaty which would permit such testing.

As to the second point, though admittedly the provision laid down in Agreed Statement D, annexed to the Treaty is ambiguous, and though it is true that the Europeans do not know the negotiation record, the testimony given by the authors of the Treaty, including that of the American Chief Negotiator, *Mr. Gerard Smith*, who declared that a broad interpretation of the Statement would make the Treaty "a dead letter", has sufficiently clarified the intention of the authors.

Moreover, as has rightly been suggested, the very language of Agreed Statement D which begins "In order to ensure fulfilment of the obligation not to deploy ABM systems..." would also prevent the Parties to the Treaty from deploying systems based on other physical principles than those at the time of the conclusion of the Treaty.

c) Apart from the controversies on the testing of "exotic" weapons in space, there is another issue on which the West-European countries have expressed opinions, divergent from those manifested in the U.S., namely the use and testing of ASAT weapons capable of reaching satellites in high orbit.

As for the U.S., it should be noted that the attitude of the American Administration to the development and testing of these weapons, has - in the last few years - given rise to frequent changes.

In view of the great overlap between anti-satellite technology and that of S.D.I., the question of the use of ASAT's is of crucial importance. Since satellites operating at high altitude are essential for communication, arms control information and early-warning of a strategic nuclear attack, the American Administration originally was strongly in favour of

trying to achieve an agreement with the Soviet Union aimed at protection of these satellites.

Though in April 1984, *President Reagan* declared that the Administration was exploring the possibility of a limited agreement which could protect these satellites, in August 1985 he informed Congress of the intention to conduct its first test of an ASAT against an object in space, stating that such a test was in accordance with the ABM Treaty. However, as Congress considered the consequences of such testing to be ultimately against strategic interest of the U.S., it passed in December 1985, a resolution halting U.S. tests until 30 September 1986 unless the Soviet Union resumed testing of these weapons before that time. In October 1986, Congress and *President Reagan* agreed to extend the ASAT test ban through the end of Fiscal Year 1987.⁷

But in the course of this year, several developments have taken place which indicate that at least some members of the Administration appear to consider that any extension of the ASAT test ban would be detrimental to national security.

In March 1987, the Defense Department unveiled a plan to restructure the Administration's anti-satellite programme with the goal of deployment. *Mr. Weinberger* said that this programme emphasized the Administration's commitments to a serious imbalance between U.S. and Soviet anti-satellite capabilities. The Pentagon hoped to conduct three air-launched anti-satellite weapons tests against space targets after October 1987.

Though at the time of writing the present article no decision on the lifting or continuation of the ban has yet been taken, it is important to refer to a Bill introduced on 10 March 1987 by a number of Senators aimed at a limitation of ASAT's and to a Joint Resolution of the same date by a number of the House of Representatives requiring the U.S. to continue during fiscal year 1988 the existing U.S.-Soviet Union moratorium on testing ASAT weapons so long as the Soviet Union does the same.

Whereas one cannot tell whether, or at what time, the bills may be passed, in view of the strong support of Congress to the continuation of the present moratorium, there are reasons to expect that an agreement on such continuation could be reached.

Insofar as the Soviet Union is concerned, the concrete deal which the Soviets want most is a continued moratorium on the testing of ASAT's. If the view of American space experts that the Soviets are ahead of the U.S. in ASAT's, having for several years the world's only operational systems, is correct, their insistence on the need of a moratorium on ASAT testing is not surprising.

In the context, it is important to note that during discussions of the Directors of the New York Council of Foreign Relations in Moscow in April 1987, Soviet officials argued that a defensive system would not be

7. For a more detailed exposition of the American and Soviet position on this issue see Goedhuis, *The Importance of Preserving and Strengthening the ABM Treaty of 1972*, INTERNATIONAL RELATIONS 475-493 (1986).

vulnerable to Soviet attack. Non-nuclear anti-satellite weapons could knock out elements of the S.D.I. system.

Turning now to the attitude of West European countries regarding the use of ASAT weapons, several of them, including France, Britain, West Germany, the Netherlands and Belgium declared their strong support to the reaching of an agreement by which a ban would be imposed on weapons capable of reaching satellites in high orbit.

As to France, the French representative to the Geneva Disarmament Conference, in June 1984, put forward a proposal along these lines and in November of that year, *Mr. Trudeau*, the former Prime Minister of Canada, called on NATO to support the French plan, also supported by Canada, to ban this kind of ASAT weapons.

It should be noted however that up till now the efforts to arrive at a multilateral agreement on such a ban have not obtained any results.

So far as the legal position of the use of ASAT's is concerned, first it should be noted that in the ABM Treaty no consideration has been given to the use of these weapons. However, there is one provision in this Treaty which is also relevant to such use, namely article V pertaining to limits on space-based and other mobile systems and components.

Another provision which limits the use of ASAT's, has been laid down in article IV of the Outer Space Treaty of 1967, in which the Parties to the Treaty have undertaken not to place in orbit around the Earth any objects carrying nuclear weapons or any other kind of weapons of mass destruction. Both Space Powers have spent considerable amounts of money in the research of high-energy lasers, including X-ray lasers. The use of such type of lasers on ASAT weapons, which may derive their energy from small nuclear explosives, would violate this article. Moreover, the testing of such weapons would jeopardize the 1963 Partial Test Ban Treaty which bans, *inter alia*, nuclear weapons in outer space.

Another question which arises in this context relates to the permissibility or non-permissibility of stationing ASAT's on the Moon. article III of the Moon Treaty of 1979, reiterating article IV (2) of the Outer Space Treaty of 1967, provides that the Moon shall be used by all Parties exclusively for peaceful purposes. It should be mentioned that up till now, neither of the two main Space Powers have ratified this Treaty.

Though a survey of the fundamental controversies on the meaning of this term, on which an abundant literature exists, would far exceed the scope of this article, suffice it to say that, whereas the U.S. continues to interpret the term "peaceful" as "non-aggressive", the Soviet Union and most West European countries consider the term to mean "non-military". An acceptance of the American interpretation would mean that a stationing of ASAT's on the Moon for defensive purposes would not be illegal. It is submitted however that, on accepting such a position, one would necessarily come into conflict with the provisions laid down both in the Space and Moon Treaty, that the establishment of military bases, installations and fortifications shall be forbidden.

Although great caution is required when one wishes to speculate on the possibility of the U.S. and the Soviet Union arriving at an agreement

on the interpretation of the term "peaceful", it is difficult to imagine that in the short term such an agreement can be reached. Consequently it seems unlikely that the original aim of the authors of the Treaty to arrive at a complete demilitarization of the Moon can be achieved.

d) I come now to another problem on the use of defensive weapons in space, namely the potential military uses on space-stations. On this issue also, strong divergencies exist between the West-European countries and the American Administration.

First a few remarks on the present state of development of these stations will be made. Although there are at this stage several factors which make it difficult to obtain a clear picture of how and when the aim of constructing viable space stations can be achieved, on both sides of the Atlantic, a firm determination exists to vigorously proceed with their development.

As to the United States, *President Reagan*, in January 1984, announced the American aim to establish the first manned space-station in the next decade. Whereas, until the disaster of the Challenger space shuttle in January 1986 and the following accidents with the Titan and Delta rockets, priority has been given to the development of the space shuttle as the sole means of transportation for the aim of establishing these stations, the recognition has been growing that the policy of relying on the shuttle fleet alone as a means of such transportation must be abandoned. Apart from the use of expendable rockets, great pressure is being exerted on the development of an aerospace plane which is believed ultimately to be available for at least some of the tasks which up until now have been carried out by the shuttle. On the pursuance of this project, both in the United States and in Europe, I will make some comments at a later stage.

Before considering the role of the American Allies in the development of the station, I draw your attention to the remarkable progress of the Soviet space-station programme.

The first low-orbiting space-station, called Salyut I was launched by the Soviets in April 1971. Since that time several other Salyut spacecraft were launched, but a new larger orbital station, named MIR (Peace), was launched in February 1986, constituting another important step towards the aim of a permanently manned complex in space. In view of this progress, the Soviets, at this stage, appear to have an important lead in the establishment of such stations.

Now, as regard the role of the West European countries in the development of space stations, in August 1973, a "Memorandum of Understanding" between NASA and a number of European countries was signed for a cooperative programme concerning a Space Laboratory (SKYLAB) in

conjunction with the American space shuttle.⁸ The European nations participating in SKYLAB are: West Germany, France, Italy, the Netherlands, Denmark, Austria and Switzerland. It should be noted, however, that as SKYLAB is not a facility that can be used over a multi-year period, it cannot be considered as a true space station.⁹

Two years later, in 1975, a European Space Agency (ESA) was established by merging the European Organization for the Development and Construction of Space Vehicle Launches (ELDO). The Convention regarding the establishment provides *i.a.* that ESA will be used for exclusively peaceful purposes to promote European space cooperation in scientific programs and space application systems. It also provides that the Agency may cooperate with other international organizations and other governments. As to such cooperation, in April 1985, the Council of ESA decided to join the U.S. in design studies for a 12 billion dollar space-station planned for the mid 1990's. It was further agreed to authorize the spending of about 60 million on studies for a space laboratory unit, named "Columbus", which could be plugged into the U.S. core of the projected space station.

ESA countries, while recognizing the importance of cooperating with NASA in the international space station programme, decided at the Rome Space Station Conference in January 1985, to evolve a long term autonomous space capability. Consequently ESA wanted to maintain the option of detaching the module from the space station for autonomous operations. On this issue, a dispute arose between ESA and NASA which, at the time of writing, has as yet not been resolved.

At present ESA is completing final studies of a new multi-million dollar program encompassing space transportation, space station and telecommunications projects that will set the course for European space activities for the next ten to twenty years. This programme, to be presented this year for approval by its members, covers authorization for developments of the Columbus space station, the Ariane launcher and the Hermes space plane.

Insofar as the development of a space plane as a means of transportation to and from space stations is concerned, it should be noted that there are several projects to develop such a plane. As to the U.S., President Reagan referred to the project of a National Aerospace Plane in his February 1986 "State of the Union Address".

In Europe, in December 1986, ten members of the European Space Agency (ESA) agreed to participate in a 35 million dollar development effort for the Hermes space plane, which is expected to enter service in

8. See Galloway *The Relevance of General Multilateral Space Conventions to Space Stations*, SPACE STATIONS 51 (Bockstiegel ed., Carl Heymanns Verlag 1985).

9. On the SPACELAB, Europe's contribution to the U.S., see Bourelly, *Agreements between States and with International Organizations*, SPACE STATIONS 71.

the mid 1990's. Britain, having its own project of a Horizontal Take-off and Landing Plane (HOTOL) has as yet not formally joined in the Hermes project, but, as it has realized that HOTOL cannot be financed by Britain alone, it appears to be likely that the British Government will also join in the multi-national project, possibly in the near future.

The Soviet Union, for its part, has a programme for a space plane which is expected to begin full-scale manned flight testing soon.¹⁰

The crucial and ardently debated question to which attention has to be given now, concerns the potential military uses of space stations. I may start by saying that, in my personal view, it is difficult to imagine that *all* military uses on these stations can be prevented.

So far as the present position of the American Administration is concerned, whereas in the beginning of 1984 the Department of Defense expressed the view that there were no defense requirements for such a station, at a later stage the Department appeared to be convinced that, apart from functions which have both military and non-military objectives, such as remote sensing reconnaissance, communication, weather observation and others, purely military functions on these stations, including ballistic defense operations, cannot be avoided. It can be assumed that the Department of Defense, in taking this position, was also influenced by Soviet manned military demonstrations on the Salyut 7 space station as monitored by U.S. intelligence agencies.

However, the intention of the Department to draw up formal plans for such uses raised considerable concern, not only of the American European Allies, but also of Japan and Canada. They considered that such plans would seriously threaten the international cooperation on the multi-billion dollar project. In this context it should be mentioned that preliminary agreements between the United States and its partners in the development of these stations said that they would be used only for peaceful purposes.

In the beginning of February 1987 the Administration, reacting to this concern, testified that there would be no major weapons systems on the stations but that some Pentagon research could be performed, such as research of semi-conductors. However, two months later, a letter of the Defense Secretary, *Mr. Weinberger*, to Secretary of State, *Mr. Shultz*, revealed high-level disagreement among Administration officials about European, Canadian, and Japanese participation in the station. In this letter, *Mr. Weinberger* counseled *Mr. Shultz* to reserve a place on this station for the military and suggested that if such decision would result in the international partners dropping out of the station programme, the U.S. should be prepared to go forward alone if the price of cooperation would be too high.

When one considers now the Soviet attitude towards the potential military uses of space stations, after President Reagan's announcement on 25 January 1984 that the U.S. would establish its first manned space

10. See Aviation Week and Space Technology, 30 March 1987.

station, the Soviet News Agency Tass said in an article published the following day, that the U.S. space station would become a tool of the military. The Soviet assertion, made on several occasions, that its space station would only be used for non-military purposes, has been challenged in several American publications. In an article published in the American journal "Aviation Week and Space Technology" it was postulated that the Soviets intended to provide a self-defense capability for their space stations which would include direct-energy weapons,¹¹ and in an article published in "Newsweek",¹² it was stated that U.S. intelligence officials had been experimenting with a laser programme similar to the one planned by the U.S.

Attention may also be drawn to the 1985 edition of the U.S. Department of Defense publication "Soviet Military Power", according to which the Soviets have made known their plans to replace Salyut with larger space complexes supporting twenty or more cosmonauts on a permanent basis. Such complexes would enhance their space-based military support and war capabilities.

However that may be, it is difficult to imagine that the Soviets would not try to match any military uses of space stations which the U.S. would consider to be indispensable for its security.

So far as the approach of the West European countries to the military uses of space stations is concerned, there appears to be as yet no firm consensus on this issue.

In the first place, attention should be drawn to the address which *President Mitterand* gave on 7 February 1984 to the two Houses of Parliament in The Hague, in which he called on Western European nations to begin their own work on orbiting defensive space stations. This proposal was apparently aimed as an edge against the unavailability of a corresponding U.S. system.

In November 1985, the importance of building a European military was also stressed by *Mr. Pichaud*, Chief military space engineer for the French General Delegation for the "Armaments Ballistic Missile Office". He suggested that the platform proposed as a joint European project could be served and fueled by the Hermes spaceplane. On the role of such a plane, some comments will be made below.

It should be noted however that, contrary to the above suggestions, the Convention adopted by the European Space Agency, to which reference was made above, provides that the ESA will be used for exclusively peaceful purposes and this includes European programmes for the development of a space station.

I referred to the importance of the projected space plane as a means of transportation to and from space stations. Also, on the question whether such a plane might be used for military purposes, no agreement

11. Aviation Week and Space Technology, 11 June 1984.

12. Newsweek, 11 March 1985.

appears to exist between the U.S. Administration and the West European countries, particularly in the Hermes project.

In the "Guide to the S.D.I.", the enormous potential military value of space planes has been stressed¹³ and, as was mentioned in an article in "Aviation Week and Space Technology" of 27 April 1987, the American Department of Defense will fund about three fourths of all the costs.

The European participants in the Hermes project, on the other hand, have outlined its missions solely for science and observation requirements.

Though, as far as I know, the Soviet Union has not made any official statements on its intention to use its space plane for military purposes, it has been suggested that this plane, which is expected to begin full-scale testing soon, will become the world's first space fighter, will provide space station defense, anti-satellite operations, reconnaissance and emergency repair of Soviet satellites.¹⁴

Attention should be drawn to a remarkable development which happened at the end of December 1986. It was reported that France had contacted the Soviet Union to discuss the technical aspects necessary to make the Hermes space plane compatible with the Soviets MIR orbital space station. If this report were correct, the French contact with the Soviet Union on this issue could mean first, that the French do not consider Hermes to serve military purposes and second, that they also believe that such purposes will not be used on the Soviet MIR station.

But what about the statement made by the French military expert, *M. Pichaud*, with reference to the above, that a European military platform could be served and fueled by the Hermes space plane?

In the preceding pages it has been submitted that in the context of the S.D.I. programme, military uses of space stations cannot be avoided. As space planes are an indispensable element in the development of these stations, it seems difficult to believe that efforts to arrive at an agreement aimed at using space planes only for non-military purposes would have a chance of success.

Proceeding now to the legal aspects of the potential military uses of space stations, it should be noted that a difference exists between the legal rules applicable to space stations in free orbit and those relating to stations on the Moon.

As to the first category, consideration should be given to the legality of two kinds of functions on these stations.

Attention has been given above to functions which have both military and non-military objectives, such as remote sensing, reconnaissance, communication and others. There can be no doubt that such activities will also be carried out on space stations and that - as is

13. See *supra* note 10, at 322.

14. See *Aviation Week and Space Technology*, 30 March 1987, p. 29.

generally recognized - operations like reconnaissance play an important role in the achievement of greater strategic stability.

So far as the legal permissibility of these functions is concerned, there are no rules so far adopted which would restrain or prohibit any of them. And among the host of issues which arise in the potential militarization of space stations, the most crucial one relates to the use of defensive weapons on these stations. It is suggested that, in the context of S.D.I., support of ballistic missile operations of space stations cannot be avoided.

When considering the legal position of such operations, it is the A.B.M. Treaty which has to be taken into account. Article V of this Treaty provides that each Party undertakes not to develop, test or deploy A.B.M. systems, which *inter alia* are space based. As research into such systems is not specified in this article, as has been mentioned above, a general recognition exists not only in the U.S. and Europe but also in the Soviet Union that research on defensive weapons cannot be prevented.

In the preceding pages, comments have been made on the continuous serious divergencies on the *kind* of research which may be permitted under the terms of the Treaty, and these divergencies will make themselves felt also on the research of defensive weapons on space stations.

Though the American Administration considers that the testing of exotic space weapons outside the laboratory is allowed, it is submitted that there can be no doubt that under the rules so far adopted, there is one kind of testing which - also on space stations - would be illegal, namely the testing of X-ray lasers using nuclear explosives. Such testing would infringe both the provisions contained in article IV of the Outer Space Treaty of 1967 as much as those laid down in article I of the Test Ban Treaty of 1963.

As to the legal rules applicable to lunar stations, reference was made above to article IV (2) of the Outer Space Treaty and article 3 of the Moon Treaty of 1972 and to the conflicts of the meaning of the provision that the moon and other celestial bodies shall be used by all Parties to the Treaty, exclusively for peaceful purposes.

An acceptance of the American interpretation of the term "peaceful" as "non-aggressive" would mean that a lunar station could be used for all kinds of military purposes, as long as they could not be considered to be aggressive. But, as has been submitted, such a result would certainly run counter to the intention of the authors of the Treaty and would moreover come into conflict with the provision contained in both the articles referred to above, stipulating that the establishment of military bases, installations, and fortifications on the moon and other celestial bodies shall be forbidden.

III. Turning now to the views expressed by West European Governments on the question whether, and if so when, a separate European space defensive system should be established, it should be noted that as yet no firm consensus on this issue has been attained. Until now the discussions

discussions on the need of such a system have been concentrated on the possible development of an anti-tactical missile plan (ATBM).

As was to be expected, the West European position on this issue is strongly being influenced by the progress made on an agreement between the U.S. and the Soviet Union concerning the elimination of intermediate and short-range nuclear missiles in Europe. But before making some comments on this influence, consideration should be given to statements made by America's European Allies on the ATBM system, *before* the prospective of the achievement of a European Missile Deal between the two main Space Powers. In the first place, reference should be made to a declaration made in October 1986 by the West German Defense Minister, *Mr. Worner*, according to which the West German government was strongly in favour of the establishment of an ATBM system. From statements made by French officials, the conclusion can be drawn that the French Government also was firmly convinced of the need of developing such a system.

On the other hand, the views expressed by members of the Netherlands government have shown that the Netherlands appeared to be in doubt as - at least - to the urgency of the need of evolving this system. In December 1987, the Dutch Minister of Defense, *Mr. van Eekelen* and the Dutch Chief of Staff, *General Huyser*, both warned against an overrating of the threat of tactical nuclear weapons. However, *General Huyser* declared to be strongly convinced that, in the long run, a European defense against these weapons would be inevitable.

Statements made by British officials at that time also demonstrated a certain lack of positiveness of the urgency of a development of the system.

When one now considers the European reaction to the prospects of a European Missile Deal, there are strong indications that the West European Governments increasingly recognize the fact that such a deal not only necessitates a fundamental rethink of 'long-held' assumptions on European defense *in general*, but also that such a deal strengthens rather than lessens the urgency of efforts aimed at reaching a consensus on European space defense.

In this context, reference should be made to an article published at the end of June 1987, in which it was reported that after recent exploratory discussions between American and European defense officials, the U.S. and West European Allies had come closer to an agreement on a collaborative anti-tactical missile programme.¹⁵

In this article it was further reported that a senior American official of the Defense Department has said that an agreement on specific cooperative ATBM systems could be sorted out within the next six months. I might submit that, when one takes account of the many divergencies between the present American Administration and West European countries, in particular those relating to the development of the *kind of*

15. See *Aviation Week and Space Technology*, 29 June 1987, pp. 18-20.

defensive space weapons which are legally permissible, one may have strong doubts that the optimistic prognostications referred to above might come into operation. The obstacles must be overcome before a multilateral agreement expectation can be resolved within the short period of six months.

IV. On the basis of the preceding observations, some conclusions may be drawn.

Consideration was given to the dissimilarities in the attitude of the American Administration and West European countries on three main issues: the first regarding the legal permissibility of the development of space weapons in *general*, the second relating to the development and use of ASAT weapons, and the third pertaining to potential military uses of space stations.

As the present gap between the American Administration and Western Europe on these issues obviously has an unfavorable effect on reaching a collaborative agreement between the U.S. and its Allies aimed at a European space defensive system, some speculations may be made on whether and how this gap might be closed.

As to the first issue, reference was made to the continuing controversies between the present American Administration and Congress on the interpretation of the ABM Treaty of 1972. It was suggested that it would seem highly unlikely that, during the remaining months of the present Administration this confrontation could be solved.

On the basis of several statements made by members of the Democratic majority of Congress, however, one might be inclined to assume that a new Administration, instituted after the election at the end of 1988, would not follow the present Administration's broad interpretation of this Treaty.

From these statements, the conclusion can be drawn that while the great majority of the Democratic members of Congress appear to be convinced of the need to continue with the research of space weapons, they would reject the view that under the terms of the ABM Treaty, the testing of these weapons outside the laboratory is legally allowed.

If this assumption would prove to be correct, there would be grounds to believe that, since the American West European Allies also strongly oppose the broad interpretation of this Treaty, a closing of the present gap on this issue might be achieved.

With regard to the second issue, relating to the use of ASAT weapons, attention was drawn to the divergent views expressed by members of the present American Administration on the question whether the development and testing of these weapons would be essential to protect American strategic interests.

In this context, mention was made to the Resolutions passed by Congress in December 1985 and in September 1986, by which a moratorium on U.S. testing of these weapons was accepted. It was suggested that, though at the time of writing the present article, no firm prediction of the continuation of such moratorium could be made, the two

Bills introduced in March 1987 by both members of the Senate and those of the House of Representatives, demonstrated a strong support to such continuation.

If these Bills were accepted, and since the Soviet Union on several occasions has declared their strong attachment to a ban on ASAT's, at least some progress on a bilateral treaty between the main Space Powers on limitations on the testing, deployment and use of these weapons (a Treaty which was proposed in the Bill by the members of the House of Representatives) might be expected.

The enquiry of the attitude of the West European Government towards ASAT weapons, demonstrated that they were strongly in favour of a ban or of, at least, a limitation of these weapons. However, as the use of these weapons have wide implications, not only for the main Space Powers but also for all other countries in the world, the European proposals were aimed at the concluding of a treaty on this issue on a *multilateral basis*.

Though the negotiations between the U.S. and the Soviet Union aimed at the conclusion of a bilateral agreement on the use of ASAT's should be considered to be of crucial importance, the discussions initiated by the Geneva Conference on Disarmament contemplating a possible *multilateral* treaty, should be pursued in parallel to those of the two main Space Powers.

Whereas a cautious optimism might be expressed that on this issue the American and West European attitudes might eventually coincide, it is on the third issue, the potential military uses of space stations, that the greatest obstacles on the achievement of a common approach present themselves.

So far as the present attitude of the U.S. is concerned, it has been mentioned that, though originally the American Department of Defense believed that there were no defense requirements for these stations, at a later stage the Department became convinced that apart from functions on these stations which have both military and non-military objectives, purely military functions, including ballistic defense operations, cannot be avoided. It was suggested that this position was also influenced by Soviet manned military demonstrations on their space stations, which apparently had been monitored by American intelligence agencies.

West European countries, however, have voiced their strong opposition to the use of space stations for military purposes. In the Convention adopted in 1975 by the members of the European Space Agency, it was provided that the Agency would be used for exclusively peaceful purposes and this includes European programmes of a space station.

When the intention of the American Department of Defense became known, considerable concern was expressed by American Allies. They considered that plans on the militarization of space stations would seriously threaten the project aimed at international cooperation in the development of these stations.

But can one expect that the European desired object of limiting the use of space stations exclusively for non-military purposes can be

fulfilled? It was submitted that - as space stations are bound to play an essential role, in particular, in ballistic defense operations - military uses of these stations can hardly be prevented.

A demilitarization of space stations could only be achieved if an agreement would be reached on the prohibition of the development of *all* weapons in space and efforts to reach such an agreement have failed and are bound to fail, at least in any foreseeable future.¹⁶

Finally, reverting to the remarks made in the preceding pages on the West European position towards the development of an anti-tactical missile system for Europe, it was suggested that though the prospects of a Euromissile deal has resulted in a growing realization of the need not to delay discussions on this development, divergencies continue to exist between the West Europeans on the *urgency* of establishing ATBM systems. When one takes account not only of those divergencies but also of the conflicts between the present American Administration and West European countries regarding the *kind* of developments of space weapons in general, which, under the terms of the ABM Treaty, is allowed, an *early* agreement on the establishment of a collaborative anti-tactical missile system can hardly be expected.

Nevertheless, the importance of the exploratory discussion between American and European defense officials on this issue, to which reference has been made, should not be underrated. By studying the options which are available, by dispersing the present confusions and illusions, a clearer perception could be achieved of whether and when an ATBM system should be established.

16. In the address of the present writer, given to the Parliamentary and Scientific Committee of both Houses of the British Parliament in June 1984, it was argued that military competition in space is as inevitable as military competition on earth, sea and in the air. See 42 Science in Parliament, No. 179 (October 1984).

THE ENLARGEMENT OF THE EUROPEAN SPACE AGENCY - LEGAL ISSUES

G. Lafferranderie*

Following the accession of Austria and Norway to its Convention on 1 January 1987, the European Space Agency (ESA) groups together thirteen Member States.¹ On the same date, the Agreement between Finland and the European Space Agency granting Finland the status of Associate Member entered into force.² Together with the Cooperation Agreement between Canada and ESA,³ fifteen States have a permanent interest in ESA's activities and programmes; others could occasionally be involved through their participation in optional programmes, for example, the operational Meteosat programme carried by ESA as an optional programme pending the entry into force of the Eumetsat Convention⁴ has involved sixteen participating States.⁵

* Legal Adviser, European Space Agency. This article reflects the author's personal views and not those of the organization to which he belongs.

1. The thirteen ESA member states include: Austria, Belgium, Denmark, France, Germany, Italy, Ireland, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom.

2. Association Agreements between ESA and Finland *concluded in* September 1986, *entered into force* January 1, 1987, ESA BASIC TEXTS (ESA Legal Affairs ed. 1987) [The Agreements and Council papers mentioned in this article could not be cited by page number since they are not public documents and are available only to ESA delegations. Ed.]

3. Cooperation Agreement between ESA and Canada *concluded in* 1978 *and later renewed*, ESA BASIC TEXTS.

4. ESA BASIC TEXTS. See Lafferranderie, *L'Apport du Programme Meteosat Operationnel sur le plan juridique*, ESA BULL. 68 (No. 37, Feb. 1984) (Contribution of the Operational Meteosat Programme to the juridical plan).

5. The sixteen states participating in the Meteosat programme include Finland, Portugal, and Turkey in addition to the ESA member states.

This enlargement of ESA is quite remarkable. One can remember that six States were originally members of ELDO,⁶ ten of ESRO.⁷ The ESA Convention required for its entry into force the signature of Belgium, Denmark, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland, the United Kingdom, all former members of ESRO or ELDO⁸ - Australia withdrew from ELDO (on 1 January 1975) before the opening for signature of the ESA Convention.

Thus, the "enlargement of the Agency", *i.e.* the participation by different countries in the Agency's programmes and activities, has taken two forms:

- admission as a Member State (article XXII of the ESA Convention), as was the case for Austria and Norway;
- participation in the activities and programmes of the Agency (Article XIV), as either a "cooperating" State (Canada), a State participating in an optional programme (as non-Member States (Canada and Finland)), or as an associate member or observer.

Within the latter category different degrees of cooperation are established. The use of this range of forms of cooperation raises the issue - which is a political one - of optimum participation, *i.e.* the limit to which the Agency can expand and still continue to achieve the objectives assigned to it. This possible limit to the Agency's expansion also raises questions regarding the functioning and decision-making of the Agency. The European Space Agency is by definition a "limited" organization, this is due, in particular, to the mission of ESA "to provide for and to promote among European States cooperation in space research and technology and

6. ELDO Convention, 507 U.N.T.S. 177 (1964); J.O.R.F. 10339 (Nov. 23, 1965). The ELDO membership included Australia, Belgium, France, Germany, Italy, and the United Kingdom.

7. ESRO Convention, 6258 U.N.T.S. 35 (1965); J.O.R.F. 5589 (June 27, 1964); 4 I.L.M. 306 (1965). The ESRO membership included Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden, Switzerland, and the United Kingdom.

8. See *supra* notes 6-7. These conventions are also reproduced in N.M. MATTE, AEROSPACE LAW, ed. Pedone- annexes X - XI (1969); E.N.T.I. Spaziali Internazionali - Statuti e documenti - Annessi - Padova, Cedam, 1962.

their space applications."⁹ Such a cooperation requires a minimum level of technology and industrial capacity of Member States.

This study will be limited to the various forms of enlargement and to recent examples of their implementation.

1. Admission

The Convention lays down a procedure for admission through accession following a unanimous Council decision on the membership application.

According to the relevant provision:

1. After the entry into force of this Convention, any State may accede thereto following a decision of the Council taken by a unanimous vote of all Member States.
2. A State that wishes to accede to this Convention shall notify the Director General, who shall inform the Member States of this request at least three months before it is submitted to the Council for decision.¹⁰

Although this article contains no qualification, it must be emphasized that article II of the Convention requires the Agency to provide for cooperation among "European States"; the Preamble also makes reference to the desire "to pursue and to strengthen European cooperation" and to "European countries". The links between the Preamble and articles II and XXII limits the possibilities of admission. The status of Member State, as defined in the Convention is acquired upon deposit of the instrument of accession (France being the depositary) - obligation to contribute to at least the mandatory activities of the Agency

9. ESA Convention, art. II, J.O.R.F. (December 14, 1980); Bundesgesetzblatt (No. 61) (Nov. 26, 1976). See also, N.M. MATTE, AEROSPACE LAW (1977).

Article III states: "The purpose of the Agency shall be to provide for and to promote, for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications systems."
Id.

10. ESA Convention, art. XXII.

(general budget and science programme according to a scale based on gross national product), voting rights, etc.¹¹

Since Council is required to take a unanimous decision,¹² it is presumably entitled to place certain conditions upon admission. The Convention itself requires only a special payment related to the current value of the Agency's assets ("entrance fee") fixed by a two-third majority of all Member States.

Any State that was not a party to the (ESRO) Convention ... or to the (ELDO) Convention ... and which becomes a party to this Convention shall make, in addition to its contributions, a special payment related to the current value of the assets of the Agency... (art. XIII, 4. a.)

The following criteria could be considered:

- pro memoriam, the properties of statehood and "European-ness" (an international organization cannot be admitted as a Member);
- the fact of belonging to the community of interests of the present Member States, *i.e.* those of the founder Member States;
- belonging to the community of interests of the Member States entails acceptance of the Agency's objectives and a manifest desire to integrate with the Agency and strengthen it;
- an appropriate level of industrial infrastructure.

Before becoming full Member States, Austria and Norway were linked to the Agency through Association Agreements. The Association Agreement between the Agency and the Republic of Austria was signed on 17 October 1979 (entered into force on 1 April 1981) and was revised by an Agreement signed on 12 April 1984 (entered into force on 1 May 1985).¹³

Similarly, Norway enjoyed the status of Associate Member of the Agency pursuant to an Agreement signed on 2 April 1981, entered into force on 1 November 1981 and amended later on 24 October 1985.¹⁴

11. ESA Convention, art. I, para. 3 provides: "All Member States shall participate in the mandatory activities referred to in Article V.1.a. and shall contribute to the fixed common costs of the Agency, referred to in Annex II." *Id.* In particular, the mandatory activities cover the scientific program and basic activities such as studies of future projects and technological research work. The content of common costs is detailed in the Financial Rules, and are the costs associated with the functioning of an international organization.

12. ESA Convention, art. XXII.1

13. *See supra* note 2.

14. *Id.*

It must be underlined that Austria and Norway were invited to join ESRO from the beginning and were represented in the Plenipotentiary Conference but finally were not in a position to sign the Convention. However, Austria and Norway took part in some ESRO programmes and increasingly participated in ESRO/ESA activities and programmes such as Spacelab, or the Olympus programmes (Austria) and MAROTS and other communications programmes (Norway). These Association Agreements were concluded for a period of five years; their content followed largely a pattern elaborated for the Cooperation Agreement concluded between ESA and Canada in 1978. The Association Agreement with Austria provided for the possibility of Austria acceding to the Convention.¹⁵

After 20 years of relations with the Agency and of increasing participation in the Agency's programmes, it was judged that the time had come to examine the possibility of a change in the relationships. In February 1985, Austria and Norway applied to become full ESA Members and the Council of the Agency received favorably these requests and approved the Accession Agreements in October 1985. Agreements between Austria, Norway and the Agency were signed on 12 December 1985. The purpose of these Agreements was to determine the terms and conditions of their respective accessions and, in addition, to develop transitional measures. The "Association" Agreements in force were extended (for some months) up to the date of entry into force of the Agency's Convention for these new members and, at the latest, until 31 December 1986, the date envisaged for the deposit of the ratification instrument of the ESA Convention; should the instrument not have been deposited by this date, the terms and conditions would have been open to renegotiation. During this transitional period, Austria and Norway were considered as far as possible as Member States.

Austria and Norway were invited to take all necessary steps in order that accession would occur before 1 January 1987.

Austria and Norway were placed in the same situation as the other Member States with regard to decisions, rulings, resolutions or any other acts made by the Council and invited to take all appropriate measures to adapt their internal legislation and rules to the rights and obligations resulting from their accession.

A number of debates were necessary to achieve a consensus among Member States on the amount to be retained as "special payment". How should the "current value of the assets of the Agency be calculated? How should "assets" be defined? How could previous payments made through contributions to the optional programmes be taken into account? Finally, an "entrance fee" was retained and the deposits of the ratification instrument were performed on 30 December 1986. The date of entry into force of the Agency's Convention for Austria and Norway had the effect of terminating the previous Arrangements concerning their participation in

15. *Id.*

certain optional programmes, the participation being therefore solely governed by the Declaration previously accepted.

2. *Associate Membership - A Form of Cooperation*

The concept of Associate Member appears in Article XIV of the ESA Convention, entitled "cooperation". Article XIV 3, lays down that:

Such cooperation may also take the form of according associate membership to non-member States which undertake to contribute at least to the studies of future projects under Article V. 1. a. i. (of the Convention- on one of the items belonging to basic activities). The detailed arrangements for each such associate membership shall be defined by the Council by a two-thirds majority of all Member States.

This article XIV was taken unchanged from a provision drawn up when the ESRO Convention was revised in July 1972.¹⁶ The ESRO¹⁷ and ELDO Conventions¹⁸ accorded some non-Member States observer status. This is the status that the drafters of the revised text of the ESRO Convention, and subsequently the ESA Convention, wanted to replace by Associate Member status. An observer was not obliged to make any contribution, but could follow discussions and be informed about the Agency's activities and programmes. The Associate Member turned into an observer bound to pay a specific contribution. The prime objective was to get the observer to express real interest in the Agency's activities and programmes and to demonstrate it by making a contribution, however small. Nevertheless, the observer status did not disappear - it has been reinstated by the rules of procedure of the Council. Rule 23.1 stipulates that "The Council may, by unanimous decision, grant observer status ... This status includes the right to be represented in meetings of the Council." To date, no Member State has been granted this observer status

16. The process of revising the ESRO Convention was abandoned, all the amendments being finalized, due to the decision to embark on the drafting of a new convention for the establishment of ESA. Nevertheless, the work done was not lost. The draft of the revised ESRO Convention was the basis for drafting the ESA Convention. H. Kaltenecker, *The Reform of the European Space Research Organization* - IISL Vienna - Oct. 1972.

17. ELDO Convention, *supra* note 6. The observer status has been granted twice to the European Community Commission at the EJA Council meeting at ministerial level (Rome January 1985 The Hague November 1987).

18. ESRO Convention, *supra* note 7.

on this sole basis (observer status is given through cooperation - or Association Agreement).^{18a}

The Associate Member "status" is not defined by the Convention; its understanding has evolved and the Council has finally adopted guidelines to be used when negotiating the arrangements with a non-Member State.

The first case of implementation (de facto) of this article XIV.3 was that of Ireland, which had signed the ESA Convention on 31 December 1975 but which could not become a Member State until the Convention entered into force and until its own ratification instruments had been deposited. To take into account these constraints, a specific Agreement was concluded in November 1976 between ESA (ESRO conducting its activities under the name of ESA) and Ireland.¹⁹ In pursuance of Article 1 of this Agreement, its purpose was to define the conditions governing the "association" of Ireland with the Agency's activities. This Agreement was drawn up in the context of Ireland becoming an ESA Member State (already signatory of the Convention).

A request for associate membership came from Canada in July 1977. It was not accorded on the grounds in particular that as the ESA Convention was not in force and as this nation was not included in the ESRO Convention, which served as the legal basis for the Agency's activities, something that did not have a legal existence could not be accorded. It was therefore a Cooperation Agreement that was concluded on 9 December 1978 (entered into force on 1 January 1979) for a period of five years and renewed at a later date for a further period of five years.²⁰

Subsequently, requests were made by Austria and Norway. Negotiations with these countries began before the Convention entered into force. The Association Agreement with Austria was signed on 17 October 1979 (prior to the Convention formally entering into force 30 October 1980) and the Agreement with Norway was signed on 2 April 1981.²¹

18a. The observer status has been granted twice to the European Community Commission at the ESA Council meeting at ministerial level (Rome - January 1985 -The Hague -November 1987.

19. Agreement between ESA and Ireland *concluded in November 1976*, ESA BASIC TEXTS.

20. See Bourély, *La participation du Canada aux programmes de l'Agence Spatiale Européenne*, 5 ANNALS AIR & SPACE L. 363 (1980); Bourély, *Le Canada et l'Agence Spatiale Européenne*, 4 ANNALS AIR & SPACE L. 347 (1979); Bourély, *Les relations privilégiées de l'Agence avec certains Etats non membres*, ESA BULL. (No. 21, Feb. 1980); Bourély & Lafferranderie, *Les organisations de l'espace - Jurisclassers de droit international*, FASCICULE 195 (Paris 1981).

21. Association Agreement between ESA and Austria *concluded on October 17, 1979*, ESA BASIC TEXTS (ESA Legal Affairs 1987 ed.)

Article 1 of the Austrian Association Agreement solved the problem as follows:

The purpose of this Agreement is to define the conditions governing the association of the Republic of Austria with the Agency. Once the Convention of 30 May 1975 and this Agreement will have both entered into force, the Republic of Austria shall be considered as an Associate Member of the Agency within the meaning of Article XIV.3 of the Convention." (This Association Agreement entered into force on 1 April 1981).

It should be pointed out that when Austria and Norway were granted Associate Member status, both countries were already participating in several ESA optional programmes, intended taking part in new programmes and, as European States, did not rule out acceding to the Convention at later date.

In the basis of these two Association Agreements, granted to Western European countries, the associate membership status would have had the following characteristics:

- payment of a contribution to the studies of future projects; this financial solution was amplified to include a contribution to two other outputs ("education" and "Earthnet") and a contribution to the "net fixed common costs" (the first items on the basis of average national income and the second at 1%);
- the possibility of participating in optional programmes (subject to detailed arrangements approved by the Participating States);
- the possibility of having two representatives in Council or in subsidiary bodies - who may have the right to vote on issues connected with the programme/outputs to which the Associate Member contributes and the right to be heard on other issues;
- access to information and scientific satellite data. In addition, the Agency puts in as much effort to ensure that Associate Members get a fair industrial return as it does with the Member States.²²

An associate member is invited to use the Agency's facilities and the products developed by it and its Member States. These two Association Agreements were concluded for a period of five years, provided for a review after three years to examine the possibilities of its continuation,

22. *Id.*; Association Agreement between ESA, Norway and Austria concluded on April 2, 1981, ESA BASIC TEXTS.

outright termination, renewal or full membership (renewal was not provided for in the Association Agreement with Norway). Under these two Agreements, associate membership was regarded, as a stepping stone to full membership, as a transitional, educational phase that should lead to full membership.

An event, namely the formal request made by Finland in December 1984, to be granted such associate member status, lead the Council to define the meaning of the expression used in article XIV.3 of the Convention.²³ In February 1985, the Council set up an ad hoc Working Group to look into the issue of associate membership. The Group's conclusions were adopted by Council in October 1985 together with guidelines.²⁴

Finland having renewed its request to become an associate member, the Agency entered into negotiations on that basis with the Finnish authorities. In June 1986, the Council authorised the Director General to sign the Association Agreement. The Agreement was signed in Helsinki on 19 September 1986 together with two other Agreements, one on the participation of Finland in the ESA science programme, the other concerning the participation of Finland in the earth observation preparatory programme.

When defining the meaning of associate member, two approaches were discussed in the Council Working Group:

- associate membership, as a preliminary to accession. In such a case, this status should only be granted to a "European" State and should contain a time limit;
- associate membership, as a form of cooperation, offered to any non-Member State and decoupled from accession.²⁵

Finally, a consensus was reached on a separation of the two concepts of associate membership and accession - associate membership is not a preliminary to accession, it neither leads automatically to accession nor extends it.²⁶ Accession will require a unanimous vote.

Associate membership is and remains a qualified form of cooperation, which can be granted to any non-Member State whether European or not. It will reflect a certain level of cooperation and, therefore, has political significance. This status will correspond to the situation of countries, European or not, that wish to establish relatively close links

23. ESA Council papers.

24. *Id.*

25. *Id.*

26. *Id.*

and actively cooperate with the Agency, but which, even in the long term, could not be expected to fulfill the conditions for accession.

The guidelines endorsed by Council for negotiating an Association Agreement²⁷ focus on the following points:

- the associate member shall participate in the expenditure entered in the general budget of the Agency and shall contribute a fraction on the basis of its average national income at factor cost (like any Member State);
- the associate member shall not have the right to participate in the basic technology research programme (reserved for Member States);
- it may participate in projects conducted under the Agency's scientific programme by providing experiments or observation facilities;
- the associate member shall have observer status on the Council with respect to items of common interest. It may not be invited to attend meetings of subsidiary bodies. It shall not have voting rights;
- the associate member may have access to the facilities and services of the Agency. It shall bear the cost incurred in accordance with the rules and procedures applicable to Member States;
- it may be entrusted with the execution of work under the Agency's programmes without any guarantee of industrial return on its financial participation;
- it shall favor the use for its own needs of European space transportation systems and the facilities and products of the Agency.

Associate membership shall be accorded for a period in principle of not less than five years. Such membership may be renewed for a subsequent period by written agreement at least six months before the expiry date. Participation in an ESA optional programme would be encouraged.

The Council has tried to keep associate membership attractive to both the associate member and the Agency, to enable the associate member to participate in the functioning of the Agency, whilst retaining a less favorable status than that of a Member State.

3. *Participation in programmes*

Participation in either the Agency's science programme or in an optional programme represents the ordinary and principal way of participating in the Agency's programmes and activities.

Participation in an optional programme is open to non-Member States and to international organizations (associate membership is reserved to non-Member States only). A non-Member State may take part in one or more programmes, for example, Finland is participating in the science programme (one of the mandatory programmes) and in the Earth Observation Preparatory Programme.

Subject to a decision to be taken by Council by unanimity on the principle, the rights and obligations of participating States are defined in an Agreement concluded between the Agency and the non-Member State concerned. This Agreement defines the modalities approved by the Participating States. The status of "Participating State" does not, in practice, differentiate between Member or non-Member State. All participating States (even non-Member States) have the same right to vote, attend meetings of the body ("Programme Board") in charge of monitoring the programme and also benefit from the Agency's obligation to ensure an industrial return in proportion to a country's contribution. The non-Member participating in an optional programme will, through the participation Agreement, accept the terms of the legal instruments which, according to the ESA Convention, govern the execution of the programme, i.e. the Declaration and the Implementing Rules.²⁸

In conclusion, the ESA Convention offers an interesting equilibrium between, on the one hand, a controlled enlargement by accession (membership is quite limited and should remain attractive) and on the other, the possibility of various levels of international cooperation in the form of involvement in the Agency's activities and programmes.

A non-Member State can be in one of the following situations as regards its relations with the Agency:

- a cooperating State (article XIV.1 allows for various forms of cooperation agreements - from an "umbrella" agreement to a close cooperation, such as that with Canada);
- a participant in an optional programme;
- an associate member;
- or even an observer.

28. See ESA Convention, Annex III (Declaration and Implementing Rules).

A non-Member State can, if necessary, be in more than one situation at the same time.

It is the duty of the Council to treat with caution these various forms of enlargement of the Agency and to reconcile the strengthening of the Convention's objectives with the necessity of international cooperation.

PROTECTING SPACE ASSETS: A LEGAL ANALYSIS OF "KEEP-OUT ZONES"

F. Kenneth Schwetje*

Aerospace Daily recently reported that the Strategic Defense Initiative Organization (SDIO) made reference in a Senate report to "Keep-Out Zones" as a useful way of protecting space-based objects.¹ The notion of insulating space objects with protective zones is neither novel nor original with the SDIO. This paper will demonstrate that the concept has been discussed by a number of authors since the earliest days of space exploration.² While the topic has been of interest academically, no genuine need to establish any such zones has yet emerged. The renewed interest in "Keep-Out Zones," "Safety Zones," "Zones of Exclusivity," and a host of other names has been promoted by a growing concern that any space-based weapons systems deployed by the United States could be easily neutralized by Soviet "space mines."³ There seems to be some questions, at least in the West, as to whether or not such zones can be established under the current outer space legal regime. What follows first is a discussion of the technical concept of these keep-out zones. Next, various analogous situations on Earth are examined in an effort to determine how international law treats the exercise of such a claim, falling short of sovereignty.

Soviet jurists have far less difficulty with the notion than we do in the United States and Europe. An examination of the writings of preeminent Soviet scholars demonstrates that they have already expressed a willingness to establish zones around space objects, a fact often

* Chief, Air and Space Law, J.A.G.'s Dept., U.S.A.F., Washington, D.C.; Chair, A.B.A. Aerospace Law Committee.

The views and conclusions expressed in this paper are those of the author and do not necessarily reflect the official policy or position of the Department of Defense, United States Air Force, or the United States Government.

1. *SDIO Response to Senate Report Mentions 'Keep-Out Zones,'* AEROSPACE DAILY, April 15, 1987, p. 85.

2. MYRES S. MCDUGAL, HAROLD LASSWELL AND IVAN VLASIC, LAW AND PUBLIC ORDER IN SPACE 301-311 (1963).

3. These are satellites deployed within lethal range of a target space object. In the optimum mode of deployment, they would continuously trail their target. Using conventional or nuclear charges, the space mine could destroy its target on command from Earth or could be salvage fused to explode when attacked or disturbed.

overlooked by Western commentators. In contrast to the consistent Soviet position, the comments of some Western writers are set forth. The paper concludes with recommendations on how the concept might be employed.

The Notion of Zones

Various proposals have been made on how a zone regime might be fashioned. Some are predicated on bilateral or multilateral agreements, others could be established unilaterally. Often, the same terminology is used to describe similar, but not identical, arrangements for separating space objects.

Frequently, the idea of zones is part of a more elaborate scheme to devise "rules of the road" for outer space traffic.⁴ One author includes "Keep-Out Zones" as a cardinal rule of the road. He defines the zone as "an area of space through which the space objects of other nations could not pass without permission."⁵ The model Keep-Out Zone envisioned by this author and that of the Office of Technology Assessment might include the following elements:⁶

- Keep 100 kilometers and three degrees out-of-plane from foreign satellites below 5000 km.
- Keep 500 kilometers from foreign satellites above 5000 kilometers except those within 500 kilometers of geosynchronous altitude.
- One pre-announced close approach at a time is allowed.
- In the event of a violation of the rules above, the nation of registry of the satellite that most recently initiated a maneuver "burn" is at fault and guilty of trespass.
- Satellites trespassing upon keep-out zones may be forcibly prevented from continued trespass.

In the late 1970s, *M. I. Lazarev* wrote an article advocating the use of protective zones in space.⁷ He considered it obvious that security zones would be created around "space cities." The dimensions of the zone could be determined by technical specialists. Peaceful passage would be permitted through the zones. *Lazarev* opined that absent security zones,

4. Collins & Williams, *Towards Traffic Systems for Near-Earth Space*, PROC. 29TH COLLOQ. L. OUTER SPACE 161 (1986).

5. DalBello, 'Rules of the Road': *Legal Measures to Strengthen the Peaceful Uses of Outer Space*, PROC. 28TH COLLOQ. L. OUTER SPACE 9 (1985).

6. U.S. CONG. OFF. TECH. ASSESS., *ANTI-SATELLITE WEAPONS, COUNTER-MEASURES, AND ARMS CONTROL* at 136 (1985).

7. Lazarev, *Future Space Cities*, 5 ANNALS AIR & SPACE L. 529 (1980).

it would be necessary to establish the space-equivalent of the territorial sea.⁸

Another similar idea is the product of legal research done by *Lt. Col. A. J. Butler*, USAF (ret.). *Colonel Butler* designed a system to protect manned space assets. Under *Butler's* scheme, two distinct types of zones would be established. The first would be a true safety zone that required permission prior to entry and would be of limited dimension. The extent of the safety zone would only be as large as necessary to protect activities in which safety was a prime factor. Outside the safety zone, a Space Defense Identification Zone (SPADIZ) would be established. The SPADIZ would be quite large; all approaching spacecraft would be required to identify themselves and give prior notice of approach.⁹

Blau and *Goure* proposed the creation of "exclusionary zones," the penetration of which provides a recognizable and acceptable presumption of a threat.¹⁰ They define the crossing of such zones as creating a reasonable expectation of attack, and they would, accordingly, preserve the right to respond with force.

The most elaborate system has been proposed by *Albert Wohlstetter* and *Brian Chow*.¹¹ However, the "Space-Defense Zones" (SDZ) differ in three aspects from other "Keep-Out Zone" proposals. First, rather than attempting to protect every satellite with a critical mission, an SDZ protects the mission itself. Secondly, the zones are not attached to the satellites; *Wohlstetter* and *Chow* reserve entire sectors for satellites of various defense groupings. And, finally, they find previous proposals silent or ineffective in dealing with violations.

They have fashioned a number of self-defense zones to be assigned to the Western Alliance or the Soviet Bloc. Each side would have the right to decide which of the other side's satellites may remain in its zone. In the event of a violation, there is an explicit right to inspect, expel or render harmless invading satellites. This SDZ arrangement would make the entire "shell" inaccessible to an attacker, so the threat of space mines would be lessened.

8. *Id.*, at 532.

9. To the author's knowledge, the concept of SPADIZ originated with *Lt. Col. Butler* and is contained in unpublished memoranda written by him.

10. T. BLAU & D. GOURE, *MILITARY AND DIPLOMATIC ISSUES IN ACTIVE SPACE DEFENSE* 39 (1980).

11. A. WOHLSTETTER & B. CHOW, *SELF DEFENSE ZONES IN SPACE* 29-32 (1986).

Zones On and Above Earth

In the earthly environment, the international community has generally not objected to the establishment of special zones if the zones under the circumstances were reasonable and did not unduly hamper or interfere with another nation's freedom to navigate the seas or supra-adjacent airspace. Important in the following discussion is the notion that the key to gaining international acceptance of such zones has been that they extend no claim of sovereignty. There is a clear distinction between sovereignty and the right to exercise a preventive, protective, or regulatory jurisdiction.¹²

Various zones have been declared and legally recognized. These zones have various names and serve diverse purposes.¹³ During periods of hostility, extensive controlled areas have been established. During World War I, thirty-three defensive zones were created by the United States and in World War II, seventeen maritime control areas were created by this country.¹⁴

Another type of zone utilized in both times of tension and hostilities is the *cordon sanitaire*. Not universally recognized in international law because of its restrictive form, the establishment of a *cordon sanitaire* normally allows a nation to engage and destroy a potential enemy or unidentified aircraft or vessel without further notice.¹⁵ Action such as this could be considered unreasonable in peacetime and has certain dubious characteristics in wartime.¹⁶

12. C. HYDE, *INTERNATIONAL LAW*, I 467 (1945).

13. Some examples are safety zones, protective areas, exclusive zones, identification zones, *cordons sanitaire*, self-defense areas, zones of responsibility, security and warning zones.

14. M. WHITEMAN, 4 *DIGEST OF INTERNATIONAL LAW* 389 (1963).

15. Gilliland, *Submarines and Targets: Suggestions for New Codified Rules of Submarine Warfare*, 73 *GEO. L. J.* 975, 991-996 (1984-85). This comment contains a lengthy exposition on the use of zones in modern naval warfare. Of special interest is the discussion of the "Total Exclusion Zone" established by the British during the Falkland Islands crisis.

16. Regan, *International Law and the Naval Commander*, 107 *U.S. NAVAL INST. PROC.* 51 (1981). This article discussed declaration of "moving" zones that accompany a naval task force. Such a concept is analogous to the establishment of zones around space objects. The author points out the drawbacks of such moving zones: first, they require the task force to broadcast its current and planned positions well in advance, something naval vessels are not disposed to do for obvious reasons; second, the zones would follow the task force, even in heavily trafficked areas, and therefore could greatly impede freedom of the seas and navigation in congested areas. The article proposes only the use of stationary zones around geographic areas.

Numerous warning and temporary security zones have been created to warn ships and aircraft that portions of the high seas were to be used for testing nuclear weapons, ballistic missiles, or naval gunnery exercises.¹⁷ Between 1946 and 1954, the United States established warning areas of from 30,000 to 400,000 square miles in the Pacific. These zones are considered legal due to the negligible interference with normal shipping. When such zones are established, they do not prohibit the entry of ships and aircraft and thus do not constitute a blockade, but only warn of dangerous activity in the zone.

Both Iran and Iraq have declared such zones in the Persian Gulf. The United States issued a Notice to Mariners (NOTMAR)¹⁸ and Notice to Airmen (NOTAM)¹⁹ in the Gulf region that warned ships and aircraft not to approach closer than 5 nautical miles (nm) without permission. Those craft violating these warnings risk defensive measures.

International law recognizes safety zones as well as warning zones. The 1958 Convention on the Continental Shelf states that safety zones of up to 500 meters can be established around man-made installations on the

17. MCDUGAL, *supra* note 2, at 298.

18. NOTMAR: U.S. naval forces operating in international waters within the Persian Gulf, Strait of Hormuz, the Gulf of Oman, and the Arabian Sea north of twenty degrees north are taking additional defensive precautions against terrorist threats. All surface and subsurface ships and craft are requested to avoid closing U.S. forces nearer than 5 nautical miles without previously identifying themselves. U.S. forces, especially when operating in confined waters, shall remain mindful of navigational considerations of ships and craft in their immediate vicinity. It is requested that radio contact with U.S. naval forces be maintained on channel 16, 121.5 mhz VHF or 243.0 mhz UHF when approaching within five nautical miles of U.S. naval forces. Surface and subsurface ships and craft that close U.S. naval forces within five nautical miles without making prior contact and/or whose intentions are unclear to such forces may be held at risk by U.S. defense measures.

These measures will apply when U.S. forces are engaged in transit passage through the Strait of Hormuz or when in innocent passage through territorial waters and when operating in such waters with the approval of the coastal state.

This notice is published solely to advise that measures in self-defense will be exercised by U.S. naval forces. The measures will be implemented in a manner that does not impede the freedom of any vessel of any nation or state.

19. NOTAM: U.S. naval forces in the Persian Gulf, Strait of Hormuz, Gulf of Oman, and Arabian Sea (north of 20 degrees north) are taking additional defensive precautions against terrorist threats. Aircraft at altitudes of less than 200 ft. at ground level which are not cleared for approach/departure to or from a regional airport are requested to avoid approaching closer than five nautical miles and to establish and maintain radio contact with U.S. naval forces on 121.5 megahertz (mhz) VHF or 243.0 mhz UHF. Aircraft which approach within five nautical miles at altitudes less than 2000 ft. at ground level whose intentions are unclear to U.S. naval forces may be held at risk by U.S. defensive measures.

continental shelf. A later comprehensive treaty incorporates the same concept of safety zones around artificial islands, research facilities and mining activities.²⁰ Lest the reader be left with the impression that this state of affairs arises from treaty provisions, the United States unilaterally declared safety zones around radar platforms as far as 100 miles away from our coast.²¹

A declared zone that has gained widespread acceptance in peacetime is the air defense identification zone (ADIZ). As a condition of entry into United States airspace, civil aircraft must pass through this coastal zone. The pilots are required to report their position not less than one hour and not more than two hours average direct cruising distance from the United States. In establishing the ADIZ, the United States is not claiming sovereignty over the high seas; the consequence of failing to comply with the rules for the ADIZ is the risk of interception by military fighter aircraft and a possible denial of entry into U.S. airspace.

In 1951, Canada promulgated a similar regulation in the interest of national security, the Canadian Air Defense Identification Zone (CADIZ). The CADIZ requirements are more severe than those of the U.S. ADIZ in that position reports must be made within the defense zone

20. United Nations Convention on the Law of the Sea, Article 60 states:

(4) The coastal State may, where necessary, establish reasonable safety zones around such artificial islands, installations and structures in which it may take appropriate measures to ensure the safety both of navigation and of the artificial islands, installations and structures.

(5) The breadth of the safety zones shall be determined by the coastal State, taking into account applicable international standards. Such zones shall be designed to ensure that they are reasonably related to the nature and function of the artificial islands, installations or structures, and shall not exceed a distance of 500 meters around them, measured from each point of their outer edge, except as authorized by generally accepted international standards or as recommended by the competent international organization. Due notice shall be given of the extent of safety zones.

(6) All ships must respect these safety zones and shall comply with generally accepted international standards regarding navigation in the vicinity of artificial islands, installations, structures and safety zones.

(7) Artificial islands, installations and structures and the safety zone around them may not be established where interference may be caused to the use of recognized sea lanes essential to international navigation.

(8) Artificial islands, installations and structures do not possess the status of islands. They have no territorial sea of their own, and their presence does not affect the delimitation of the territorial sea, the exclusive economic zone or the continental shelf.

United Nations Convention on the Law of the Sea, Dec. 10, 1982, art. 60, U.N. Pub. E. 83. V. 5 (1983) 21 I.L.M. 1261 (1982).

21. MCDUGAL, *supra* note 2, at 298. These were "Texas towers," radar built on structures similar to oil drilling rigs.

whether or not the aircraft is bound for Canada.²² In 1961, the French established a "zone of special responsibility" extending up to 80 miles off the coast of Algeria. The French did so in the belief that Algerian nationalists might use air routes to transport supplies and manpower.²³

According to press reports, the French regulations required the filing of flight plans, identification of passengers flying within the assigned aerial corridor, and contact with ground identification stations. Apparently, the slightest infraction of any of these rules resulted in the interception of the offending aircraft by French military planes.²⁴

Soviet Views

"In an effort to protect further their property in space, yet at the same time allow for the possibility of authorized visits, the Soviets have proposed the establishment of security zones (*zony bezopastnosti*) at some distance around their spaceships."²⁵ In the definitive work on Soviet space law positions, Zhukov and Kolosov state:

That is why Soviet experts have raised the question of surrounding space objects with safety zones, within which the states on whose registry the objects are carried would exercise their sovereign rights of jurisdiction and control... The establishment of such zones could obviously not be tantamount to the appropriation of territory. International maritime law is familiar with the establishment of various zones of medical and customs control on the high seas adjacent to territorial waters.... Just as the establishment of such zones cannot be interpreted as appropriation of territory, so the establishment of safety zones around space objects cannot be seen as a sovereignty claim to the territory or space occupied by these zones. This is not just because such safety zones are temporary - they may be established for a sufficiently long period.... A territory under the sovereignty of some state differs essentially from any functional zones on territories in common use in that its status and forms of use are not subject to international

22. MCDUGAL, *supra* note 2, at 308.

23. *Id.*

24. *Id.*, at 309.

25. Russell, *Military Activities in Outer Space: Soviet Legal Views*, 25 HARV. INT'L L. J. 155, 184 (1984).

settlement, but are determined exclusively by the authority of the state exercising sovereignty over it.²⁶

Other jurists are no less supportive of the concept of zones around space objects. *Vitaly D. Bordonov* predicts:

The development of rapidly maneuverable space objects brings to the fore the problem of insuring the necessary conditions for the safe and effective functioning of space objects, especially those carrying a crew on board. For this purpose the state involved may establish around them zones of security within the bounds of which all the activities of space objects finding themselves in such zones must proceed in keeping with previously agreed stipulations. In the case of a threat to one space object from another stemming from a breach of rules of maneuvering in a zone of this kind, the state concerned has a right to take protective measures to remove this threat.²⁷

The concerns expressed by Soviet writers vary; what does not is their expression of the need for and legality of exclusionary zones in space. Witness the comments of *B. G. Dudakov* arguing for a Convention to specify the distance limit around satellites to prevent "cosmic piracy."²⁸ Of great interest is this author's discussion of what constitutes this new form of piracy. He claims that:

Even short-duration stationing (without any activities on the part of the pirate) in the vicinity of the satellite, which, as a rule, is equipped with rather sensitive scientific devices...may result in interference and substantially affect the satellite performance.²⁹

The Soviet Union actively campaigned for years to have the U.S. Space Shuttle considered an ASAT weapon.³⁰ The vigor of these efforts has diminished as the Soviet Union comes closer to realizing an opera-

26. ZHUKOV & KOLOSOV, *INTERNATIONAL SPACE LAW* 64 (1984).

27. V. Bordonov, *Rights of States as Regards Space Objects*, PROC. 24TH COLLOQ. L. OUTER SPACE 90 (1981).

28. Dudakov, *On International Legal Status of Artificial Earth Satellites and the Zone Adjacent to Them*, PROC. 24TH COLLOQ. L. OUTER SPACE 97 (1981).

29. *Id.*, at 100.

30. Deudney, *Unlocking Space*, FOREIGN POL'Y (Winter 1983-84 at 101).

tional space plane of its own. The complaint of *Dudakov* and others is that the Shuttle's ability to pick up space objects in orbit foreshadowed "the prospective investigation of Soviet satellites and their destruction, if necessary."³¹

Implicit in the works of all Soviet international lawyers considering the issue is that the exclusionary zones are an inherent right of the state of registry. While advocating international agreements to accomplish this end, not one Russian lawyer has ever denied the possibility of a unilateral declaration of exclusionary zones.

While Soviet legal scholars have created the framework necessary to establish zones around space objects, criticism of the U.S. SDI program and such zones is reflected in technical writings of Soviet scientists. In their review of the vulnerability of SDI to Soviet countermeasures, a group of scientists ridiculed "sovereignty zones" because

...the size of the zone would be too small to protect a station against antisatellite weapons, say space mines. At the same time, these zones could not be extended indefinitely without disrupting normal peaceful activities in space.³²

Absent from the quoted portion of the article and elsewhere in the book is any suggestion that the establishment of sovereignty zones would be violative of international law.

U. S. Views

No true consensus exists among Western authorities concerning space defense zones. At one end of the spectrum, analyses such as *Colin Gray's* represent the anti-zone position:

Unfortunately, there is no legal basis for an American assertion of sovereign prerogatives over space zones around its satellites. By way of analogy again, the U. S. would be asserting the right to sink, on suspicion only, any Soviet (or other) vessel that approached too closely, in unilateral U. S. judgment, to a U. S. aircraft carrier in time of peace or crisis. The obvious fact that the suspicious trailing object (candidate space mine) in space would be unmanned would render a U. S. decision to shoot somewhat less burdensome than in the case of a trawler at sea, but it is still virtually inconceivable that the U. S. would destroy Soviet spacecraft

31. *Dudakov, supra* note 28, at 98.

32. Y. VELIKHOV *et al.*, *WEAPONS IN SPACE: THE DILEMMA OF SECURITY* 46 (Moscow, Mir Press, 1986).

in peacetime on suspicion. Not to mince words, such destruction, unsanctified by international law, would be an act of war. Preventive or preemptive self-defense has its strategic merits as a code of conduct, but it also invites anarchy. However, the potential U. S. (or Soviet - these arguments could cut both ways) dilemma cannot be ignored, even if there is no obvious plausible solution. A \$3 million space mine could disable or destroy a \$5 billion HEL battle station.³³

Gray's analysis is flawed in a number of respects: As is amply demonstrated above and below, many of the world's most notable legal scholars in both the East and West have provided legal justification for keep-out zones; secondly, the destruction of a trespassing space object would not be "unsanctified" by international law and under most circumstances not amount to an act of war; and finally, preemptive self-defense hardly amounts to anarchy. Under all but the most unusual circumstances a *reasonable* application of force enhances stability.

Gray does concede that, given the realities of such a scenario, if the United States placed battle stations in orbit "that were absolutely critical to the U. S. theory of national security, it would have to bite the bullet...and enforce an expansively defined 'Keep-Out Zone.'"³⁴

The majority U. S. position might best be described as uncertain.³⁵ Most writers have a great deal of trouble reconciling keep-out zones and article II of the Outer Space Treaty which reads:

Outer Space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.³⁶

This article is one of the foundations of the current legal regime for outer space. The original expression of this principle is found in United Nations General Assembly Resolution 1348, reflecting a desire of the General Assembly to avoid in outer space the rivalries caused by claims of sovereignty. The concept was repeated in Resolutions 1472,

33. C. GRAY, *AMERICAN MILITARY SPACE POLY*, 67 (Cambridge: ABT Books, 1982).

34. *Id.*, at 68.

35. DalBello, *supra* note 5, at 10.

36. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies January 27, 1967, art. II 18 U.S.T. 2410, T.I.A.S. 6347, 610 U.N.T.S. 205 (effective October 10, 1967) [Outer Space Treaty].

1721, and 1962. Article II is considered declaratory of customary international law, binding on all nations irrespective of whether they are party to the Outer Space Treaty or not.³⁷ This prohibition against national appropriation must be read in conjunction with the provisions of the entire Treaty, including article I, a portion of which states that

Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.³⁸

Thus, appropriate non-aggressive uses of the space environment are permitted as long as no claim of exclusive use is based on sovereignty. Certain areas of the earth's surface are considered *res communis*, that is, the territory of no nation, available for all to use. However, historically the international community has recognized the right of jurisdictional competence, but not sovereignty over limited areas of what is recognized as *res communis*. This limited jurisdictional authority must meet the criteria of reasonableness under the circumstances, both with regard to the size of the zone created and the restrictions imposed on the use of the zone by other nations. Professor McDougal has eloquently set forth this standard and reminded us that reciprocity would protect against abuse. In elaborating on the test, he explained:

For the detailed appraisal of the lawfulness of particular claims to exercise occasional exclusive competence in outer space, the most appropriate test would appear to be the traditional one of reasonableness. It is by this test that the authoritative decision-makers of the world community have consistently during modern times, with respect to many different sharable resources, decided between competing claims to inclusive use and authority, as well as upon the lawfulness of many different claims seeking to restrict that inclusivity for a variety of exclusive purposes. The burden of proving reasonableness should of course in each particular instance fall upon the state applying its authority in outer space to the spacecraft of other states. The reasonableness of the measures undertaken may be determined on the basis of a careful balancing of all the variable factors in context, with special emphasis upon the realities of the asserted threats. The multifactoral analysis

37. N. M. MATTE, *SPACE ACTIVITIES AND EMERGING INTERNATIONAL LAW* 275 (Montreal, CRASL, 1984).

38. Outer Space Treaty, art. I.

we recommend for the appraisal of reasonableness of particular claims should, further, consider the relation between the degree of authority asserted and the degree of authority necessary to the achievement of the purpose, the area affected by such measures, especially its importance to other members of the international community and, generally, its significance for the conduct of peaceful exploration of space, the level of crisis in the earth-space arena at the time of assertion, the availability or the absence of alternatives that might achieve the same purpose but with less cost, the duration of interference resulting from the claim, and so forth.

Any claim of such occasional competence by one state must, of course, carry the promise of reciprocity, in comparable circumstances, to all other states. The best protection of the general community against abuses in the exercise of exclusive competence may be found in the imperatives of clarifying a common interest, including both mutual tolerance and the realistic expectation of prompt retaliation against unreasonable demand. The requirements of "giving" for "taking," thus, impose necessary limits upon arbitrary and wanton assertions of authority.³⁹

If such zones are created and they unduly interfere with space navigation, the zone created would be deemed unreasonable and therefore not legal under international law. If reasonableness is the correct test, and the author submits that *Professor McDougal* writing a quarter of a century ago was correct, zones around space objects need not be rejected *per se* based on the articles of the Outer Space Treaty. Applying well-recognized principles of international law developed for terrestrial application, such theories can be applied in the space environment.⁴⁰

39. MCDUGAL, *supra* note 2, at 293.

40. Professor DeSaussure has stated: "The Outer Space Treaty provides that outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means. Whether space stations are treated as instrumentalities or as extended territorial enclaves, this prohibits the creation of any territorial buffer zones around them. It may not, however, prohibit the creation of circumventing non-sovereign zones for safety or security. Space stations may eventually be regarded as real rather than personal property when they begin to shelter human settlements. They may then be classified as territory, floating space islands in constant orbit around the earth. The station's function, location, design, permanence, orbital path and habitability distinguish it from other space objects. It has been compared to a deepwater port, which is a fixed place on the high seas serving as a way station. These ports have a special status." DeSaussure, *The Impact of Manned Space Stations on the Law of Outer Space*, 21 SAN DIEGO L. REV. 985, 997 (1984) (footnotes omitted).

Precedent exists for declaring at least a temporary exclusive use of a *res communis* as described above when nations conduct naval maneuvers, satellite launches and recoveries, missile and nuclear bomb tests.⁴¹

A number of American policy analysts are consistent with the views of the Soviet jurists. One such example is the "Blau-Goure Doctrine" based on the principle that the exercise of the right of self-defense is part of national policy and international law, even in space.⁴² These authors recognize the important political problems to be faced including the measured definition of zones, their purposes and their effective presentation publicly.⁴³

Returning to the proposals of the OTA,⁴⁴ the rationale for the rules pertaining to keep-out zones fairly well summarize Western arguments in their favor:⁴⁵

- First, ASAT weapons such as nuclear interceptors would have to be kept at a range of several hundred kilometers from moderately hardened satellites in order to protect them;
- Satellites in geostationary orbit are already so closely spaced that keep out zones large enough to protect them could not be established without displacing existing satellites and reducing the number of available "slots";
- Third, a number of critical military missions could be performed by satellites in supersynchronous orbit, that is, above the geosynchronous orbit. In this region there would be adequate room to accommodate large keep-out zones;
- Fourth, in the deep space area below geosynchronous orbit, several satellites normally occupy the same orbit, such as the highly elliptical, semi-synchronous "Molniya" orbits. Again, adequate room exists to establish keep-out zones of several hundred kilometer radius.

41. DalBello, *supra* note 5, at 10.

42. Blau & Goure, *supra* note 10, at 39. The Outer Space Treaty, art. III states that "State parties shall carry on activities in the exploration and use of outer space in accordance with international law, including the Charter of the United Nations...." See *infra* note 48 (discussion of the right to self-defense).

43. *Id.*, at 40.

44. See *supra* note 6.

45. *Supra* note 6, at 136.

- The proliferation of satellites in low-Earth orbit makes keep-out zones impractical. However, smaller zones could be established and different orbital planes could be required;
- Pre-announced close approaches would be permitted. These would be primarily for the purpose of inspection to determine if a satellite had a nuclear weapon on board.

In conclusion of its discussion on keep-out zones, the OTA recognized that any such regime will need careful tailoring to prevent such abuses as establishing so many zones to in effect create a space blockade.

Conclusion

While a number of conclusions can be drawn from the discussion above, certain obvious ones must be drawn:

- There may be no absolute legal impediment to the establishment of zones around any type of space object. The huge expanses of space and the speeds of spacecraft will allow and require substantial zonal dimensions. It is unreasonable to expect the crews of manned objects in space to allow the uncontrolled approach of other satellites. Strategic stability will be enhanced as the superpowers and their constellations of allies find a certain degree of security for their critical satellites.
- The establishment of zones would not seek to limit the production or deployment of space weapons; this would be left to other agreements. It would set up an information and clarification system whereby ambiguous acts in space could be explained. The Archduke Francis Ferdinand of World War III may very well be a critical Soviet or American satellite hit by a piece of space debris during a time of crisis.⁴⁶ Minimum distance requirements and the prohibition against close approaches are only an extension of well-tested terrestrial examples.⁴⁷

46. Duedney, *supra* note 30, at 98.

47. For example, the US-Soviet Agreement on Prevention of Incidents at Sea, May 1972, which requires surveillance ships to "stay at a distance which avoids the risk of collision and...avoid executing maneuvers...endangering the ships under surveillance," Art. 3(4). See Stojak, *Current Proposals for the Future Control of Outer Space Weaponization*, 10 ANNALS AIR & SPACE L. 453, 469 (1985), and S.M. Lynn-Jones, "A Quiet Success for Arms Control: Preventing Incidents at Sea," INTL SECURITY 154-85 (1985).

- Based on the extensive expression of approval by Soviet jurists, the Soviet Union would have no legal soul-searching if it chose to implement zones around its space objects. While Western scholars debate the merits of space zones, our Eastern colleagues stand ready to establish them.

- From a military point of view, keep-out zones may not be the most efficient scenario to protect critical national security assets. Policing these areas may be close to impossible. Contrary to popular belief, NORAD does not constantly observe every satellite in orbit every minute of every day. This year, a Soviet satellite passed one of ours in geosynchronous orbit and it was not detected by NORAD.

- Military space planners are moving now to consider proliferation to be a reasonable way of ensuring survivability against ASAT's. An increase in the number of space objects will greatly complicate the task of keeping space defense zones under observation, as well as difficulty in enforcing transgressions in the zone. From a purely cost-effectiveness perspective, it may be more desirable to have a redundant system capable of sustaining losses with minimal mission impairment than trying to protect one extremely expensive, vital satellite that must be observed constantly and protected. This approach of deploying a hundred Volkswagens rather than one Rolls-Royce also makes sense when one considers the possibility of accidental destruction by collision with space debris or some catastrophic system failure.

- Notwithstanding all of the other military considerations, some thought must be given to the plausibility of the Soviet Union actually being able to accomplish a successful, simultaneous attack on every critical U. S. space asset. Anything less could put the Soviets at a disadvantage during a preemptive first strike scenario. Yet, the reality of the situation becomes mind-boggling when one considers that a potential aggressor would have to rely on largely untested weapons and untried tactics, with only one chance for success, under circumstances that would tax the most sophisticated command, control, and communications system, which the Soviets have so far failed to produce. A more practical approach to the protection of space assets may be derived from measures other than drawing a line in space and daring the other side to cross it.

- The defense of space-based assets would be consistent with the Charter of the United Nations. Article 51 of the Charter recognizes the inherent right of self-defense if an armed attack occurs. Even if one argued successfully that the placement of space-mines next to valuable satellites did not amount to an armed

attack, the U. S. position has always been that the pre-existing law with regard to self-defense survives unimpaired by any provision of the Charter. In the view of *Professor Oscar Schachter*, international law permits the use of legitimate self-defense in advance of actual attack.⁴⁸ He states that

...we must recognize that there may well be situations in which the imminence of an attack is so clear and the danger so great that defensive action is essential for self-preservation.⁴⁹

The purpose of this paper has been to demonstrate certain legal and policy arguments that can be made in favor of keep-out zones should the necessity arise to establish them. No agency of the U. S. Government has advocated such a practice in the near future. The article began with a speculation on the part of SDIO on the efficacy of keep-out zones to protect against space mines. Such zones arguably could be established consistent with accepted principles of international law; however, no need has yet prompted such a move. For a variety of reasons, space mines and keep-out zones may be bad ideas whose time will never come. The categorical rejection of space zones for various purposes of safety, security, and traffic management, however, would be a grave mistake. If we truly believe that space can be colonized by earthkind, these concepts should be considered to promote safety, security, and stability.

48. Schachter, *The Right of States to Use Force*, 82 MICH. L. REV. 1620, 1634 (1984).

49. *Id.*

**SPACE COMMUNICATIONS TO AIRCRAFT:
A NEW DEVELOPMENT IN
INTERNATIONAL SPACE LAW (PART II)+**

*Dr. Wolf D. von Noorden**

The first part of this article concluded by noting the Fourth Recommendation of the International Conference on the Establishment of a Maritime Satellite System. This was that a study should be made of the possible use by INMARSAT of multi-purpose satellites providing both a maritime mobile and an aeronautical mobile communications capability.

Pursuant to this recommendation, the INMARSAT Directorate undertook technical studies of aeronautical satellite communications, and held detailed discussions with the International Civil Aviation Organization (ICAO), the International Air and Transport Association (IATA), airlines, aeronautical industry representatives and other members of the aeronautical community. The Director General reported on the results of these discussions to the Third Session of the INMARSAT Assembly, held in October 1983.¹ By this time the ICAO Council had already expressed interest in the availability of mobile satellite telecommunications for the international civil aviation community.² Also, INMARSAT had modified the Request for Proposals for its second generation satellites, to provide for a communications capability in the aeronautical mobile 1-1 satellite 'R' band.

The INMARSAT Assembly noted the Director General's report and requested the Director General "to study what amendments to the Convention and Operating Agreement would be desirable relative to the provision of aeronautical satellite telecommunications, and to report thereon to the next session of the Assembly."³

+ Part I of this article appeared in 15 J. SPACE L. 25-34 (1987).

* Legal Adviser, INMARSAT. The views expressed in this article are those of the author and not necessarily those of any organization with which he is or has been connected.

1. ASSEMBLY/3/7.
2. ICAO doc. C-WP/7941 at 2-3.
3. ASSEMBLY/3/7/para.11.2.

The Amendment Process

The procedures established for amendment of the INMARSAT Convention and Operating Agreement are relatively lengthy.⁴ Amendments may be proposed by any Party or, in the case of the Operating Agreement, by any Signatory. The proposed amendments are circulated to all Parties and Signatories for comment, after which they are considered by the Council, which in turn expresses its views to the Assembly. If adopted by the Assembly, the amendments enter into force after individual notices of acceptance have been received from a special majority of the parties.

The Director General submitted some draft amendments for initial consideration by the INMARSAT Council at its Eighteenth Session, in July 1984.⁵ The Council decided to invite any willing Party and Signatory formally to initiate the amendment procedures by submitting proposed amendments to the Director General.⁶ In response, amendments were submitted by both Norway and the United Kingdom. The two sets of proposed amendments differed from each other principally in their treatment of the relationship between INMARSAT and ICAO, an issue which is discussed below. Comments on various aspects of the proposed amendments were received from several other Parties and from interested bodies, including ICAO.

The proposed amendments and related comments were submitted to the INMARSAT Council for consideration at its Twentieth Session, in February and March 1985. The Council did not attempt to resolve all the outstanding issues, in particular, the relationship between the proposed amendments and the institutional competence of ICAO. Neither did the INMARSAT Council seek agreement upon a single version of the text of the amendments. However, there was general support for the objective of the proposed amendments; and the Council decided to recommend to the Assembly "the adoption of amendments to the INMARSAT Convention to enable INMARSAT to provide aeronautical satellite communications services," based on the proposed texts and the comments received.⁷ The

4. INMARSAT Convention, art. 34; INMARSAT Operating Agreement, art. XVIII.

5. COUNCIL/18/5.

6. COUNCIL/18/SR/FINAL/para. 16.1.5.

7. COUNCIL/18/SR/FINAL/para.16.1.4.

relevant amendments to the Operating Agreement were approved, with a recommendation to the Assembly to confirm them.⁸

On 13 March 1985, the Director General invited all INMARSAT Parties to be represented at a Meeting of Experts, to be held at INMARSAT's Headquarters. The purpose of the meeting was to prepare a further consolidated text of the proposed amendments, for consideration and adoption by the Fourth Session of the INMARSAT Assembly. It should be noted that the convening of such a meeting is not a part of the formal amendment process. The object was to attempt, so far as possible, to resolve disagreements relating to the amendments before the Assembly met.

The Meeting of Experts took place from 7 to 9 May 1985. Twenty parties were represented, and observers attended on behalf of IMO and ICAO. A further consolidated text was prepared for submission to the INMARSAT Assembly, together with various individual comments and statements.

The Fourth Session of the INMARSAT Assembly took place in October 1985. The remaining problems of drafting were resolved to the extent that the Assembly was able to adopt the amendments to the Convention. It also confirmed the amendments to the Operating Agreement.

The amendments to the Convention will enter into force one hundred and twenty days after the Depositary⁹ has received notices of acceptance from two-thirds of those States which, at the time of adoption by the Assembly, were Parties and represented at least two-thirds of the total investment shares.¹⁰

The amendments to the Operating Agreement will enter into force one hundred and twenty days after the Depositary has received notices of approval by two-thirds of those Signatories which, at the time of confirmation by the Assembly, were Signatories and then held at least two-thirds of the total investment shares.¹¹

It is, at present, expected that the amendments will enter into force at some time in 1988. This delay may seem surprising; but in several Member States legislative action is required before notice of approval of the amendments can be given. In certain others, the acceptance process has become linked with internal regulatory considerations. Meanwhile, INMARSAT has been actively planning and

8. *Id.*

9. The Depositary of both the Convention and the Operating Agreement is the Secretary-General of the International Maritime Organization.

10. INMARSAT Convention, art. 34(2).

11. INMARSAT Operating Agreement, art. XVIII(2).

promoting its future aeronautical services; and has offered certain limited aeronautical services on an experimental or interim basis.

The Substance of the Amendments

As amended, article 3(1) of the INMARSAT Convention provides that the purpose of the Organization is as follows:

to make provision for the space segment necessary for improving maritime communications and, as practicable, aeronautical communications, thereby assisting in improving communications for distress and safety of life, communications for air traffic services, the efficiency and management of ships and aircraft, maritime and aeronautical public correspondence services and radiodetermination capabilities.

The inclusion of the words "as practicable" has its origins in a concern of the United States that INMARSAT should not be obliged to provide aeronautical services, but merely permitted. The United States initially proposed that this should be made clear by an amendment to Article 3(2). The original text reads as follows:

The Organization shall seek to serve all areas where there is need for maritime communications.

The United States proposal was to amend this as follows:

The Organization shall seek to serve all areas where there is a need for maritime communications and may seek also to serve aircraft by providing a space segment for improving aeronautical communications...¹²

This proposal was based on an assumption that aeronautical services would also be provided by other systems competing with INMARSAT;¹³ so that the Organization should not be obliged to provide services for which it had no guaranteed demand. However, the Meeting of Experts did not favor the proposed American text, preferring to deal with the matter by the use of the words "as practicable" in article 3(1). This text was adopted by the Assembly.

12. COUNCIL/20/SR/FINAL, Annex II.

13. *Id.*, Annex I.

It may be doubted whether provisions dealing with the purpose or competence of an international organization do impose on the organization or its Member States a duty to fulfill such a purpose or exercise such a competence. However, if one assumes that article 3 places a duty on INMARSAT to provide the various services referred to, it is doubtful whether the insertion of the words "as practicable" is really apt to convert such a duty into a mere competence. It would seem rather that an absolute duty becomes a qualified one. The distinction between a qualified duty and a mere competence is important. At present, for example, it could hardly be argued that it was not "practicable" for INMARSAT to offer aeronautical services. However, the point is likely to remain academic, because none of the INMARSAT Parties has opposed its plans to introduce such services.

In another respect, however, there is a much clearer distinction between the bases on which INMARSAT provides, respectively, maritime and aeronautical services. As regards maritime services, INMARSAT has a limited degree of protection from competition under article 8 of the Convention. This provides that a Party is to notify the Organization in the event that it or any person within its jurisdiction intends to make provision for, or initiate the use of, separate space segment facilities to meet any or all of the purposes of the INMARSAT space segment.¹⁴ The stated object is "...to ensure technical compatibility and to avoid significant economic harm to the INMARSAT system." Article 8 has its origins in a concern that the market for maritime satellite communications might be modest in relation to the cost of providing the necessary space segment; and that INMARSAT might not be viable financially if unrestrained competition were allowed. The article provides for the INMARSAT Council to make a recommendation with respect to technical compatibility and for the Assembly to make a recommendation with respect to economic harm. Although both such recommendations are of a "non-binding" nature, it may be inferred that the relevant Party is at least obliged to consider such recommendations in good faith.

It was never envisaged that INMARSAT should enjoy such protection from competition with respect to aeronautical services. The international civil aviation community had made no commitment whatsoever to use INMARSAT services, and ICAO had expressly disclaimed any such commitment by itself, its Member States or users.¹⁵ Both Norway and the United Kingdom, in their respective proposed amendments, restricted the scope of article 8 by the insertion of the word "maritime"; that is to say, the obligation to notify would only arise with

14. There are comparable provision under art. XIV of the INTELSAT Agreement.

15. ICAO doc. C-WP/8126, attachment 1, para. 2.

respect to separate space segment facilities which met any or all of the maritime purposes of the INMARSAT space segment. There was scarcely any opposition to this qualification, and in due course the Assembly adopted such an amendment to article 8.

A much more controversial issue concerns, as already indicated, relations between INMARSAT and ICAO. The relationship between INMARSAT and other international organizations is governed by article 27 of the Convention which, in its original version, reads as follows:

The Organization shall co-operate with the United Nations and its bodies dealing with the Peaceful Uses of Outer Space and Ocean Area, its Specialized Agencies, as well as other international organizations, on matters of common interest. In particular the Organization shall take into account the relevant Resolutions and Recommendations of the Inter-Governmental Maritime Consultative Organization. The Organization shall observe the relevant provisions of the International Telecommunication Convention and regulations made thereunder, and shall in the design, development, construction and establishment of the INMARSAT space segment and in the procedures established for regulating the operation of the INMARSAT space segment and of earth stations give due consideration to the relevant Resolutions, Recommendations and procedures of the organs of the International Telecommunication Union.

Under the Chicago Convention 1944, ICAO has the competence to adopt international standards and recommended practices and procedures relating to the safety, regularity and efficiency of air navigation.¹⁶ It is expressly provided that such standards and recommended practices and procedures may relate *inter alia* to "... communications systems and air navigation aids, including ground marking ..." ¹⁷ The question arose from the outset as to how these should fit into the scheme of Article 27 of the INMARSAT Convention. The Norwegian proposal was to amend the second sentence of article 27, as follows:

In particular, the Organization shall take into account the relevant Resolutions, Standards and Recommendations of the

16. Convention on International Civil Aviation, art. 37. Note that one of the objectives of ICAO is to promote "safe, regular, efficient and economical air transport": *Id.*, art. 44.

17. *Id.*

International Maritime Organization and the International Civil Aviation Organization.¹⁸

The United Kingdom, on the other hand, proposed that the third sentence be amended as follows:

The Organization shall observe the relevant provisions and regulations made under the International Telecommunication Convention and the Convention on International Civil Aviation, and shall in the design, development, construction and establishment of the INMARSAT space segment and in the procedures established for regulating the operation of the INMARSAT space segment and of earth stations give due consideration to the relevant resolutions, recommendations, standards and procedures of the organs of the International Telecommunication Union and the International Civil Aviation Organization.¹⁹

ICAO strongly favored a wording which would require INMARSAT to observe relevant standards adopted by the ICAO Council under the Chicago Convention.²⁰ There was an obvious and legitimate concern that any other wording, such as that proposed by Norway, might weaken the force of ICAO standards and recommended practices.²¹

Ultimately, however, the Assembly adopted a wording very close to that originally proposed by Norway:

In particular, the Organization shall take into account the relevant international standards, regulations, resolutions, procedures and recommendations of the International Maritime Organization and the International Civil Aviation Organization.

In other words, the position of the ICAO was assimilated to that of IMO, rather than ITU. In order to understand this, it is necessary to compare the respective constituent instruments of the three organizations in question.

18. Annex I to Verbal Note from Director General to INMARSAT Parties (Oct. 18, 1984).

19. *Id.*

20. ICAO doc. C-WP/7941, at 4-5; INMARSAT doc. COUNCIL/20/6/ADD/1/ATTACHMENT 2.

21. See Milde, *ICAO*, 10 ANNALS AIR & SPACE L. 483 (1985).

The present International Telecommunication Convention²² provides that, "Members of the Union shall have the rights and shall be subject to the obligations provided for in the Convention."²³ It further states that, "The provisions of the Convention are supplemented by the Administrative Regulations which regulate the use of telecommunications and shall be binding on all Members."²⁴ These obligations are not qualified. It is therefore entirely appropriate that INMARSAT should be required to "observe" the relevant provisions of the convention and regulations. However, INMARSAT is only obliged to give "due consideration" to the relevant resolutions, recommendations and procedures of ITU organs, for these do not bind ITU Member States.

In the case of IMO, its resolutions and recommendations do not bind Member States, although in practice they are highly persuasive.²⁵ The practice of IMO is to promote the adoption of international maritime conventions, and to recommend to States that they become Parties to such conventions. IMO has no competence to develop international standards and regulations and to impose these directly upon Member States. This is why INMARSAT is obliged only to "take into account" the relevant resolutions and recommendations of IMO.

In the case of ICAO, as has already been noted, the Organization is empowered to adopt international standards and recommended practices and procedures relating to the safety, regularity and efficiency of air navigation.²⁶ However, under article 38 of the Chicago Convention, individual States may depart from such international standards and procedures. A State may do so if it "deems it necessary," or if it finds it "impracticable" to comply in all respects. States therefore have a virtually unfettered right to depart from ICAO standards and procedures; although under article 38 they are required to notify the Organization of differences between their own practice and that established by an international standard. Of course, the international standards and procedures adopted by ICAO, which are designated as Annexes to the Chicago Convention,²⁷ have produced a high degree of uniformity in the

22. International Telecommunication Convention, Nairobi (1982).

23. Art. 2(1).

24. Art. 42(1).

25. See THE INTERNATIONAL MARITIME ORGANIZATION 11 (L.S. Mankabady, ed.).

26. See *supra* note 14.

27. Article 54 of the Chicago Convention provides that international standards shall "for convenience" be designated as Annexes to the Convention, but does not provide that they shall become part of the Convention.

practice of Member States in relation to air navigation. Nevertheless, numerous States have notified departures from ICAO standards pursuant to article 38. This applies not least to Annex 10 of the Chicago Convention, which contains standards relating to aeronautical telecommunications.

It was therefore considered quite inappropriate that INMARSAT should be obliged to "observe" ICAO standards and procedures; for in this event, States would assume under the INMARSAT Convention a stricter obligation to comply with ICAO standards and procedures than they had assumed under the Chicago Convention. Accordingly, the amended INMARSAT Convention obliges the Organization to "take into account" international standards and procedures of ICAO.

Nonetheless, ICAO remains the sole international body with the competence to establish international standards and procedures relating to aeronautical satellite telecommunications. It is, furthermore, very much in INMARSAT's interest that ICAO should, in due course, establish relevant standards and procedures, because INMARSAT may turn out not to be the only provider of aeronautical satellite telecommunications services. In this event, it would be highly undesirable for the various competing systems to be technically incompatible, so that airborne equipment could operate only to one system.

It may be added that the history of INMARSAT's relationship with IMO demonstrates the importance which, in the practice of INMARSAT, is attached to the obligation to "take account" of the acts of another international organization. For example, INMARSAT has been closely involved in the development of IMO's Global Maritime Distress and Safety System (GMDSS). The requirements of the GMDSS are now an important factor in planning the INMARSAT space segment.²⁸

Another of the recent amendments to the INMARSAT Convention is relevant to the relationship between INMARSAT and ICAO. Article 15 originally provided that one of the powers of the INMARSAT Council is the "determination of maritime satellite telecommunications requirements." This was amended to read "maritime and aeronautical telecommunications requirements."²⁹

This amendment was again opposed by ICAO, on various grounds. The initial concern seems to have been that the word "requirements" might refer to technical standards.³⁰ However, technical standards are dealt with in article 27 which, as has already been shown, acknowledges the competence of ICAO in this area. The only qualification is that article

28. See Lundberg, *INMARSAT: Improving Maritime Communication*, MARINE POL'Y 343-5 (1984).

29. INMARSAT Convention, art. 15(a).

30. ICAO docs. C-WP/7941, at 4; C-WP/8013, Attachment 1, at 2.

15(c) empowers the INMARSAT Council to adopt criteria and procedures for approval of earth stations (including aeronautical earth stations) for access to the INMARSAT space segment. However, the exercise of this power will be subject to article 27; and there is nothing in article 15(c) to suggest that INMARSAT has any competence similar to that of ICAO to establish international technical standards.

It was also suggested from within ICAO that, if INMARSAT were allowed to determine aeronautical telecommunications requirements, the aeronautical frequency bands might become saturated with public passenger telephone traffic, to the prejudice of safety-related communications.³¹ However, it is clear that INMARSAT has no competence to allocate frequency bands for particular purposes; or, in general to coordinate frequency assignments. INMARSAT merely has a responsibility, under article 28 of the Convention, to arrange for the coordination of frequencies to be used for its space segment; and for the notification of such frequencies to ITU. This may be contrasted with the position of ICAO which, although it has no competence to allocate frequency bands, has an important role in planning and coordinating the assignments of aeronautical radio frequencies, which it does in cooperation with ITU.

In addition, the concern of ICAO was expressly linked to ICAO Assembly Resolution A22-20,³² which had recited that:

ICAO is responsible for developing the position of international civil aviation on all matters related to the study of questions involving the use of space technology for air navigation purposes, including the determination of international civil aviation's particular requirements in respect of the application of space technology.

It is clear that the word "requirements", in this context, does not refer to technical standards. Neither, it is submitted, does it have the same meaning as in article 15(a) of the INMARSAT Convention. The "particular requirements" of international civil aviation seem to have two aspects. First, there are the particular types of communication which the industry requires, such as air traffic control and meteorological reports. Secondly, there are the essential characteristics of such services: whether a service will be voice or data; whether a high or low data rate will be used; whether the communication must be instantaneous or whether, for example, a "store and forward" message system will be adequate. INMARSAT clearly cannot determine the "requirements" of international civil aviation, understood in this sense..

31. ICAO doc. C-WP/8013 at 4.

32. ICAO doc. C-WP/8126, para. 1.

On the other hand, these "requirements" translate into demands on space segment capacity. It is necessary to determine how many aircraft will use satellite telecommunications, for what purposes, in what volume, and in what geographical regions. This leads to a calculation of the number of voice and data channels required, which is essential for space segment planning. It is these "requirements" for aeronautical satellite telecommunications which the INMARSAT Council is empowered to determine.³³ This point may be reinforced by observing that, in the context of article 15(a), "determine" means to ascertain, not to prescribe.

Before the amendment to article 15(a) was adopted, the ICAO Council had recognized that it would be for the INMARSAT Council to determine the commercial demand for aeronautical satellite telecommunications services provided by INMARSAT, and the conditions under which such services would be provided.³⁴ However, this is not a sufficient description of the proper functions of the INMARSAT Council. For example, it is enough simply to know the likely volume of air traffic control communications. The geographical characteristics of established air routes and air traffic control regions may influence the location of satellites or the type of "footprint" required. To take another example: different services may have differing requirements as to availability and reliability. This may affect whether the service is provided on a dedicated satellite or through a transponder on a hybrid satellite. It will certainly affect the question of whether and how a spare (backup) satellite is provided. These are obviously matters for the space segment provider to determine. It is difficult to think how better to describe all relevant matters than by the use of the word "requirements," although the potential for ambiguity is to be regretted.

It is entirely understandable that ICAO should insist on preserving its various competences under the Chicago Convention. Equally, INMARSAT must remain responsible for planning and providing its own space segment. This is particularly important because ICAO has expressly disclaimed any commitment to the future operational use of a particular satellite telecommunications system; and has to date refused to accept any financial commitment in relation to such a system.³⁵ INMARSAT has an obligation to operate on a sound financial basis, having regard to accepted commercial principles.³⁶ A determination of aeronautical satellite telecommunications requirements, within the

33. See also Lundberg, *INMARSAT - A bird in the hand?*, 41 ICAO BULL. 12 (Dec. 1986).

34. ICAO doc. C-WP/8126, para. 4.

35. See *supra* note 15.

36. INMARSAT Convention, art. 5(3).

meaning of article 15(a), is essential for the Organization to determine the feasibility and necessary features of its aeronautical satellite telecommunications system.

It can therefore be seen that, in adopting the various amendments to the Convention, the INMARSAT Assembly was not motivated by any desire to trespass upon the competence of ICAO. It is the writer's view, for the reasons set out above, that the amendments do not, correctly interpreted, have such an adverse effect. Moreover, when adopting the amendments, the Assembly also expressly recognized the competence of ICAO in the field of aeronautical communications, and resolved to recommend to the Council that it should authorize the Director General to negotiate an agreement between INMARSAT and ICAO. In particular:

The agreement will provide for the establishment of means to ensure proper coordination and cooperation between the two organizations in all matters related to the planning and provision of the space segment used for aeronautical telecommunications.³⁷

The two organizations have now reached an advanced stage in the negotiation of such an agreement.

Further Developments

INMARSAT has been an active contributor to the work of ICAO's Special Committee on Future Air Navigation Systems (FANS). This was established in November 1983 by the ICAO Council to report, *inter alia*, on technical, operational, institutional and economic questions relating to future potential air navigation systems and the possible benefits of satellite technology for international civil aviation.³⁸ FANS has already considered in some detail the technical characteristics of an aeronautical satellite system; but of particular interest in the present context are the initial conclusions of FANS with respect to institutional aspects.³⁹

FANS has reiterated that ICAO is the only appropriate body to establish technical standards for international aeronautical communications and surveillance services. It also recognizes that States will continue to authorize communications and surveillance services in the airspace for which they are responsible. Services should be accessible to

37. ASSEMBLY/4/10/para. 7.10.

38. Report of the Second Meeting of the Special Committee on Future Air Navigation Systems (April 1985).

39. Report of the Third Meeting of the Special Committee on Future Air Navigation Systems, 6 (Nov. 1986).

all users without discrimination. Service providers must at least comply with ICAO minimum standards of performance for data and voice communications used to provide safety services. There should be an equitable attribution and distribution of costs of joint arrangements among participating States and users. Arrangements must provide for the necessary levels of safety and continuity; for reasonable pricing of services; and for State and user participation in the planning of services.⁴⁰

FANS took into account the possible benefits of competition in the provision of services but considered also that:

to the extent possible existing government or inter-governmental organizations should be utilized to perform the functions which may be needed. Aeronautical interests must be fully protected in such arrangements.⁴¹

The FANS Committee has also considered the implications for aeronautical satellite telecommunications of Article 30 of the Chicago Convention, which deals with aircraft radio equipment. Paragraph (a) of this Article provides *inter alia* that, "The use of radio transmitting apparatus in the territory of the contracting State whose territory is flown over shall be in accordance with the regulations prescribed by that State." The FANS Committee noted that:

individual Contracting States have enacted national regulations which may effectively prohibit any radio transmissions from aircraft operating in or over national territories, for purposes other than ATS, and related air navigation applications or on radio frequencies other than those specifically notified ... for aeronautical mobile safety services....⁴²

Paragraph (b) of article 30 provides that radio transmitting apparatus may be used only by licensed members of the flight crew. The FANS Committee noted that it would appear to prevent passengers from using aeronautical public correspondence services.⁴³ Accordingly, the FANS Committee made the following recommendation:

40. *Id.*, sec. 6.2.7.

41. *Id.*, sec. 6.2.5, 6.2.6.

42. *Id.*, sec.6.2.9.2.

43. *Id.*, sec. 6.2.9.3.

That ICAO, in the light of the planned implementation of aeronautical administrative communications and aeronautical passenger communications services, as a matter of urgency, study the implications of Article 30(a) and (b) of the Convention on International Civil Aviation, with a view to enabling on a global basis, non-safety air-ground communications.⁴⁴

It remains to note one further development affecting the international legal framework of aeronautical satellite telecommunications. In September 1987, the World Administrative Radio Conference (WARC) for the Mobile Service meets in Geneva to consider *inter alia* the frequency requirements of mobile-satellite services. Among the matters to be considered are proposals that part of the aeronautical 'R' band be reallocated or shared with other mobile-satellite services. The WARC will also decide whether to make any allocation for aeronautical public correspondence services, which are at present excluded from the aeronautical 'R' band.⁴⁵ The claims of aeronautical satellite services will be weighed against other demands on the same spectrum: for example, for land mobile-satellite services. The decisions of the WARC will be crucial to the development of satellite telecommunications services for the international civil aviation community.

44. *Id.*, sec. 6.2.9.4.

45. See Lundberg, *Between a rock and a hard place*, TELECOMM. POL'Y 3 (March 1987).

EVENTS OF INTEREST

A. Past Events

Reports

"The Use of the Geostationary Orbit," I.A.A. Symposium, Brighton, Oct. 15, 1987.

During the 38th Congress of the International Astronautical Federation, which was held in Brighton, United Kingdom, from October 10-17, 1987, the International Academy of Astronautics (I.A.A.) presented a special symposium on "The Use of the Geostationary Orbit." Planning of the program was under the direction of *Eilene Galloway* (USA), coordinator. *Dr. Lubos Perek* (Czechoslovakia) was chairman; *N. Jasentuliyana* (Sri Lanka and the United Nations) was vice chairman; and *Marietta Benko* (Federal Republic of Germany) was rapporteur. The focus of the symposium was on issues that are being considered by the World Administrative Radio Conference (WARC) of the International Telecommunication Union (ITU), and the timing - October 15, 1987 - was between the 1985 WARC and the second WARC session which will begin on August 29, 1988, for a five-week conference.

The first speaker was *Dr. Lubos Perek*, former Chief of the United Nations Outer Space Affairs Division and now with the Astronomical Institute of the Czechoslovak Academy of Sciences in Prague. *Dr. Perek's* paper on "The Scientific and Technical Aspects of the Geostationary Orbit" provided the factual foundation which must be taken into account when decisions are made on political, legal and economic factors. He explained the necessity for man-made station-keeping to maintain satellites at or near the GSO, the probability of collisions increasing in the future, the necessity for international agreements to restrict space debris, and urged that the GSO be reserved for exclusively peaceful and useful applications.

The next paper on "The Current Legal Regime of the Geostationary Orbit and Prospects for the Future" by *N. Jasentuliyana* and *Ralph Chipman*, of the United Nations, analyzed the issues of concern to the ITU and WARC against the background of ITU resolutions and the current situation. The authors pointed out that "...the essential legal/political issue is not one of permanent occupation, but one of equitable division of orbit and frequency assignments." The legal debate reflects the difference between achieving law by the gradual development of general principles or by first establishing such principles to apply as specific problems arise. Adjustment of these two positions requires compromise.

The 1985 WARC "agreed that equitable access could be provided through an allotment plan in the new frequency bands that 'shall permit such administration to satisfy requirements for national services from at least one orbital position...' and that improved multilateral coordination

procedures would be developed for the frequency bands already in general use." This agreement is only an outline reported to the second session of WARC 1988 and does not constitute international law. The authors base their paper on "the view of the great majority of States that outer space includes the geostationary orbit" and conclude that "while the evolution of the legal status is likely to be slow and difficult, nevertheless there is a movement away from confrontation toward improved international relations in the adjustment of technical solutions with international space law.

The paper by the Secretary General of the ITU, *Richard E. Butler*, on "The Role of the ITU in the Use of the Geostationary Orbit" points out that rules on use of the GSO have been developed by the ITU which is responsible for the analysis and recommendations of the physical and electromagnetic phenomena of the GSO. Following a description of the technical aspects, regulations, orderly recording, technical cooperation, and exchange of information, the author concludes that "The ITU will, in accordance with the mandate given to it by its 163 Member countries, continue to carry forward its regulatory, standardization, planning, development and coordination work in regard to the use of the geostationary satellite orbit."

The Director General of the International Maritime Satellite Organization (INMARSAT), *Olof Lundberg*, analyzed the trend toward mobile satellites in "INMARSAT, a Model of International Cooperation." He explained that use of the GSO is "a looming mobile satellite problem" involving "serious international regulatory and political difficulty, the magnitude of which, ...has not been fully grasped." Problems of interference arise in the degree of spacing on the orbital arc where the GSO resource is scarcer for mobile satellites. He asks whether the needs of the global mobile satellite market could be met by a shared system which would permit efficient use of scarce orbital and frequency resources. INMARSAT is an example of an international system that is supported by the world community and has met mobile needs. He states that the maritime community has received services on "a global, internationally cooperative basis" and that such services "should be open to all, and should be non-discriminatory." INMARSAT is preparing for commercial aviation satellite communications in 1989 and will use many principles that were developed for maritime purposes. As an institution, INMARSAT "may provide policy-makers with a useful model for meeting the growing worldwide need for mobile communications without clogging the geostationary orbit."

David M. Leive, Legal Advisor of the International Telecommunications Satellite Organization (INTELSAT) in his paper on "The Role of INTELSAT in the Use of the Geostationary Orbit" analyzes the issues facing the ITU in the two sessions of the World Administrative Radio Conference - the agreements reached during the first WARC session in 1985 and those that are pending and subject to study prior to decisions to be made by WARC 1988. Since 170 nations use the INTELSAT system, the allocation of rights is a major concern.

At present some 150 commercial communications satellites are functioning on the GSO arc in specific slots allocated for their lifetime duration on a "first-come, first-served basis, with coordination and negotiation to accommodate new systems." Developing countries have proposed assigning slots to all nations even though they cannot use them at present. International organizations, such as INMARSAT, INTELSAT, EUTELSAT, ARABSAT and INTERSPUTNIK also need orbital slots. WARC-ORB-85-88 has the objective of "guaranteeing in practice for all countries equitable access to the geostationary satellite orbit and to the frequency bands used for satellite services."

The First Session decided on two planning approaches: (1) multilateral planning meetings, and (2) an allotment plan. The first would improve the regulatory planning process by multilateral planning meetings; the second would plan the expansion bands, not now in use, and is "limited to national systems providing domestic services." Details of these two approaches would need to be worked out, but it is already clear that accommodating national and international needs is exceedingly complex and must depend upon adjustment to technical factors if the GSO is to continue being used efficiently and economically for worldwide communications. The second WARC session must take into account the role of multi-administration organizations which have special technical characteristics. Decisions must be made on the duties of multilateral planning meetings and what role multi-administration organizations will play. INTELSAT is used by 170 nations and is functioning efficiently and economically with the "most equitable use of the radio frequency spectrum and orbital space, as required in its Charter."

INTELSAT studies "show that it is technically feasible to incorporate networks of multi-administration systems in the allotment planning process without adversely impacting on national systems." The capability of INTELSAT and other multi-administration organizations to provide global space communications depends upon recognition of their special requirements "and they must be able to participate in whatever regulatory framework evolves for planning and allocation of orbital resources."

The "Proposal by the German Democratic Republic on Use of the Geostationary Orbit" by *W. Hampe*, who was GDR representative to the United Nations COPUOS Legal Subcommittee, and *R. Mueller* of the Martin-Luther-University, explains the GDR draft principles governing the activities of States in the utilization of the geostationary orbit which was introduced at the 1986 session. The proposal recognizes that all States are concerned with ensuring efficient, rational and equitable use of the GSO and the frequency bands allocated for space radio services, and recognizes the competence of the Legal Subcommittee and the International Telecommunication Union. Each article of the GDR proposal is analyzed in terms of the definition of the GSO; compliance with the 1967 Outer Space Treaty; promotion of broad international cooperation; use of the GSO is not appropriation; denial of sovereign claims; equal rights of all States to the GSO; recognition of the role in global communications of inter-national

organizations such as INTELSAT, INMARSAT and INTERSPUTNIK; and the close connection between this proposal and that of the Soviet Union on establishing a world space organization as "a suitable framework for combining the efforts of different countries in the peaceful exploration and uses of outer space."

The proposal stresses that "any claim for sovereignty, as asserted by some States, cannot be recognized." Technical conditions required for efficient use of the GSO must be included in making future plans, and States should cooperate in complying with ITU regulations. The GDR considers that "priority should be given to the development of the agreed dual system, *i.e.*, to draw up an allotment plan for certain space services and frequency bands and improve the coordination mechanism and regulatory procedures for space services and frequency bands not covered by plans." All States are urged to adopt technologies that would facilitate efficient, economic use of the GSO.

Dr. A. A. Cocca, advanced the "Viewpoints of the Equatorial Countries Toward the Use of the Geostationary Orbit", explaining that the orbit and radio spectrum are governed by space law and telecommunications law. Regarding equity as a fundamental principle of international law, he advocates an equilibrium among all ITU members and developing countries. He emphasized the positive results of the current debate over issues involving the GSO: "that the international community does not accept monopolies, priorities, privileges or preferential rights..."; that it is urged to delimit airspace and outer space with the GSO having its own legal regime; and that the ITU is administering the GSO and radio spectrum as "a Common Heritage of Mankind", a situation which should be "expressly recognized."

Dr. Stephen E. Doyle, in his paper on "Equitable Aspects of Access to and Use of the Geostationary Satellite Orbit", seeks a new attitude toward analyzing GSO problems by stating that this orbit and the radio frequency spectrum are not "limited natural resources" but inexhaustible physical phenomena which are expanded for use and not subject to sovereign claims. International cooperation and accommodation are required for efficient and economic use of the GSO and this has been the practice with ITU assistance, resulting in worldwide space communications based on equity. This paper is a valuable source for definitions of official terms used in dealing with the complexities of the technical, economic, political and legal factors.

Dr. Priyatna Abdurrasyid's paper on "Developing Countries and Use of the Geostationary Orbit" affirms that this is a limited, scarce natural resource of significance to all countries because of its importance for global communications. He questions the "first come first served" practice of allocating positions on the GSO and calls for regulations by a "specific *sui generis* regime to guarantee a fair, rational and equitable sharing."

This symposium will be published in a special issue of ACTA ASTRONAUTICA, the journal of the International Academy of

Astronautics, in June 1988. The journal may be obtained from Pergamon Journals, Inc., Maxwell House, Fairview Park, Elmsford, New York 10523.

Eilene Galloway
Honorary Director, IISL and
Trustee, I.A.A.

The 30th Colloquium on the Law of Outer Space, Brighton, October 10-17, 1987.

The Colloquium took place during the XXXVIIIth Congress of the International Astronautical Federation and was well attended by lawyers from all parts of the world. The sessions of the Colloquium were held at the Metropole Hotel and the Brighton Centre.

After the opening remarks of the President of the International Institute of Space Law, *Dr. Gibson* chaired the first session assisted by *Mr. W. de Vries*.

Notwithstanding the great number of papers which limited the time available for presentations, there was still sufficient time for a valuable exchange of views. This was largely due to the outstanding guidance of *Dr. Gibson* whose sense of humor created a pleasant atmosphere for the efficient handling of this difficult task.

The four official subjects were the following: 1. the legal aspects of maintaining outer space for peaceful purposes; 2. the legal aspects of environmental problems in outer space; 3. the legal aspects of commercialization of space activities; and 4. the United Nations and legal principles of remote sensing.

The first subject "Legal aspects of maintaining outer space for peaceful purposes" aroused a lot of interest. *Dr. Almond* (USA) observed that: "Law develops through communications affecting the relations and activities of states. Scientific observers of state relations can provide commentary and reasoned argument of the value of the communications process by pointing to and reducing the points of contest and conflict. A part of the communications process is that of consultations among states. In observing this process, one must carefully look at state practice and procedures. This shows that certain outcomes in state relations are not preordained. States are free to impose a framework of national goals in which they can pursue global order or to maintain contending public order. The choice made, is of great impact to the consultative activities and the communications process."

Prof. Bakotic (Yugoslavia) considered another aspect of the topic, namely, whether outer space is a neutralized or a demilitarized area, or both. Several speakers commented on the SDI project. Among them were *Mr. Bowman* (USA) and *Ambassador Finch* (USA), who also stressed the importance of the Magna Charta of Outer Space in this respect. *Eilene and Jonathan Galloway* (USA) spoke about the United States national space legislation on the exploration and use of outer space for peaceful purposes

and considered the sources of this legislation. *Dr. von Kries* (FRG) addressed space-based defense and the law of outer space, whereas *Dr. Wirin* (USA) commented on using outer space to promote peace, which was the same theme as *Dr. Safavi's* (Iran) paper presented by *Prof. Christol*.

Prof. Gál (Hungary) mentioned that space law contains national and international law. Most important of those is international law, and emphasis must be laid on cooperation. To structure international cooperation, he proposed the setting up of an International World Agency for Space. Also, *Prof. Gorbiel* (Poland) was in favor of a new juridical instrument to decide which objects fall under the Outer Space Treaty (OST). *Dr. Okolie* (USA) focused *inter alia* on the problem of estoppel in space law. States participate in the discussions without having adhered to any of the space treaties. Therefore, there exists a need to examine carefully the negotiations process which may be too broad for legal assessment. *Prof. Mueller* (GDR) presented a paper written by *Prof. Reintanz*, *Dr. Howald* and himself. He discussed the prevention of all weapons in outer space from the point of view of space law and general international law. The process of completing the international legal framework to prevent an arms race in space is a key for the maintenance of world peace and international security and an essential prerequisite for the development of international cooperation.

Dr. Rothblatt (USA) stressed the importance of trust and understanding for maintaining peace in space. Trust and understanding arise from trade and cooperation. Hence, peace in space will evolve from a defense-basis only as space-based trade and cooperation grow. The developments of the space programs of the United States and the Soviet Union were examined by *Dr. Marcia Smith* (USA). She observed that cooperation in space lessens the possibility of space being used for non-peaceful purposes. Recognizing each country's involvement in "aggressive" space activities, there seems, at the same time, to be a strong desire on the part of some individuals to promote cooperation between the superpowers as a solution or alternative to aggressive space activities. Such cooperation has proven its value over the past thirty years. However, future cooperative effects should be judged on their own merits and not in relation to aggressive space activities conducted by space powers.

The history of space law shows that there exists a firm conviction that outer space must be used exclusively for peaceful purposes. This was stressed by *Dr. Tatsuzawa* (Japan). *Dr. Vereshchetin* (USSR) commented in his paper that in order to prevent an arms race in outer space, strict observance of existing treaties is needed. However, in U.S. policy great differences exist between the narrow and the broad interpretation of the ABM treaty. Moreover, many contradicting opinions have been heard in the interpretation of the two opposing views themselves. For instance, which "narrow" interpretation is the "narrow" interpretation? He gave an overview of the many divergent views.

After the presentation of papers a vivid discussion emerged. *Dr. von Kries* argued that *Dr. Smith* (USA) held the view that deployment of a space laser accelerated by a nuclear device violated the Outer Space

Treaty of 1967 and the Nuclear Test Ban Treaty. *Dr. Smith* denied such view. The latter view is that the Test Ban Treaty prohibits only testing, not deployment. Note that this treaty would not apply in a time of war, whereas the OST prohibits deployment of nuclear weapons, not nuclear devices in outer space. Therefore, a nuclear-device-powered laser can be lawfully placed in space under current treaties and international law.

Dr. Almond asked *Dr. Vereshchetin* about his views on adopting an agreement to renounce ambiguities between the US and USSR and if so, whether this was an admission of the ambiguities and differences in the positions of the two countries. In the latter event, there would be no agreement between the two sides, and each side could pursue its own line of action based on its own interpretation unless otherwise agreed. With reference to the comments and the paper presented by *Dr. Vereshchetin*, *Dr. Doyle* pointed out that some of the confusion of views that he had declared to exist, may be resolved by reference to official sources. The United States Department of State publishes with regularity a series of reference works discussing international law and practice of the United States and presenting official views and interpretations. Materials therein are often quotations of statements of government officials or are selected views of specialists with which the government can agree.

Dr. Okolie commented on the narrow and the broad interpretation of the ABM Treaty. *Prof. Christol* (USA) noted that countless discussions had taken place among the parties relating to the terms of the agreement. This has led to the fine-tuning of a number of its terms. This approach has found a valuable counterpart in the negotiations relating to ballistic missiles after the agreement to negotiate was entered into by *Secretary of State Shultz* and *Foreign Minister Gromyko* on January 8, 1985. This has produced favorable results in negotiating a new agreement relating to intermediate nuclear missiles in Europe. At the same time, both countries have been engaged, under the aegis of the Helsinki Accords of 1975, in seeking a clearer understanding of confidence and security building measures in Europe. This should be coupled with the announced Soviet policy of glasnost.

The second session about the Legal Aspects of Outer Space Environmental Problems was presided over by *Dr. V. S. Vereshchetin* (USSR) with *Mrs. Zwaan* acting as rapporteur. The first speaker, *Prof. Bockstiegel* (FRG), mentioned that space debris is not a solitary subject, but must be seen in its context. He was followed by *Ms. McCloud* (USA), who speaking about Space Pollution, put forward three proposals: 1. to amend the existing treaties or to create a new convention; 2. to establish an Advisory Board monitoring and researching the impact of space activities on the environment, and promulgating mandatory standards and recommendations; and 3. to establish a Regulatory Board enforcing these standards.

Prof. Diederiks-Verschoor (Netherlands) commented on the term "debris" and "space object" in relation to the establishment of liability for damage. She also mentioned some procedures to solve the problem of debris, which were also proposed by other speakers. As a solution, *Mr.*

Kuskuvelis (Greece) suggested "a functional aerospace environmental regime" because, in his opinion, air and space activities tend to integrate more and more. *Prof. Gorove* mentioned that what is generally needed is a careful review of all data on space debris by an internationally constituted expert group of scientists, engineers and economists. The data on debris must include their nature, number, form, size, orbital location, the possibility of damage including, harmful radiation and the cost of remedial measures in each category. Then, the matter should be referred to lawyers and policymakers to make appropriate recommendations to the international community to deal with various aspects of the problem. *Mr. Lippens de Cerf* (Belgium) noted that lately non-scientific forms of use of outer space had arisen, such as the installation in low earth orbit of large space structures, reflecting light to the earth. These projects are not prohibited under space law, but may interfere with another peaceful use of outer space, namely space observation (astronomy). Also, debris resulting from these structures may endanger space safety.

Dr. He Qizhi (China) stated that two approaches exist to deal with the problem of space debris. Either we elaborate a comprehensive international instrument at once, or we deal with the problem piecemeal. *Ms. Ospina* (USA) thought that conclusion of a new treaty on environmental law would be very time-consuming. She proposed to establish an "International Outer Space Clean-up Fund" to which each state would contribute according to its "actual use" of space resources. This contribution could be based on the profit or a percentage of the cost. Part of the fund should be used for R & D in materials that self-destruct harmlessly or can be recycled, in order to prevent a further degradation of the space/earth environment. Also *Mr. Reibel* (USA) thought that the current international legal regime to prevent orbital debris is inadequate. He stated that measurement and tracking capabilities must be improved, wide dissemination of data on debris must be provided, the design of payloads and launch vehicles must be regulated and the deliberate fragmentation of spacecraft must be banned or limited. *Dr. Reijnen* (Netherlands) stressed that article IX of the Space Treaty is not adequate for today's space pollution. Also *Col. Schwetje* (USA) asked for action. The current major source of debris is explosion fragments. The future major source is fragmentation through collision. The risk may be reduced by shielding the objects. Inactive satellites may be removed from orbit and re-entered into the atmosphere. Disposal orbits may be introduced. In the paper of *Ms. Sterns* and *Mr. Tennen* (USA), it was stressed that wide disclosure of information and cooperation must be ensured, and some form of strict liability must be adopted. A comprehensive international agreement must be concluded which is not only consistent with the existing treaty provisions, but also adequately detailed and specific. *Mr. Terekhov* called attention to the 1986 I.A.E.A Convention on Nuclear Accidents and the Consideration of the Use of Nuclear Power Sources in Outer Space in the Legal Subcommittee of COPUOS, thereby introducing another aspect of the environmental problems.

In the discussion that followed the presentations, *Mr. Perek* (Czechoslovakia) expressed the opinion that the subject should be put on the agenda of COPUOS. All of us will help by providing background facts for the discussion within the UN. *Col. Wirin* agreed with this opinion. *Prof. Diederiks* mentioned that in her statement, as an observer at the Legal Subcommittee of COPUOS, she had noted that if the U.N. would consider environmental problems as a new subject for study, the International Astronautical Federation would be happy to cooperate in connection with such study. *Mr. Ribeiro* (Portugal) said that we should focus on design and management. We should make sure that no-one will ever produce debris before the spacecraft has been designed and manufactured. *Mr. Smith* (UK) stressed that we should prevent further pollution in space, and remove what is there, in the hope that the cleaning of space might lead to similar action on earth. *Dr. Okolie* disagreed with *Dr. Reijnen* on the interpretation of article IX of the Space Treaty, affirming that article IX applies to space debris. He agreed with *Lt. Col. Schwetje* on the clarification of article IX in U.S. practice regarding debris. *Dr. Reijnen* answered that in her opinion article IX refers to biological contamination, but that there can be other forms which may lead to adverse changes. Space debris of non-biological character should be covered as well. *Dr. Doyle* read article IX of the Space Treaty. In his opinion it was clear that more is covered than just biological damage. *Mr. Reibel* agreed with *Mr. Ribeiro* that prevention of space debris should start before the spacecraft even exists. The chairman, *Dr. Vereshchetin*, concluded that the general understanding seems to be that the problem of space environmental protection is mature for further study and for eventual legal regulation by the U.N.

The third session on Legal Aspects of Commercialization of Space Activities was chaired by *Mr. Neil Hosenball* (USA), assisted by *Mr. I.I. Kuskavelis* (Greece). The first speaker, *Mr. Bittlinger* (FRG) treated the question of state responsibility for private space activities. He also stressed the importance of clarifying the scope of a state's discretion as to the fulfillment of international obligations with respect to national space activities. *Dr. Bourély* (France) reviewed the legislative measures taken by West European countries to implement article VI of the Space Treaty, and to organize as well, on a purely national basis, space activities by adapting to, or completing, the present legislation of each of these countries. The conclusion of *Mrs. Catalano-Sgrosso* was that private space firms must receive stronger support in order to be able to face the space adventure. More specific international regulations concerning the problems of industrial activities in the space sector would be needed.

Mr. Doyle (USA) stressed the legal aspects of international competition in providing launch services and referred to articles in the space treaties relevant to the topic of launching. His paper contains four tables indicating the different categories of space launch services. Commercial ELV services and NASA were discussed by *Mr. Frankle* (USA), who also gave suggestions for possible methods to solve the problems contractually, fiscally and legislatively.

Prof. Ikeda (Japan) mentioned the legal aspects of commercialization of space activities in Japan. He added that in his country three private companies are already operating and competing with each other, but none of them have hitherto made use of space telecommunications. Satellite telecommunications have to be developed in the near future. *Mr. Musarra* (USA) reported on the current status of the U.S. Department of Transportation's commercial space transportation licensing program and related regulatory activities. His conclusion was that a new private industry has emerged and the U.S. is committed to ensuring that it conducts its activities safely and responsibly. International cooperation in commercial activities in outer space was considered extensively by *Mr. Raclin* (USA). He thought cooperation is not necessary but advisable as a practical matter. *Mr. Lippens de Cerf* (Belgium) spoke on International Satellite Telecommunications and European Economic Community Law. He concluded that the EEC Treaty, on the one hand, and the Intelsat, Inmarsat and Eutelsat agreements, on the other, should be harmonized. Finally, *Mr. Milton Smith* (USA) analyzed the concept of equitable access to the orbit/spectrum resource in the context on planning decisions that must be made at the 1988 Space WARC. His conclusion was that all of the factors relevant to equitable access must be taken into consideration in a fair and just manner.

The Chairman opened the ensuing discussion by mentioning space manufacturing activities. *Ambassador Finch* (USA) "amplified" this topic. He noted that space manufacturing is becoming increasingly important and called attention to the Proceedings of the Princeton Space Manufacturing Conference, organized by the Space Studies Institute. He said that space insurance is becoming more available since its price went from 30% of the value of the satellite down to 20%, and as low as 11%. Furthermore, *Mr. Finch* drew attention to the fact that none of the papers referred to "model launching agreements", such as the one between the U.S. Air Force and McDonnell Douglas, or "turn key" contracts. According to a "turn key" agreement, the buyer of space services is guaranteed by the manufacturer a successful launching, a successful orbital insertion and 30 days of satellite functioning.

Prof. Böckstiegel (FRG), referring to *Mr. Doyle's* paper, said that although some agreements have not been ratified by all governments, they have become general international law and apply *erga omnes*. He agreed that insurance is an important matter but the problems related to it are not only legal and, therefore, other meetings (than the IISL's) dealing with both the economic and legal aspects are appropriate for dealing with this topic. With reference to *Mr. Bourelly's* paper, he said that competition law should be applied within the EEC on space and telecommunications matters.

The Chairman mentioned the "security interests" and the problems of loan and mortgage for space enterprises, noting that facilities in space need both loans and security interests. *Mr. Doyle* (USA) replied to *Prof. Böckstiegel's* comments by saying that the latter raised an important point. Yet, the problem is that some States have signed some agreements

while they have not signed others. *Mr. Doyle* wondered how space law can be applied as a whole and *erga omnes* when on the same topic, signed agreements contain definitions that differ from the ones in non-signed agreements. For example, liability is differently defined in the Outer Space Treaty, in the Liability Convention and in the Registration Convention. The Chairman noted that the Registration Convention was a follow-up to the Liability Convention.

Mr. Burnett (USA) asked what the impact of the U.S. presidential decision on the Shuttle would be regarding commercial launch services. *Mr. Jasentuliyana* (U.N.) stressed the importance of the Liability Convention. Ninety countries have ratified it, showing the largest adherence within the shortest time period. *Mr. Lippens de Cerf* (Belgium) mentioned that the same laws should apply to all firms working within the EEC. *Prof. Almond* (USA) supported the view that space agreements have become general international law. It is difficult, though, to prove it by examining the States' practices. In order to support the argument, he mentioned the example of the USA. The USA, when they entered World War II, respected the Geneva Protocol on the prohibition of the use of chemical weapons, because all other States had shown such an intention. Could a State, which did not sign the space agreements, say that its activities do not come under the realm of these agreements?

Prof. Christol (USA) drew attention to the exact terminology of article II of the 1967 Principles Treaty, and in particular to its negotiating history. In his article published in vol. IX of *The Annals of Air and Space Law* (1984), it was demonstrated that article II precluded international intergovernmental organizations from making claims and disposing of outer space areas and resources which States, on their own account, were prohibited from making. Neither States nor such international bodies can exercise sovereignty relating to the space environment (outer space, *per se*, the Moon, other celestial bodies and the natural resources of such areas) so that the fullest exploitation and use of the orbit/spectrum resource, which is not a limited resource, may take place. There is a need for good-faith cooperation and accommodation. This will be possible when the full range of scientific and technological innovation is fully comprehended. Following *Prof. Christol's* remarks, *Prof. Gorove* noted that art. II of the Outer Space Treaty banning national appropriation of outer space, including the moon and other celestial bodies, did not apply to natural resources of the moon and other celestial bodies in our solar system. This was implicitly recognized by COPUOS in the course of the negotiations leading up to the Moon Agreement where the issue was whether the Moon Agreement should place a moratorium on the exploitation of such resources prior to the establishment of an international regime. Many developing nations favored the idea of a moratorium while the United States and other countries opposed it. Clearly, if there had been a ban on exploitation already in place by virtue of art. II of the Outer Space Treaty, the moratorium debate during the drafting of the Moon Agreement would have been meaningless.

Mr. Okolie (USA) commented on *Mr. Smith's* paper saying that many nations have an interest in satellite communications, but not all have the necessary resources. He stressed the importance of a dialogue between developed and less developed countries and added that to limit the possibility of a nation's participation in future space developments is an elusive concept. *Mr. Smith* (USA) agreed on the immediate need of developing countries for telecommunications but he did not agree with the more political argument of every country maintaining its own satellite(s); 75% of the developing countries will never need, he said, a satellite of their own.

Mr. Menter (USA) asked whether the United States would be held responsible for the activities of an American corporation if the corporation was using Soviet launching capabilities in order to put a satellite in orbit and prior to launching the U.S. had denied permission to the corporation to do so. *Mr. Bittlinger* (FRG) noted that in the above scenario the U.S. would not be held responsible. Following *Dr. Menter's* and *Mr. Bittlinger's* interventions, *Prof. Gorove* remarked that, in the case of OTRAG, activities were conducted in Libya without permission from the Federal Republic of Germany. He recalled relevant discussion at a previous Colloquium (24th Coll., pp. 267-8) where *Prof. Böckstiegel*, *Dr. Menter* and himself reached consensus that the F.R.G. would still be liable for OTRAG's activities. *Prof. Böckstiegel* (FRG) commented that such a conclusion could not be drawn. The *Chairman* added that the NASA launching contracts did not provide for the launching authority's liability.

Prof. Vereshchetin (USSR) stated that many American corporations had applied to Glavkosmos for launching services; yet, they were denied permission to launch by the American government. He asked whether this situation fits into the existing space law. He stressed that the problem of transfer of technology has been addressed by the Soviet Union's proposed "black box" solution. *Mr. Doyle* (USA) mentioned that permission was denied according to the Ammunitions Control Law, existing since 1956. Under this law, satellites cannot be exported without permission of the Secretary of State. The law specifies that they cannot be exported to a communist country, unless the Secretary of State decides that it is in the interest of U.S. foreign policy and, consequently, authorizes it. *Prof. Vereshchetin* (USSR) asked whether the transport of a satellite in a "black box" and its subsequent launching into outer space could be considered as an export. *Mr. Doyle* answered that the law applied to any object governed by it. The Commission of Ammunitions denied permission but the decisions was appealed in the direction of the State Department. He noted that things might have been easier if reciprocity had existed between the USA and the USSR.

The fourth session on the United Nations and Legal Principles of Remote Sensing was presided by *Prof. A.A. Cocca* (Argentina) with the assistance of *Ms. Hockova* (Czechoslovakia). The first speaker, *Prof. Christol* (USA) stated that with the adoption of principles of remote sensing by the U.N., formal approval has been accorded to the principles.

He went on to summarize why in his view the remote sensing principles were so important. Next, *Prof. Cocca* (Argentina) gave a solid survey of the history of remote sensing, while *Mr. DalBello* (USA) examined some of the issues that might result of media-operated remote sensing satellites, should they become commonplace. *Dr. Gál* (Hungary) expressed the view that an "Analysis of Moscow Convention [of 1978] as well as the U.N. Resolution demonstrates that application of international law, including the U.N. Charter built upon the system of sovereign states, to remote sensing activity constitute a firm basis of remote sensing law".

Dr. Mueller (GDR) presenting a paper made in cooperation with *Mr. Hampe*, remarked that "although not binding according to international law, the present catalogue of principles may be regarded as a good political and legal basis for the further steps in codification." The next speaker, *Prof. Myers* (USA) gave a solid commentary on the principles but concluded that "power and influence, not law" were "the dominant factors of international relations." *Prof. DeSaussure* (USA), addressing the interaction of domestic and international law, observed that "the recent U.N. Resolution on principles for remote sensing is too general to establish a legal framework". He felt that "in the absence of a widely adopted treaty placing the regulation of this conduct in an international body, it will be state practice and domestic legislation which will form the basis for the emerging customary law on this activity". *Dr. Okolie* (USA), speaking on "International Space Law Norms Regulating Commercial Remote Sensing of the Earth from Space" stressed "the degree of legal protection of the individual private businesses operating transnationally in the transfer of remote sensing technology and the balancing of such interests with the required public order guaranteed only by the sovereign subjects of international law". *Dr. Sloup's* (USA) paper on mediasat, gray reconnaissance and the new United Nations principles on remote sensing dealt with new developments in remote sensing and their legal implications. "Regulating Remote Sensing of the Earth, taking into Account the Present Trend of Privatization of this Space Activity", was the topic of *Mrs. T. Zwaan* and *Mr. W. de Vries* (Netherlands) who proposed to elaborate a sort of "code of conduct" for private enterprises participating in remote sensing, following the example of the already existing international code of conduct for multinationals. They preferred this code of conduct to an international treaty. *Mrs. Sybesma-Knol* (Belgium), speaking about "Negotiating the U.N. Principles on Remote Sensing of the Earth from Space: the Role of Observers", was in favor of extending the role of observers. Finally, *Mrs. Hockova* (Czechoslovakia), noted in her paper the "Time Factor Significance for International Law Regulation of Remote Sensing."

The general discussion on remote sensing was started by *Mr. Kuskuvelis* who asked *Dr. Sloup* about the area of "gray reconnaissance". *Dr. Sloup* answered that the spatial resolution of U.S. remote sensing devices amounts to 10 M, while those of France (SPOT) amounts to 5 M. *Prof. Christol* (USA) felt that there was no problem regarding consensus, noting that "This is a great political deal and it has great importance for

international customary law". Commenting on this, *Dr. Gal* (Hungary) expressed the opinion that in spite of the fact that Res. 41/65 was accepted by consensus, its rules did not have treaty force. *Dr. Okolie* (USA) asked the question whether a private company can freely publish remote sensing data and information and answered that the government has a right to obtain the data from private companies. *Dr. Kopal* (Czechoslovakia) stressed that the observer status must be distinguished from permanent status. Commenting on the remarks of *Prof. Christol* and *Dr. Gal*, *Mr. Wirin* (USA) observed that there is no absolute right to disseminate information to a third nation. *Dr. Ploman* (Sweden) cautioned that we should keep the specifications of outer space law.

Following *Dr. Ploman's* observations, *Prof. Gorove* noted that the discussion on remote sensing has brought out several areas where important queries remain. Among them are the following; What are the legitimate rights and interests of the sensed States? Whether sovereignty over natural resources extends to information about resources and, if so, in what context and in what manner? What is the scope and extent of international responsibility in connection with remote sensing activities when they are carried out by governmental or nongovernmental entities? In view of these queries, the subject of remote sensing should continue to receive attention in future Colloquia. *Prof. Christol* (USA) suggested that one of the major gains of the 1986 remote sensing principles was the return to the practice of consensus in COPUOS. This led to the General Assembly's unanimous approval, which accorded greater "legitimacy" in the sense of expectations of compliance than had occurred with the less than unanimous approval of the 1982 G.A. Resolution on direct television broadcasting. *Dr. Kopal* noted that the legitimacy of the resolution on DBS and of Res. 41/65 were accepted under the UN Charter.

Mr. Bittlinger (FRG) asked *Mrs. Zwaan* (Netherlands) whether the code of conduct that she mentioned as a means to stimulate private remote sensing activities was understood by her as an amendment to Art. VI of the Outer Space Treaty, which undoubtedly prescribed the authorization of the appropriate state before a national space activity of nongovernmental entities took place. *Mrs. Zwaan* answered that a code of conduct should serve as a guideline in the same manner as other codes do, without having a binding force. Article VI of the OST must remain as it is. *Mr. Reibel* (USA) observed that U.S. law would prohibit furnishing data abroad concerning national security. *Prof. Sybesma-Knol* (Belgium) stated that there is a right of states to participate in the work of UN organs. *Dr. Kopal* listed a number of intergovernmental organizations having observer status, namely Cospas, IAF, Intersputnik, etc.

The President of the International Institute of Space Law closed the Colloquium thanking the Chairmen of the sessions and their assistants. She also thanked the speakers on the different subjects, the participants in the discussion and all participants for their kind attention and attendance. She mentioned that the sessions of the Colloquium had truly taken place in an atmosphere of cooperation and in

an effort to reach a mutual understanding which was a good tradition and a fundamental goal of the Institute.

I.H. Ph. Diederiks-Verschoor
President, International
Institute of Space Law (IAF)

Short Accounts

Workshop on "The Human Experience in Antarctica: Applications to Life in Space", Sunnyvale, California, August 17-19, 1987.

The National Science Foundation (NSF) and National Aeronautics and Space Administration (NASA) co-sponsored a program on the Antarctic experience and how it could benefit those making plans for long-term space missions. The University of California, Davis, hosted the program under the direction of Professor Al Harrison, Department of Psychology.

The purpose of the workshop was to bring together the "soft" scientists who were working on problems resulting from "wintering over" in the Antarctic or problems anticipated by long space voyages. Antarctica has long been an analog for a variety of legal issues arising from space activities; other social sciences devote an equal amount of effort comparing these two environments to help them predict how long duration manned space activities can be more successful.

The attendees were mainly sociologists, psychologists, and psychiatrists. The program included sessions on "Consciousness and Altered States"; "Stress and Stress Management"; "Life in Isolation - Life in the Antarctic, Life in Space"; "Psychological and Sociological Aspects of Manned Spaceflight"; "Applying Habituality Research to the Design of Space Facilities"; "Psychological Screening of Winter-Over Candidates"; "Communications Issues of Space"; and "Conflict Resolution".

One of the more popular panels was entitled *Legal and Political Issues*. Four distinguished space law practitioners were asked to discuss the Antarctic analogy as it applied to the legal regime in space. Professor Howard J. Taubenfeld of Southern Methodist University, presented a paper on the "International Regulation of Space and the Antarctic"; Dr. J. Henry Glazer, Chief Counsel, NASA/Ames discussed the notion of "Astrolaw" in a paper entitled "Regulating Outer Space and the Threat to Fundamental Freedom"; Lt. Col. F. Kenneth Schwetje, USAF, Chief of Space Law, Office of The Judge Advocate General, proposed that a complete criminal justice system be adopted for long-term space activities modeled after the Uniform Code of Military Justice in a work called "Justice in Antarctica, Space, and the Military". Attorney "Uncle Chuck" Stovitz of Beverly Hills, California, closed with a discussion of what U.S. civil laws may now be applicable to the Antarctic and space in his paper, "American Civil Law Has Arrived".

This multidisciplinary meeting will be memorialized in published proceedings which will be available this winter.

F. Kenneth Schwetje, Lt. Col., USAF
Chief of Space Law
International Law Division
Office of The Judge Advocate General

Legal and Commercial Issues of Space Utilization, International Bar Association (IBA) Conference, London, Sept. 14-18, 1987.

The Outer Space Committee meetings of the IBA Section on Business Law, encompassing topical legal and commercial issues, were held during the IBA's recent conference in London, Sept. 14-18, 1987. They were timely, coinciding as they did with the successful Ariane launch and held just weeks before the thirtieth anniversary of the orbiting of Sputnik, the first artificial satellite.

The first session of the Outer Space Committee was chaired by *Jack Leeming* of the British National Space Centre and was opened by former astronaut *Joseph P. Allen* (USA), who presented an insight into the future of "Commerce Beyond the Edge of the Earth". Developments in outer space transportation will continue to result in burgeoning businesses concerned with communication satellites, "earth resources" and such ventures as man tended space platforms and laboratories. *John B. Gantt* (USA) provided an up to the minute analysis of developments in the U.S. Space Policy Law and Regulation and examined such issues as the question of government indemnification to protect United States commercial launcher companies, increasing power of the D.O.D. compared to N.A.S.A in shaping United States space policy and the very question of whether the United States has a cohesive and comprehensive national long range policy. *Mikhail Safranov* (U.S.S.R.), *Wang Lu* (China) and *Yoshihiro Ishizawa* (Japan) each reviewed their respective country's history of outer space activities and present day capabilities and services on offer to foreign organizations, with the aid of interesting video and slide presentations.

The afternoon session dealt with the Joint United States, European, Japanese and Canadian Space Station Project and involved presentations from eminent speakers representing each party followed by a panel discussion. *John O'Brien*, General Counsel of N.A.S.A., *George Van Reeth* of the European Space Agency, *Christian Paterman* of the West German Ministry of Research and Technology, *Seigi Hinato* of the Japanese Ministry of Foreign Affairs and *Edward G. Lee* of the Canadian Department of External Affairs took part. Although the currency of the Intergovernmental Agreement negotiations prevented the specific discussion of all aspects, the meeting was advised of the items which are candidates for inclusion in the legal regime. Fundamental issues of course are the questions of jurisdiction with respect to the space station, intellectual property considerations, inter party waiver of liability and

third party liability. Despite the constraints, strong and sometimes divergent opinions were expressed regarding matters such as the definition of the concept of partnership and dispute settlement provision. Clearly, the product of the negotiations will provide the next major contribution to "space law" and is eagerly awaited.

The joint meeting with the Committee on Insurance on September 17 was chaired by *Stephen Merrett* (England). The first speaker, *Hans Schimrock* (France) outlined the composition and aims of the European Space Agency followed by an illustration of a "typical satellite project" using the ECS and Marecs missions as examples. *Lee Scherer* (USA) foresaw problems in the future commercialization of U.S. Expendable Launch Vehicles, namely, high premium rates, limited insurance capacity and lack of government indemnification for third party liability claims exceeding available insurance. *Benito Pagnanelli* (Italy) hoped that the successful Ariane launch of the ECS-4 and AUSSAT A3 satellites insured for a total amount of \$100M pre-separation (increased to \$140M after separation) would revitalize interest in the industry by insurers but stressed the need for more reliable technology to increase market capacity. *Bernard Goudge* (England) agreed that a lack of confidence in the ability of technology to perform constituted the real crisis in the industry rather than the lack of insurance capacity, which was alive but dormant in the wake of a series of disasters. While capacity was vital, *Brian Moore* (England) emphasized three other crucial difficulties inherent in obtaining the best deal for the insured: negotiating rates in a leadership-limited market; lack of uniformity in policy wordings for individual risks; and, lack of coverage in some areas resulting in part self-insurance.

Turning to products liability insurance, *John Howes* (England) recommended a master facility to include all aspects of a launch covering both users and manufacturers' liability and concluded that renegotiation of the Air Force Agreement was essential since its requirement of cover for unlimited liability was not feasible in the current climate. *James Barrett* (USA) proffered a solution in the recognition of a distinction between "probable maximum loss" and "maximum possible loss" transmitted into a horizontal assumption of third party liability and damage to government property risks - the industry assuming the "probable maximum loss" up to the level of reasonably available insurance and the U.S. Government assuming the second layer of "maximum possible loss." *Per Englesson* (Sweden) would like to see manufacturers not selling satellites unless they obtained releases from the buyer without which they were wide open to subrogation. *David Peachey* (England) personally felt that in the past underwriters had accepted that the intention of parties signing waivers and hold harmless clauses was not to subrogate. Since this had not proven to be true, he felt that such clauses should be re-drawn with clearly stated intentions understood by all parties. The meeting concluded with a lively panel discussion where the speakers were joined by *George Tompkins* (USA),

Rodney Buckland (England), *Peter Nesgos* (USA), and *Roland Deschamps* (France).

The final day's meetings were chaired by *Ian Awford* (England) and *S'aid Mosteshar* (England) respective chairman and vice-chairman of the committee. The morning's speakers examined from different angles the issues which can arise in relation to the use of transponders. A particularly useful analysis of the problems faced by multiple users of satellite transponder was presented by *Jeremy Rose* (England), whereas *Charles Levison* (England) discussed, in very practical terms, the commercial aspects of transponder leasing. *Marc Van Der Heyden* (Netherlands) looked at a typical transponder lease, peremptory rights and the liability of satellite operators for breakdown. The afternoon session opened with *Marietta Benkő* (FRG) who explained the principles adopted in the U.N. Resolution 41/65 of 3 December 1986, the only global law relating to remote sensing from outer space. *Jeffrey Fellows* (England) described the technical characteristics of remote sensing satellites and illustrated results obtained using slides. Concluding the meeting, *Gary Edwards* (USA) and *John Dupuy* (France) contrasted the approaches taken by EOSAT and Spot Image respectively to the problem of restricting unlawful dissemination and copying of data produced by their remote sensing systems.

Leonora Wilson (England)

Lois Rodgers (England)

Rapporteurs

SpaceTech '87, London, Oct. 8-9, 1987.

The SpaceTech '87 Conference was held in London on October 8 and 9, 1987, for the purpose of examining the political and regulatory environment for space programs in the next decade. It was an interesting program with presenters from government and industry representing both the project and legal viewpoints of current and planned programs.

The program opened with an address by *Roy Gibson*, the former Director-General of the British National Space Centre. *Mr. Gibson* discussed political and economic realities in Europe and outlined the problems to be faced by the ESA ministers in the fall. The impact of the dramatic increase of proposed program costs (four-fold increase in three to four years) was discussed, as was the need for continuity of funding, even if that comes at the expense of a given short-term level of funding. Impediments to private funding for major space projects, such as the need to speed up the return on investment were also discussed by *Mr. Gibson*.

Richard Halpern of the NASA Space Station Operations Office discussed the content and budgeting problems facing the space station project. Efforts at obtaining more continuous funding support than is

usually possible under a yearly budget cycle were mentioned as were some of the operational issues which impact the facility. *Roy Gibson* then discussed those same issues from the European perspective in the context of the Columbus project. *Mr. Gibson* stressed the need for intimate ESA-NASA cooperation and expressed optimism that, despite the problems, some acceptable agreement could be worked out.

After that discussion, *John Egan* of The Egan Group called for a new approach to commercial space. He suggested that commercial entities compete for and provide space services from a generally monopolistic position. *Mr. Egan* called for a "revolution" in thinking about commercial activities on the space station and stated his belief that, without such a change, large commercial investment in the space station is not likely. Finally, *Maxim Faget* discussed the characteristics of his commercial endeavors to produce the man-tended Industrial Space Facility.

On the afternoon of October 8, the focus shifted to possible methods and processes for estimating costs and revenues in a new and unique environment such as space. Later in the afternoon a legal panel discussed the legal framework in which the commercial users of the space station would operate. This panel was led by *Delbert Smith* of Schnader, Harrison, Segal, and Lewis of Washington, D.C., and consisted of *Herman Ersfeld*, Head of the Legal Department of MBB-ERNO, FRG; *Gabriel Lafferanderie*, Legal Adviser, ESA; *Edward Frankle*, Deputy General Counsel, NASA; and *John Rich*, Deputy Chief Counsel, McDonnell Douglas Astronautics. Each panelist discussed his perceptions of legal issues facing the space station international agreements, space station commercial operations, or more general issues related to commercialization of space. After that, *Mr. Smith* posed hypothetical questions to the panel to illustrate what legal problems may be faced by a commercial entity that wished to do business on the international space station. One conclusion flowing from these questions was that the legal regime of the space station is expected to be reasonably transparent in that no entirely new doctrines or legal initiatives are being proposed. Instead, it is hoped that a company doing business on the space station would be able to perform as it did on Earth, subject to the same problems and solutions as a terrestrial company engaged in a multinational business.

On the second day, the conference shifted to a discussion of space transportation. In the morning, visions of the relative merits and characteristics of future modes of transportation were discussed with presentations on the ESA FESTIP program, the Hermes project, the U.S. National Aerospace Plane, the British HOTOL, and the German Sanger concept. In the afternoon, the operational or soon-to-be operational systems had their chance. One presentation described the TRW Orbital Maneuvering Vehicle (OMV) which is intended to move, retrieve, or service in-orbit items. Expendable launch vehicle manufacturers also were represented and informative presentations were given discussing the status and future of Martin Marietta's commercial Titan program; ESA's Ariane vehicle; McDonnell Douglas' Delta II; and General Dynamics' Atlas Centaur vehicle. Current successes and future plans for all vehicles were

discussed, and great optimism was expressed for a lively, successful worldwide commercial launch industry in the 1990's and beyond.

Edward A. Frankle
Deputy General Counsel
NASA

Satellite Communications - Mobile Services, IAF Conference, October 16, 1987, Brighton, England

The Symposium on Satellite Communications held a session on mobile services. Several presentations were of particular interest to lawyers. *H. Kowalik* of Canada and *R.D. Briskman* of the United States chaired the session. *Mr. Gribbin* of AvSat Corp. described the company's plans and recent efforts in developing an aeronautical satellite communications system, that could provide, *inter alia*, air-ground passenger communications. *E. Bertenyi* and *M. Wachira* presented a joint paper describing TELESAT of Canada's proposed mobile Satellite System. *Mr. Sultan* of Canadian Astronautics Ltd. presented a paper addressing the plans for an advanced mobile satellite system, covering the earth with three geostationary satellites, each using one single "global" beam and several "spot" beams, with frequency reuse. *J. Naunch, H. Gunther, and K. Plate*, from the Federal Republic of Germany, discussed the proposals for the 3rd generation of INMARSAT satellites, the aim of which is to guarantee full earth coverage.

Katherine M. Gorove
Attorney at Law
Wiley, Rein & Fielding
Washington, DC

Telecom '87, Geneva, October 19-26, 1987

Telecom'87 was held in Geneva, Switzerland from October 19 to 27, 1987. The legal symposium comprised three of those days, addressing the following communications topics: global communications, television broadcasting via satellite, transactional services, WARC '88, and telecommunications trade and services. Two panels of particular relevance to those interested in space activities were those addressing global concerns and television broadcasting via satellite.

Mrs. Anne W. Branscomb, President of the Raven Group, chaired the session addressing global concerns of communications and highlighted the variety of problems faced by nations, including, *inter alia*, the spillover of satellites into neighboring nations. *Mr. Robert Somervaille*, Chairman of the Overseas Telecommunications Commission of Australia addressed a variety of issues with respect to transborder data flows.

queried the effects of inclusion of service trade in the Uruguay GATT round, and speculated that although economic factors and technology play a great role in influencing the telecommunications industry, the cultural impact of technological and economic developments would play a great role in the future. *Dr. Winfried Florian*, from the Ministry of Posts and Telecommunications of the Federal Republic of Germany, spoke of the reorientation of telecommunications in Germany. *Mr. Horibe*, Professor of Law at Hitotsubashi University in Japan, discussed the need to create a forum to coordinate national policies for information and telecommunications, suggesting that such a forum could have the following characteristics: a written charter, membership open to all groups who agree with the charter, discussion on medium and long-range policy making, an agreement to avoid the adoption of any documents which are binding on all members, and abstinence by the organization itself from telecommunications business activities in order to avoid economic conflicts of interest. *Dr. Aldo Armando Cocca*, President of the Council for Advanced International Studies in Argentina, presented a paper entitled "The Human Condition and Communication: The Right to Communicate". *Dr. Cocca's* presentation emphasized that the humanities have much to contribute to restoring the balance between the human condition and technological progress. In highlighting the fact that the right to communicate has always been a fundamental human right and a universal social necessity, *Dr. Cocca* stressed that individuals should examine the right to communicate and ask themselves: what does it mean, what is its legal basis, is it a case of *erga omnes*? If so, for whose benefit, under whose jurisdiction and at whose expense? After giving an overview of the expansion of knowledge and technical rationality, a review of the UNESCO-CEIA meeting in Cordoba in 1984, and a history of the duty to cooperate, *Dr. Cocca* focused on saving the human condition through the right to communicate. He concluded by stressing that the right to communication is part of, and inseparable from, man.

Mr. Stewart White from Dawson Waldron of Australia chaired the session on television broadcasting via satellite. *Mr. Michael Flint* from Denton Hall Burgin & Warrens of the U.K. discussed the European experience, focusing on telecommunications law, *i.e.*, the problems of uplink and downlink rights, regulations relating to direct reception and diffusion by cable networks, copyright law, signal piracy, advertising and sponsorship, regulations relating to the content of the channel, and planning laws as they effect the erection of TVRO dishes. *Mr. Flint* concluded that much is being done to recognize the needs of satellite television programmers for concerted and harmonized legislation throughout Europe, including the Council of Europe's proposed Treaty on Advertising, the EEC's proposals for harmonization of copyright law, and moves by industry bodies to bring together the varying national legislation. He argued that there would appear to be a need for a new body to deal with the special problems of pan-European satellite television broadcasting, because to date the efforts to harmonize are diverse and uncoordinated.

Mr. Robert Ross, Vice-President & Managing Director for CNN International Sales Ltd. of the United States, focused on the American experience with respect to world television distribution, highlighting the forces of change and the lessons learned. *Mr. J.L. Parapak*, President Director of PT INDOSAT of Indonesia, dealt with the Indonesian experience in operating a domestic satellite system. *Mr. Parapak* gave an overview of the development of satellite broadcasting in Indonesia and discussed the legal aspects of television broadcasting via satellite, including frequency spectrum and orbital allotment, as well as technical and socio-economic considerations of satellite use. He concluded by pointing out that developing countries must study carefully all the legal aspects and potentially negative socio-economic impacts before choosing to implement broadcasting via satellite. *Mr. David R. Aspinall*, General Manager International Media and Communications of Bond Corporation Holding Ltd. in Australia was the final speaker, tailoring his talk to the cultural, political and copyright issues of introducing television services in developing countries. First, *Mr. Aspinall* examined the cultural issues and stressed the need for countries to appraise the following factors in order to make an assessment of the social impact of the introduction of television: the relative affluence of community groups, the nexus between economic base and culture, the geographical spread of the population, race and religious composition, levels of literacy, the existence and influence of other media, and the important traditions and customs. He noted the recent introduction of service in New Guinea and how his corporation had applied principles and objectives set forth in his paper. *Mr. Aspinall* then addressed the importance of political issues, as well as copyright issues, with respect to the introduction of television services. *Mr. Francis DeRoa*, of GE Communications, Inc. commented briefly on the various presentations.

Katherine M. Gorove
Attorney at Law
Wiley, Rein & Fielding
Washington, DC

Other Events

The Case for Mars III Conference sponsored by the American Astronautical Society, NASA and other organizations was held on July 18-22, 1987 in Boulder, Colorado....At the invitation of the Soviet Academy of Sciences a number of foreign guests participated in a week-long program this fall commemorating the thirtieth anniversary of the launch of Sputnik. This was followed on October 2-4, 1987 by an International Space Future Forum attended by hundreds of Soviet and foreign guests who endorsed the idea of joint ventures during the proposed International Space Year in 1992.

The risks and rewards of participation in the SDI program and possible commercial spinoffs were discussed at a conference on "Business Opportunities in SDI: Commercial Prospects and Funding Strategies", October 5-6, 1987 in Arlington, Virginia.... The Centre for Research in Air and Space Law organized a Symposium on Space Surveillance for Arms Control and Verification Options at McGill University on October 21-23, 1987....The Telecom 87 Conference took place in Geneva, Switzerland from October 20 to 26, 1987....The George Washington University Space Policy Institute sponsored a "Solar System Exploration" Symposium on December 9, 1987.

Brief News

Intelsat transmits TV coverage of Reagan-Gorbachev summit to ten countries....Soviets assert ability to detect, by national technical means, submerged U.S. submarines. They had 2000 launches into space compared to 870 U.S. launches...Hughes Aircraft asks for State Department authorization to use China's Long March 3 booster....China's new Landsat station receives data for agricultural, land planning and geological purposes....F-15 launched ASAT testing is banned in FY '88.

ESA's Ministerial Council approves development of the Ariane 5 launcher, the Hermes manned spaceplane and the Columbus space station project...AIAA study recommends partial governmental subsidization for domestic ELV service providers....Panama becomes the fifty-first member of Inmarsat....U.S. Court of Appeals upholds financial qualification requirements for domestic satellite applicants.

Soviets set new manned spaceflight endurance record, offer to carry "getaway specials" and arrange other cooperative space flights. The first unmanned Soviet Shuttle launch is not expected until 1989 but Soviet launch capability is to quadruple by 2003....The Galileo mission to Jupiter is scheduled for October 1989....The International Space Year, planned for 1992, during the 500th anniversary of the discovery of America, is to foster international space cooperation on a broad basis...Solar-powered rockets may be developed to transfer large payloads from low-earth orbit to geosynchronous orbit at cost savings.

B. Forthcoming Events

Issues of law and policy are expected to be discussed at a host of national and international conferences. For instance, Lady Base One Lunar Development Corporation is sponsoring a National Space Policy Issues Convention on *January 22, 1988* in Atlanta, Georgia. Space Commerce '88 on the Commercial and Industrial Uses of Outer Space will be held on *February 21-25, 1988* in Montreux, Switzerland.

NASA, the IAA and the Lunar and Planetary Institute are sponsoring a Symposium in Houston, Texas, on *April 5-7 1988*. - Commercial Opportunities from Space Transportation and Related Industries will be the theme of an international gathering in Brisbane,

Australia, on *May 4-7, 1988*. - At another international colloquium to be held in Cologne (FRG) on *May 17-19, 1988* the topic of discussion will be "Environmental Aspects of Activities in Outer Space - State of the Law and Measures of Protection."

America's Telecom 88 is to meet on *May 16-21, 1988* in Rio de Janeiro, whereas the Sixteenth International Symposium on Space Technology and Science will take place on *May 22-27*, in Sapporo, Hokkaido, Japan.

The 1988 International Geoscience and Remote Sensing Symposium will be held jointly with the Annual Conference of the Remote Sensing Society from *September 13-16, 1988* at the University of Edinburgh, Scotland. - One of the sessions of the International Law Association's Conference in Warsaw, Poland on *August 21-28, 1988* will be devoted to issues of Space Law.

The XXXIst Colloquium on the Law of Outer Space, a part of the IAF Congress, will be held in Bangalore, India, from *October 8 through October 15, 1988*. Topics to be discussed will be: 1. Legal Aspects of Maintaining Outer Space for Peaceful Purposes; 2. Space Law and the Problems of Developing Countries; 3. National Space Laws and Bilateral and Regional Space Agreements; and 4. General Issues of Space Law. During the same IAF Congress, the International Academy of Astronautics is organizing a Symposium on Benefits to Society from Space Activities.

Space Commercialization: Roles of Developing Countries will be the theme of an international conference in Nashville, Tennessee, on *March 5-10, 1989*.

BOOK REVIEWS/NOTICES

The Case for Mars II, edited by Christopher P. McKay (Univelt, Inc., 1985), pp. 716.

This publication presents the proceedings of the Second Case for Mars Conference held July 10-14, 1984, at the University of Colorado. The text begins with a paper by *Dr. Thomas Paine* entitled "A Timeline for Martian Pioneers". The author points out three criteria essential to make the next century an "Extraterrestrial Century": "avoid nuclear holocaust through effective international cooperation, promote world prosperity and technical progress by raising living standards on all continents, and apply a portion of the vast human technological resources thus made available to initiate the evolution of mankind on other worlds through a self-sustaining settlement on Mars". The paper is an excellent introduction to the initial topic of the text: "National and International Aspects". The first paper under this topic discusses the "Political Acceptability of Mars Exploration". The author makes clear that the development of a low orbit manned space station, supported by the Reagan Administration, will act as a first step to manned expeditions to Mars and will encourage international cooperation.

Dr. Nathan C. Goldman, an Assistant Professor of Government at the University of Texas, continues the line of discussion about international cooperation in his presentation of "The Mars Base: International Cooperation". *Dr. Goldman* states, "The nature of the mission, its costs and complexities, suggest...that the Mars Mission will be a largely international effort". He brings forth the proposition that it would not be very efficient to go to Mars in the manner of a United States-Soviet race. The author considers a number of options for a "United States - Sponsored Joint Mission to Mars". Additionally, *Dr. Goldman* emphasizes that the decision to go to Mars will be political in nature.

The next paper presented under the main topic of "National and International Aspects" is "Russians to Mars" by *James E. Oberg*. Here *Mr. Oberg* illustrates convincingly that the Soviets are compiling the "necessary building blocks" for a mission to Mars. The most apparent Soviet "building block", says the author, is their long-term manned space flight capability gained through orbital explorations equal in length to the six to eight month trip to Mars. *Mr. Oberg* states that "a Soviet manned Mars orbital mission could be under way by the middle to late 1990's." *Mr. Oberg* continues by saying that "the outlook for an international ship with a United Nations flag" is not favorable because of the Soviets looking at Martian Voyage by the year 2000 and the United States not looking at a Martian trip until the period of 2012-2040. Thus, the author concludes with a question: "Why should the Soviets want to wait for us to catch up?"

The last paper in this section is entitled "Antarctica: Lessons for a Mars Exploration program" by *Christopher P. McKay*. Here the author hopes that the international cooperation exhibited in exploration and control of Antarctica is used as an example when it comes to planning an expedition to the Martian surface.

The publication continues with a chapter entitled "Percursor Missions" which maps out the preliminary steps to a manned-Martian Voyage: unmanned missions, a space station, and a lunar base, are but some of the steps voiced by the author. Next, three papers came under the heading of "Science". These authors explore the environmental aspects that will be encountered in setting up a Martian base, such as contamination problems, self-sufficiency, and the climate. Then, the text turns to the section of spacecraft design for a Martian base and rapid delivery of small payloads to sustain human existence on Mars.

Spacecraft design, airships to explore the Martian surface, and the power requirements for several Martian programs are the topics included in the section "Mars Space Technology". The hydrogen atom, water, permafrost and other Martian amenities are explored in the chapter entitled "Utilizing Martian Resources". This section illustrates how Martian resources will be critical in maintaining a permanent Martian base. The "Psychological Considerations in Long Distance Space Missions" is a work found in the chapter of "Human Factors". This chapter also takes into account the effect of long-term weightlessness and counter-measures for such effects in a paper by *Daniel Woodward*.

The publication concludes with a useful appendix which has abstracts from papers that were presented at the Conference, but were not available for publication.

Space Exploration and Utilization (American Astronautical Society, San Diego, California, 1986), pp. 724.

This book is an account of the Joint Meeting of the American Astronautical Society and the Japanese Rocket Society held in Waikiki, Hawaii.

The work begins with the role Japan will play in future space activities. Important activities such as: launching domestic communication satellites, science observation satellites, marine observation and earth resource satellites as well as meteorological satellites are all part of a comprehensive Japanese plan to more effectively utilize space exploration.

Internationally, countries depend upon each other in space exploration and utilization. Space adventures will be very successful in the long run if countries join together to spread the risks and costs as well as reap the benefits. Furthermore, in order to achieve a successful International Satellite Service System, there needs to be technological coordination between countries. So far, most countries have been studying technological problems independently.

Satellite systems with a high detectability potential are being further researched. These systems will be capable of sea surface temperature estimation, snow melt runoff prediction and land use classification.

The United States is researching and developing the planned U.S. Space Station which will make it possible to construct in space and launch from space large payloads into orbit. Further discussed is the ability to launch satellite vehicles capable of firing rockets from space to earth. Although still very much in the developmental stage, this system is expected to be tested in 1992. Commercialization of space based manufacturing requires more crew resource than those of NASA space stations. Thus, the private sector will be called upon to help research and implement space exploration programs. This should result in greater technology, increased jobs, and more cost effective exploration. Benefits to society also take the form of improvements in military defense, technology, communication, weather prediction and marine observation.

To sum up, those who started launching satellites had no intention of developing the moon and other planets. However, advances in researching, computerization and robotics have put us one step closer to inhabiting and developing space and its resources.

A Report on Third National Space Symposium - Space: Countdown to the Future, edited by Steven D. Mitchell (United States Space Foundation, 1987), pp. 302.

This publication presents the proceedings at the Third National Space Symposium held in Colorado Springs, Colorado on January 20-23, 1987. The symposium brought together distinguished speakers from around the world to discuss the topic of *Space: Countdown to the Future*. The book is a transcript of the speeches given by the dignitaries and is divided up into sixteen sections that correlate with the sixteen different sessions that were held at Colorado Springs.

The first session focused on an SDI update by *Lt. General James A. Abrahamson* who saw the main policy problem in defining the meaning of the phrase "defending the people of the United States." There was a difference between defensive deterrence involved in SDI and exclusive reliance on offensive deterrence, where unfortunately we find ourselves now. The best way to prevent war was to move from an exclusive offensive strategy to one that also encompassed defense. He concluded his talk emphasizing that the success of SDI will also hinge on the ability to accurately project costs.

Highlights of other sessions included a speech given by NASA Administrator *Dr. James Fletcher*, who gave a brief list of what NASA was doing to prepare for the future: getting its "house in order", establishing a permanent manned space station, developing a National Aerospace Plane, and planning for the next decade and beyond. *Dr. Michael Yarymovich*,

Vice President of Rockwell International, also outlined a seven point program for space development.

Dealing with the topic of "Space Launch Options", *Dr. Darrell R. Branscome*, Director of Special Programs at NASA, explained how NASA was implementing the nine recommendations offered by the Roger's Presidential Commission after the Space Shuttle Challenger accident. Along with other speakers, he also emphasized the need to expand the use of expendable launch vehicles (ELV's) thereby having a more balanced use of ELV's and shuttles.

Robert Daniell, Chairman and CEO of United Technological Corporation, stressed the need to obtain a commitment for our country's future in space from the political leadership of the United States. Addressing "Space Commercialization", *Dr. Brenda Forman*, Director for International Marketing, pointed out that, "Our future prospects in the commercial developments in space are going to be dominated by risk and return."

Lt. General Bernard Randolph, Deputy Chief of Staff for Research, Development and Acquisitions, USAF, touched on several facets of military research and development, and emphasized that the limiting factor in space was not technology but dollars which necessitated a reduction of the costs of putting an object into orbit. Highlighting the discussion of military aspects, the Secretary of Defense, *Casper Weinberger*, expressed his continued support for the SDI. He traced the increased Soviet expenditures on strategic defense, noting that the U.S.S.R. had spent fifteen times as much on strategic defense as the U.S.A. He reiterated that SDI had brought the Soviets back to the negotiating table and a strong SDI would keep them there.

Discussing the pros and cons of the Strategic Defense Initiative Program, *Lt. Colonel Frank Stirling*, USAF, SDI Program Office, voiced the positive aspects of SDI. He acknowledged that the SDI is not a perfect defense, but stated that SDI will change the strategic philosophy of the world and will make first strike capability obsolete. *Lt. General Daniel O. Graham*, USA, (Ret.), Director of High Frontier Foundation, felt that any degree of defense against nuclear war was better than none, so the need for SDI was clear. *Dr. Carol Rosin*, President of the Institute for Security and Cooperation in Outer Space, opined that she was not against the position of SDI in its entirety, but was opposed to space-based weapons specifically.

Among the other military speakers, *General Robert T. Herres*, Commander-in-Chief, U.S. Space Command, illustrated that having the military in space does not necessarily mean that space becomes a "weaponized" environment. He also described the importance of space in relation to the balance of world power.

"International Space Perspectives" was another topic for discussion. It offered a rare opportunity for the leaders of the space programs from France, Canada, Federal Republic of Germany, Japan, China and Great Britain to discuss their own country's future in space. This session was presided over by *Charles H. Kaman*, President of Kaman Corporation, who spoke about the lack of a unified will to continue in space. *Mr. Kaman* also made a comment about the Challenger tragedy

noting that when money becomes the first priority, and not perfection of technology, it is really not surprising to have a disaster.

Another speaker, syndicated columnist *Jack Anderson*, put forth his belief that the nation that leads in space will also be the leader in technology, and thus, be the dominating power of the twenty-first century.

Additional discussion focused on cost reduction of payloads, the call for a stable space policy, the concept of building a space station, and the space plane project.

Looking ahead, *Dr. Lavell Wood*, of the Lawrence Livermore National Laboratory, University of California, projected future expectations relating to SDI, the civilian space effort, the space station, the possibility of a lunar colony and the threat of budgetary constraints.

The publication closes with an interesting dialogue that made up the "Space Law and Policy Forum" and the "Space Education Forum". One of the topics discussed was the need for a new space treaty because of the commercial activities in outer space, another one was the continuing need to educate teachers and school children about the ever-changing aspects of space.

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CURRENT DOCUMENT

International co-operation in the peaceful uses of outer space*

The General Assembly,

Recalling its resolution 41/64 of 3 December 1986,

Deeply convinced of the common interest of mankind in promoting the exploration and use of outer space for peaceful purposes and in continuing efforts to extend to all States the benefits derived therefrom, and of the importance of international co-operation in this field, for which the United Nations should continue to provide a focal point,

Reaffirming the importance of international co-operation in developing the rule of law, including the relevant norms of space law and their important role in international co-operation for the exploration and use of outer space for peaceful purposes,

Commemorating the thirtieth anniversary of the launching into orbit of the first man-made object, Sputnik, which marked the beginning of the exploration and use of outer space for peaceful purposes and of international co-operation in this field,

Commemorating also the twentieth anniversary of the entry into force 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, 2/ which has played and continues to play a positive role in the implementation of the purposes and principles of the Charter of the United Nations and the progressive development of the law of outer space, including the elaboration and adoption of other international instruments governing the outer space activities of States,

Gravely concerned at the extension of an arms race into outer space,

Recognizing that all States, in particular those with major space capabilities, should contribute actively to the goal of preventing an arms race in outer space as an essential condition for the promotion of international co-operation in the exploration and use of outer space for peaceful purposes,

Aware of the need to increase the benefits of space technology and its applications and to contribute to an orderly growth of space activities favourable to the socio-economic advancement of mankind, in particular the peoples of developing countries,

Taking note of the progress achieved in the further development of peaceful space exploration and application as well as in various national and co-operative space projects, which contribute to international co-operation in this field,

* Adopted by the UN General Assembly without a vote as Resolution 42/68 on 2 December 1987. (Footnotes are omitted).

Taking note also of the report of the Secretary-General on the implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space,

Having considered the report of the Committee on the Peaceful Uses of Outer Space on the work of its thirtieth session,

1. Endorses the report of the Committee on the Peaceful Uses of Outer Space;
2. Invites States that have not yet become parties to the international treaties governing the uses of outer space to give consideration to ratifying or acceding to those treaties;
3. Notes that the Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space at its twenty-sixth session, in its working groups, continued its work as mandated by General Assembly resolution 41/64;
4. Endorses the recommendations of the Committee on the Peaceful Uses of Outer Space that the Legal Sub-Committee at its twenty-seventh session, taking into account the concerns of all countries, particularly those of developing countries, should:
 - (a) Continue the elaboration of draft principles relevant to the use of nuclear power sources in outer space through its working group;
 - (b) Continue, through its working group, its consideration of matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit, without prejudice to the role of the International Telecommunication Union;
5. Requests the Legal Sub-Committee to finalize the choice of a new item for its agenda, taking into account the proposal made by the Group of 77 and other proposals, in order to begin its consideration at its twenty-seventh session;
6. Notes that the Scientific and Technical Sub-Committee of the Committee on the Peaceful Uses of Outer Space at its twenty-fourth session continued its work as mandated by General Assembly resolution 41/64;
7. Endorses the recommendations of the Committee on the Peaceful Uses of Outer Space that the Scientific and Technical Sub-Committee at its twenty-fifth session, taking into account the concerns of all countries, particularly those of developing countries, should:
 - (a) Consider the following items on a priority basis:
 - (i) United Nations Programme on Space Applications and the co-ordination of space activities within the United Nations system;
 - (ii) Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space;
 - (iii) Matters relating to remote sensing of the Earth by satellites, including, inter alia, applications for developing countries;
 - (iv) Use of nuclear power sources in outer space;

- (b) Consider the following items:
- (i) Questions relating to space transportation systems and their implications for future activities in space;
 - (ii) Examination of the physical nature and technical attributes of the geostationary orbit. Examination of its utilization and applications, including, *inter alia*, in the field of space communications, as well as other questions relating to space communications developments, taking particular account of the needs and interests of developing countries;
 - (iii) Matters relating to life sciences, including space medicine;
 - (iv) Progress in the geosphere-biosphere (global change) programme; the Committee on Space Research and the International Astronautical Federation should be invited to present reports and arrange a special presentation on this subject;
 - (v) Matters relating to planetary exploration;
 - (vi) Matters relating to astronomy;
 - (vii) The theme fixed for the special attention of the 1988 session of the Scientific and Technical Sub-Committee: "Microgravity Experiments in Space and Their Applications"; the Committee on Space Research and the International Astronautical Federation should be invited to arrange a symposium, with as wide a participation as possible, on the theme "Microgravity Experiments in Space and Their Applications", to be held during the first week of the Sub-Committee's session, after the adjournment of its meeting, to complement discussions within the Sub-Committee;

8. Considers, in the context of paragraph 7 (a) (ii) above, that it is particularly urgent to implement the following recommendations:

- (a) All countries should have the opportunity to use the techniques resulting from medical studies in space;
- (b) Data banks at the national and regional levels should be strengthened and expanded and an international space information service should be established to function as a centre of co-ordination;
- (c) The United Nations should support the creation of adequate training centres at the regional level, linked, whenever possible, to institutions implementing space programmes; necessary funding for the development of such centres should be made available through financial institutions;
- (d) The United Nations should organize a fellowship programme through which selected graduates or post-graduates from developing countries should get in-depth, long-term exposure to space technology or applications; it is also desirable to encourage the availability of opportunities for such exposures on other bilateral and multilateral bases outside the United Nations system;

9. Endorses the recommendation of the Committee on the Peaceful Uses of Outer Space that the Scientific and Technical Sub-Committee should re-establish, at its twenty-fifth session, the Working Group of the Whole to Evaluate the Implementation of the Recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, with a view to improving the execution of activities relating to international co-operation, particularly those included in the United Nations Programme on Space Applications, and to propose concrete steps to increase such co-operation as well as to make it more efficient;

10. Endorses the recommendations of the Working Group of the Whole as endorsed by the Committee on the Peaceful Uses of Outer Space, contained in paragraphs 11 to 13 of the report of the Working Group of the Whole;

11. Endorses the recommendation of and the agreements reached in the Scientific and Technical Sub-Committee with respect to the use of nuclear power sources in outer space, contained in paragraphs 55 to 63 of the report on the work of its twenty-fourth session, as endorsed by the Committee on the Peaceful Uses of Outer Space in paragraph 58 of its report;

12. Decides that, during the twenty-fifth session of the Scientific and Technical Sub-Committee, the Working Group on the Use of Nuclear Power Sources in Outer Space shall be reconvened to conduct additional work on the basis of its previous reports and of subsequent reports of the Scientific and Technical Sub-Committee;

13. Endorses the United Nations Programme on Space Applications for 1988, as proposed to the Committee on the Peaceful Uses of Outer Space by the Expert on Space Applications;

14. Emphasizes the urgency and importance of implementing fully the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space as early as possible;

15. Reaffirms its approval of the recommendation of the Conference regarding the establishment and strengthening of regional mechanisms of co-operation and their promotion and creation through the United Nations system;

16. Expresses its appreciation to all Governments that made or expressed their intention to make contributions towards carrying out the recommendations of the Conference;

17. Invites all Governments to take effective action for the implementation of the recommendations of the Conference;

18. Urges all States, in particular those with major space capabilities, to contribute actively to the goal of preventing an arms race in outer space as an essential condition for the promotion of international co-operation in the exploration and uses of outer space for peaceful purposes;

19. Takes note of the views expressed and documents circulated during the thirtieth session of the Committee on the Peaceful Uses of Outer Space and during the forty-second session of the General Assembly concerning ways and means of maintaining outer space for peaceful purposes;

20. Requests the Committee on the Peaceful Uses of Outer Space to continue to consider, as a matter of priority, ways and means of maintaining outer space for peaceful purposes and to report thereon to the General Assembly at its forty-third session;

21. Affirms that the interference that satellite systems to be newly established may cause to systems already registered with the International Telecommunication Union shall not exceed the limits specified in the relevant provision of the International Telecommunication Union Radio Regulations applicable to space services;

22. Requests all organs, organizations and bodies of the United Nations system and other intergovernmental organizations working in the field of outer space or on space-related matters to co-operate in the implementation of the recommendations of the Conference;

23. Requests the Secretary-General to report to the General Assembly at its forty-third session on the implementation of the recommendations of the Conference;

24. Requests the specialized agencies and other international organizations to continue and, where appropriate, enhance their co-operation with the Committee on the Peaceful Uses of Outer Space and to provide it with progress reports on their work relating to the peaceful uses of outer space;

25. Requests the Committee on the Peaceful Uses of Outer Space to continue its work, in accordance with the present resolution, to consider, as appropriate, new projects in outer space activities and to submit a report to the General Assembly at its forty-third session, including its views on which subjects should be studied in the future.

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**VOLUME 15, NUMBER 1 & 2
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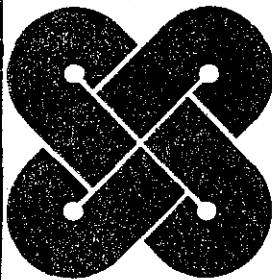
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