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COMMITTEE ON THE PEACEFUL USES
OF OUTER SPACE

REPORT OF THE LEGAL SUB-COMMITTEE ON THE WORK OF ITS
TWENTY-SECOND SESSION (21 March-8 April 1983)

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INTRODUCTION

Opening of the session

1. The Legal Sub-Committee opened its twenty-second session at United Nations Headquarters on 21 March 1983.
2. The departing Chairman of the Sub-Committee, Mr. Eugeniusz Wyzner, made a farewell statement. He expressed gratitude to all delegations for the co-operation they had extended to him during the 16 years of his chairmanship. He referred to the work and achievements of the Sub-Committee. Among those achievements, he stated, was the development of the Legal Sub-Committee as an efficient and unique body for the negotiation of legal instruments and that, he said, was a heritage all delegations would wish to preserve and foster.
3. The Sub-Committee expressed its deep appreciation and gratitude to Mr. Wyzner for the leadership he had so ably provided and the considerable contributions he had made to the work of the Sub-Committee during his long term as Chairman.
4. The Sub-Committee elected Mr. Ludek Handl (Czechoslovakia) to succeed Mr. Wyzner as Chairman of the Sub-Committee. Mr. Handl, in his introductory statement as Chairman, thanked the Sub-Committee for the honour the Sub-Committee had done his country and him in his election to the chairmanship. He need not, he said, remind the Sub-Committee of the great significance of its work to the progressive development of the law of outer space to which the Sub-Committee had made important and impressive contributions. As the Sub-Committee would appreciate, however, there was much that remained to be done. It was true that the subjects before the Sub-Committee were difficult and complex and not merely difficult and complex from the legal point of view; having regard, however, to the unique qualities of the Sub-Committee and its tradition of good will, mutual understanding and co-operation, he was confident that the Sub-Committee would continue to make progress in the work which the Committee on the Peaceful Uses of Outer Space and the General Assembly had entrusted to it.
5. The General Assembly, in its resolution 37/89 of 10 December 1982, had recommended that the Sub-Committee at its present session should: (a) continue on a priority basis its detailed consideration of the legal implications of remote sensing of the earth from space, with the aim of formulating draft principles relating to remote sensing; (b) continue its consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space, through its working group; and (c) continue its consideration of matters relating to the definition and/or delimitation of outer space and outer space activities, bearing in mind, inter alia, questions relating to the geostationary orbit, and devote adequate time for a deeper consideration of this question.

Adoption of the agenda

6. At its opening meeting the Sub-Committee adopted the following agenda (A/AC.105/C.2/L.136):

1. Opening of the session
2. Election of Chairman
3. Statement by the Chairman
4. Legal implications of remote sensing of the earth from space, with the aim of formulating draft principles
5. Consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space
6. Matters relating to the definition and/or delimitation of outer space and outer space activities, bearing in mind, inter alia, questions relating to the geostationary orbit

Organization of work

7. The Sub-Committee, in accordance with the decision taken at its 382nd meeting on 22 March 1983, organized its work as follows:

- (a) It considered the three substantive items on its agenda in the order in which they appeared in document A/AC.105/C.2/L.136:
- (i) Item 4 (Legal implications of remote sensing of the earth from space, with the aim of formulating draft principles), the only priority item on the Sub-Committee's agenda, was allocated five days;
 - (ii) Item 5 (Consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space) was allocated three days;
 - (iii) Item 6 (Matters relating to the definition and/or delimitation of outer space and outer space activities, bearing in mind, inter alia, questions relating to the geostationary orbit) was allocated three days.
- (b) It provided time for a general exchange of views to enable delegations which wished to make statements in a general exchange of views to do so and reserved the last day of its session for the consideration and adoption of its report. During this period the Latin American countries members of the Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space presented a declaration in the form of a working paper (A/AC.105/C.2/L.142) whose text is reproduced in annex III to this report, containing their views on some aspects of utilization, exploration and exploitation of outer space.

However, some delegations continued to believe that a general debate was superfluous, since delegations could express their views, in an organized and detailed manner, during the consideration of each agenda item. It was also pointed out that it would be desirable for the Legal Sub-Committee and the Scientific and Technical Sub-Committee to hold their sessions simultaneously in order better to co-ordinate their work. Other delegations stated that a general debate was useful and could help the Sub-Committee in its work. These delegations considered that the long-standing practice of consecutive sessions of the Legal and the Scientific and Technical Sub-Committees was fully justified and should be continued as it affords delegations the possibility to study, in their capitals, the results of the work of one Sub-Committee before the opening of the session of the other Sub-Committee.

(c) It re-established its Working Group, open to all members of the Sub-Committee, on agenda item 4 (Legal implications of remote sensing of the earth from space, with the aim of formulating draft principles), which was the only priority item on its agenda at the present session, and agreed that Mr. Cede, representative of Austria, should continue as Chairman of that Working Group.

(d) It re-established its Working Group, open to all members of the Sub-Committee, on agenda item 5 (Consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space) and agreed that Mr. Bueno, representative of Brazil, should continue as Chairman of that Working Group.

(e) It considered item 6 of its agenda (Matters relating to the definition and/or delimitation of outer space and outer space activities, bearing in mind, inter alia, questions relating to the geostationary orbit) in plenary meetings.

(f) It began each day with a plenary meeting, to hear delegations which wished to address it, and thereafter adjourned and reconvened, when appropriate, as a working group.

8. The Chairman informed the Sub-Committee at its 386th meeting, on 28 March, and at its 391st meeting, on 4 April 1983, that requests to participate in meetings of the Sub-Committee had been received from Cuba and the Holy See, respectively. The Sub-Committee agreed that, since the granting of observer status is the prerogative of the Committee on the Peaceful Uses of Outer Space, the Sub-Committee could take no decision on the matter, but that the representatives of Cuba and the Holy See might attend the formal meetings of the Sub-Committee and could direct to the Chair their requests for the floor should they wish to make statements.

9. The Working Group on agenda item 4 (Legal implications of remote sensing of the earth from space, with the aim of formulating draft principles) held 10 meetings. The Working Group on agenda item 5 (Consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space) held 6 meetings.

10. The Chairmen of the Working Groups reported to the Sub-Committee at its 397th meeting on 8 April 1983. The Sub-Committee took note with appreciation of the reports and work done in the Working Groups.
11. The Sub-Committee considered item 6 of its agenda at its 391st to 396th meetings from 4 to 7 April 1983.
12. During the course of the session some delegations voiced their apprehension at the growing use of outer space for military purposes contrary to the spirit of the 1967 Outer Space Treaty. These delegations noted that the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space unanimously urged all States, in particular, those with major space capabilities to contribute actively to prevent an arms race in outer space as an essential condition for the promotion of international co-operation in the exploration and utilization of outer space for peaceful purposes. The same delegations emphasized the need for the early adoption of an appropriate instrument or instruments to prevent an arms race in outer space in all its aspects. Some other delegations reiterated their view that the United Nations Committee on the Peaceful Uses of Outer Space and its Sub-Committees were not competent to consider matters related to the military uses of outer space.
13. The Sub-Committee held a total of 18 meetings. The views expressed in the Sub-Committee are summarized in documents A/AC.105/C.2/SR.381 to 398.
14. A list of the representatives of the States members of the Sub-Committee attending the session, of representatives of the States not members of the Sub-Committee attending the session, of the observers for specialized agencies and other organizations, and of the secretariat of the Sub-Committee, is to be found in document A/AC.105/C.2/INF.15 and Add.1.
15. The Sub-Committee, at its 398th meeting on 8 April 1983, adopted the present report unanimously and concluded the work of its session.

I. LEGAL IMPLICATIONS OF REMOTE SENSING OF THE EARTH FROM SPACE, WITH THE AIM OF FORMULATING DRAFT PRINCIPLES

16. The Chairman made an introductory statement on agenda item 4 (Legal implications of remote sensing of the earth from space, with the aim of formulating draft principles) at the 382nd meeting of the Sub-Committee on 22 March 1983. He referred to the work of the Sub-Committee at its twenty-first session.
17. The Chairman drew attention to the fact that the General Assembly at its thirty-seventh session, in resolution 37/89, had decided that the Sub-Committee should, at its present session, continue on a priority basis its detailed consideration of the legal implications of remote sensing of the earth from space, with the aim of formulating draft principles relating to remote sensing.
18. The Sub-Committee noted that all the texts of draft principles formulated by the Sub-Committee's Working Group on remote sensing, as of 1982, had been set out in an appendix to the report of the Chairman of the Working Group on remote sensing at the twenty-first session of the Sub-Committee (A/AC.105/305, annex I, appendix).

19. The Sub-Committee noted further that questions relating to remote sensing of the earth by satellites were also under consideration in the Scientific and Technical Sub-Committee and that the report of the Scientific and Technical Sub-Committee on its recently concluded twentieth session was contained in document A/AC.105/318.

20. The views expressed by delegations during the debate that took place on this item of the agenda are also contained, this year, in the summary records A/AC.105/C.2/SR.382 to 384 and 386 to 387.

21. As noted in paragraph 7 above, the Sub-Committee, at its 382nd meeting on 22 March 1983, re-established its Working Group on agenda item 4.

22. At the 397th meeting of the Sub-Committee, on 8 April 1983, the Chairman of the Working Group reported to the Sub-Committee. The Sub-Committee took note with appreciation of the report and work of the Working Group. In accordance with the decision taken by the Sub-Committee at the same meeting, the report of the Chairman of the Working Group is reproduced in annex I to the present report.

II. CONSIDERATION OF THE POSSIBILITY OF SUPPLEMENTING THE NORMS OF INTERNATIONAL LAW RELEVANT TO THE USE OF NUCLEAR POWER SOURCES IN OUTER SPACE

23. The Chairman made an introductory statement on agenda item 5 (Consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space) at the 388th meeting of the Sub-Committee on 29 March 1983. He referred to the work of the Sub-Committee on that item at its twenty-first session.

24. The Chairman drew attention to the fact that the General Assembly at its thirty-seventh session, in resolution 37/89, had recommended that the Sub-Committee at its present session should continue its consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space through its Working Group.

25. The Sub-Committee noted that the subject of the use of nuclear power sources in outer space had been an item on the agenda of the Scientific and Technical Sub-Committee at its twentieth session in 1983 and that the report of the Sub-Committee, of which chapter IV was the relevant section, was contained in document A/AC.105/318.

26. Two working papers were submitted to the Sub-Committee at its present session: one by Canada (A/AC.105/C.2/L.137) and the other by the Federal Republic of Germany (A/AC.105/C.2/L.138). Those working papers are reproduced in annex III to the present report.

27. The views expressed by delegations during the intensive debate that took place on this item of the agenda are contained, this year, in summary records A/AC.105/C.2/SR.388 to 390.

28. As noted in paragraph 7 above, the Sub-Committee, at its 382nd meeting on 22 March 1983, re-established its Working Group on this item of its agenda. At the 397th meeting of the Sub-Committee, on 8 April 1983, the Chairman of the Working Group reported to the Sub-Committee. The Sub-Committee took note with appreciation of the report and work of the Working Group. In accordance with the decision taken by the Sub-Committee at the same meeting, the report of the Chairman of the Working Group is reproduced in annex II to the present report.

29. In view of the fact that the Chairman of the Working Group, Ambassador Carlos Bueno, will be posted to a new and important assignment outside the seat of the United Nations, the Sub-Committee expressed its thanks to Ambassador Bueno for the outstanding services he has rendered to the Sub-Committee and reiterated its confidence in the work accomplished under his chairmanship. The Sub-Committee, further, expressed the hope that Ambassador Bueno would be able to continue to participate, if available, in the future work of the Sub-Committee.

III. MATTERS RELATING TO THE DEFINITION AND/OR DELIMITATION OF OUTER SPACE AND OUTER SPACE ACTIVITIES, BEARING IN MIND, INTER ALIA, QUESTIONS RELATING TO THE GEOSTATIONARY ORBIT

30. The Chairman made an introductory statement on agenda item 6 (Matters relating to the definition and/or delimitation of outer space and outer space activities, bearing in mind, inter alia, questions relating to the geostationary orbit) at the 391st meeting of the Sub-Committee on 4 April 1983. He referred to the work of the Sub-Committee on that item at its twenty-first session.

31. The Chairman drew attention to the fact that the General Assembly at its thirty-seventh session, in resolution 37/89, had recommended that the Sub-Committee should at its present session, continue its consideration of matters relating to the definition and/or delimitation of outer space and outer space activities, bearing in mind, inter alia, questions relating to the geostationary orbit, and devote adequate time for a deeper consideration of this question.

32. The Sub-Committee noted that the subject of the "examination of the physical nature and technical attributes of the geostationary orbit" had been an item on the agenda of the Scientific and Technical Sub-Committee at its twentieth session in 1983 and had been considered in chapter VI of its report (A/AC.105/318).

33. The Sub-Committee also had before it a working paper entitled "Approach to the delimitation of air space and outer space" submitted to the Sub-Committee at its present session by the delegation of the Union of Soviet Socialist Republics (A/AC.105/C.2/L.139). The working paper is reproduced in annex III to the present report.

34. The Sub-Committee considered agenda item 6 at its 391st to 396th meetings, from 4 to 7 April 1983. The views expressed by delegations during the debate on this subject are contained, this year, in summary records A/AC.105/C.2/SR.391 to 396.

35. Some delegations were of the view that the definition and/or delimitation of outer space was at the present time important and urgent. Such a definition and/or delimitation, they state, ought to be established through a multilateral agreement, open to all States, which would place the boundary between air space and outer space at a certain altitude above sea-level. The reasons for their view, they said, had been presented at previous sessions and recorded in earlier reports of the Sub-Committee and are well-known. These delegations spoke, in this connection, of the differences between the legal régime applicable to outer space and the legal régime applicable to air space and the desirability of a global and easily determinable boundary. They referred, by way of example, to differences between the two régimes with respect to sovereignty which involved political and security considerations and sensitivities. Such differences, they stated, made it essential that the boundary between air space and outer space be made clear. They were of the view that the definition and/or delimitation based on altitude was essentially a legal and political, and not a purely scientific or technical, matter; would prevent the occurrence of disputes; and would facilitate international co-operation; and would not impede technological development. Some delegations expressed the view that such a definition and/or delimitation of outer space had in fact developed in customary international law, as in their view States might now be regarded as having accepted the area above the lowest possible perigee of satellites as constituting outer space. They also pointed out such a definition and/or delimitation should be easily ascertainable and that provision could be made for the passage of space objects and space vehicles through air space. These delegations were not in favour of the "functional approach" advocated by some delegations.

36. Some delegations, which were in favour of a spatial definition and/or delimitation of outer space, expressed support for the proposal of the USSR in its working paper A/AC.105/C.2/L.139 which envisaged that, in the first instance, the boundary between outer space and air space should, following negotiations, be established by an international agreement, open to all States, at an altitude not exceeding 110 kilometres above sea level. The working paper also provided for passage, at lower altitudes, through the air space of one State for space objects of another State for the purpose of reaching orbit or returning to earth, provided such passage caused no adverse effect in the territory of the State whose air space was crossed.

37. Other delegations believed that a definition and/or delimitation of outer space was not necessary nor feasible at the present time. They stated that a definition and/or delimitation was not the proper course; that there was no scientific basis for such a definition and/or delimitation; that development and application of the law of outer space had proceeded satisfactorily without such a definition and/or delimitation; and that it would be unreasonable to adopt an arbitrary definition and/or delimitation which could give rise to difficulties and may impede space technological development. Some of these delegations were of the view that a "functional" theory represented the most appropriate and fruitful approach. They stated that it is not necessary to try to solve the theoretical dispute of whether there is a boundary between outer space and air space, but rather discussion should be directed towards establishing regulations to avoid possible interferences among activities peacefully carried out in outer space and

to avoid adverse consequences for human life on earth. In this regard, they stated that the approach should therefore be specific for specific purposes rather than general, and that this functional approach would better serve small States who for geographical reasons would more likely have space objects which might transverse the air space of another State. The view characterized as "pragmatic", and derived neither from the "spatial" nor from the "functional" schools, was expressed that a boundary between air space and outer space would not be responsive to any practical need now evident and could have unforeseen negative effects on the progressive and peaceful development of space activities as well as on the development of effective space law.

38. Some delegations, while reserving their position with respect to the question of the necessity and appropriateness of a spatial definition and/or delimitation at the present time, were of the view that there were aspects of the USSR working paper which they would like discussed and clarified.

39. Some delegations expressed the view that, as 16 years of work on the delimitation of outer space had led to no result, the Sub-Committee should seek to fulfil in part the mandate which the General Assembly had expressly given the Sub-Committee by concentrating its efforts on the consideration of certain key concepts such as space activities and space objects, without this study prejudicing the subsequent consideration of both the definition and/or delimitation of outer space and the question of the geostationary orbit. Other delegations were of the view that it was inadvisable to separate the two questions and that they should rather be studied together.

40. As regards the question of the geostationary orbit, some delegations believed that the Sub-Committee should commence the formulation of regulations governing the use of the geostationary orbit. They referred to the decisions of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space in Vienna in 1982 and the 1982 Conference of the International Telecommunication Union (ITU) in Nairobi. They considered the geostationary orbit to be of sui generis character and a limited natural resource. They stated that the question relating to the geostationary orbit was not considered at the time of elaboration of the Outer Space Treaty and if it was to be utilized on what they stated was at present a first come first served basis the technologically less developed States would be at a disadvantage. These delegations stated that there was a special physical relationship between the equatorial States and the geostationary orbit. Some delegations also expressed the view that technological advancement in this field highlighted further the urgent need for the promulgation of legal norms regulating the use of the orbit which would take into account the interests of equatorial countries. Technological advances were not a substitute for the formulation of such rules.

41. Other delegations expressed the view that although the geostationary orbit was a limited resource of all countries to which they should have equitable access, its limit was difficult to define because technological developments are continually expanding it. The geostationary orbit, in their view, was essentially a question of the utilization of the radio frequency spectrum and was under consideration by ITU where studies were presently under way for the 1985 World Administrative Radio

Conference. Preparation by the Legal Sub-Committee of regulations with respect to the geostationary orbit would, therefore, not be appropriate. They were of the view that the special characteristics of the geostationary orbit were due to its relation to earth as a whole and not merely to a relationship to the equator. The conviction was expressed that continued efforts to advance technology would allow the capacity of the geostationary orbit to increase and to keep pace with the demand for services; orbital positions should, therefore, be granted in accordance with demand at a particular time but without barring access to those who apply later. It was also stated that proper management of the geostationary orbit through ITU, rather than long-term inflexible planning, was required.

42. Nevertheless, other delegations expressed the view that the present ITU Plans are inadequate norms to regulate access to orbital use because technological trends are rendering this regulatory framework obsolete and, therefore, a legal regulation is required and technical planning which would take into account the needs of developing countries and the special interest of the equatorial countries. These delegations expressed the view that they would continue to work along these lines in search of such regulation.

43. The establishment of a working group of the Sub-Committee for item 6 was also considered. Some delegations stated that it was appropriate procedure at the present time for a working group of the Sub-Committee to be established to enable consideration of specific proposals with a view to determining where progress was possible with respect to the proposals. They pointed out that item 6 had been on the agenda of the Sub-Committee for many years (the question of the definition and/or delimitation of outer space and outer space activities having been on the agenda for 16 years, and the question of the geostationary orbit having been on the agenda for 5 years); that the General Assembly had requested that the Sub-Committee devote adequate time to item 6 to enable deeper consideration. The delegations concerned deemed that it was not advisable that the Sub-Committee should concentrate on general statements of views and that it would be preferable to consider specific proposals submitted to the Sub-Committee on the item, which should, in Sub-Committee practice, be within a working group of the Sub-Committee. Some of these delegations were of the view that item 6 should now be accorded priority. Some of these delegations also pointed out that in the case of item 5 of the Sub-Committee's agenda a working group had been established for an agenda item which, however, was not a priority item. Other delegations were of the view that establishment of a working group of the Sub-Committee would not at the present time be appropriate as there was no scientific basis for a definition and/or delimitation of outer space and as studies were continuing within the framework of ITU on the question of the geostationary orbit. The view was also expressed that a working group was not necessary to permit full exploration of these issues within the Sub-Committee.

44. The view was also expressed that the question to be considered was not whether a working group should or should not be established but rather whether agreement was possible on the necessity for a definition and/or delimitation of outer space. If such agreement was possible, the Sub-Committee could proceed in a working group to formulate the relevant principles.

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45. The view was expressed that establishment of a working group of the Sub-Committee at present could be acceptable provided the working group's deliberations were not limited to a consideration only of the spatial approach to the definition and/or delimitation of outer space. Some delegations expressed the view that a decision on the establishment of a working group should be taken by the Committee on the Peaceful Uses of Outer Space at its next session.

Annex I

REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON AGENDA ITEM 4

(Legal implications of remote sensing of the earth from space,
with the aim of formulating draft principles)

1. The Sub-Committee, on 22 March 1983, re-established its Working Group on agenda item 4 (Legal implications of remote sensing of the earth from space, with the aim of formulating draft principles).
2. The Working Group had before it the report of the Legal Sub-Committee on the work of its twenty-first session in 1982 which contained the report of the Chairman of the Working Group at the twenty-first session of the Sub-Committee and, in an appendix to the report of the Chairman, the texts of the draft principles as they appeared at the conclusion of the twenty-first session as well as the working papers which were before the Working Group at that session (A/AC.105/305, annex I, appendix).
3. The Working Group noted that the subject of remote sensing was an item on the agenda of the Scientific and Technical Sub-Committee at its twentieth session in February 1983 and that chapter III was the relevant section of the Scientific and Technical Sub-Committee's report on that session (A/AC.105/318).
4. The Working Group agreed that it would begin with a first review of the texts of the draft principles as they appeared at the conclusion of the twenty-first session of the Sub-Committee (A/AC.105/305, annex I, appendix) in order that delegations might refamiliarize themselves with them, taking into account the working papers set out in the appendix to the report of the Chairman of the Working Group at the twenty-first session of the Sub-Committee. The Working Group would then return to the texts of those draft principles which appeared to be of special interest, namely, principles XI to XVII, bearing in mind that principles XI to XV were of particular importance.
5. A working paper was submitted to the Working Group at its present session by the delegation of Greece with respect to principle XIII (WG/RS (1983)/WP.1), which was later amended and resubmitted as a revised working paper (WG/RS (1983)/WP.1/Rev.1). These working papers are set out in the appendix to the present report.
6. The views expressed in and the results of the discussions of the Working Group are summarized below.
7. Principle I. There was no substantive discussion of principle I. However, in connection with the Working Group's consideration of principles XII and XV, some delegations referred to principle I whose provisions they thought would need review in light of the provisions of principles XII and XV, taking into account the latest technological developments.

8. Principles II to X. These principles were not specifically discussed, although references were made to some of them by some delegations in the course of the discussion of other principles.
9. Some delegations were of the view that it might be possible at the present session for the Working Group to agree on the elimination of one of the alternatives in the square-bracketed words "[shall] [should]". Some delegations were of the view that the word "shall" should be retained, whereas other delegations were of the view that the word "should" ought to be retained, and still other delegations stated that they could accept either alternative. Some delegations felt that it would be premature for the Working Group to endeavour to resolve the question at the present stage.
10. Principle XI. The question of the deletion of the square brackets around the words "[or non-governmental]" was examined by the Working Group. Some delegations were of the view that the square brackets should be deleted because they felt that a State should be responsible for the activities of non-governmental entities within its jurisdiction and that that responsibility was in accordance with the provisions of article VI of the outer space Treaty. Other delegations, however, were of the view that the square brackets around the words "[or non-governmental]" should be retained. They pointed out that draft principle III contained a reference to the outer space Treaty and that therefore a reference to non-governmental entities, or to State responsibility with respect to remote sensing, in the present principle was superfluous.
11. Some delegations were of the view that deletion of the square brackets around principle XI as a whole should be considered. Other delegations, however, were of the view that they should be retained.
12. Reference was also made, in the course of the discussion of principle XI, to the working paper submitted to the Working Group at the twenty-first session of the Sub-Committee by the delegation of Greece concerning principle XI (WG/RS (1982)/WP.1).
13. Principle XII. The Working Group considered the question whether it could agree on the elimination of one of the alternatives in the square-bracketed words "[no later than] [before]". Some delegations were of the view that the word "before" should be retained in order that the sensed State be accorded access before any third State and that such prior access would be in accordance with the sovereignty of a sensed State.
14. Some delegations were of the opinion that the words "[no later than]" should be retained because it would not be feasible in practice for a sensed State to be accorded prior access to data concerning its territory and because the concept of non-discriminatory access would in fact ensure that no State, including the sensing State, would alone have exclusive access to data.
15. The question was raised as to what was meant by "a third State", having regard to the possibility that in remote sensing activities more than one State could participate in the sensing, namely, the State operating the space object, the State

on whose territory a receiving ground station is located, and other States participating in the remote sensing programme.

16. The view was also expressed that a sensed State should be accorded access to analysed information on moderate terms, but as the developing countries did not have the technology necessary for the processing of primary data, special consideration should be given to them for acquiring analysed information on favourable terms. Reference was made in this connection to the working paper submitted to the twenty-first session of the Sub-Committee by the delegation of China with respect to the question of access and dissemination (WG/RS(1982)/WP.12) and its relevant amendment at the present session as well as to the working paper of Greece appearing in document A/AC.105/305, annex I, page 21.

17. Some delegations expressed the view that principle XII was closely related to principle XV and that the two principles should therefore be considered together. Other delegations, however, were of the view that principles XII and XV dealt with different matters, principle XII dealing with "access" and principle XV with "dissemination".

18. The Working Group considered in some detail the proposal made at the twenty-first session of the Sub-Committee by the delegation of Brazil with respect to principles XII and XV, which proposal was also of relevance to principle XI (WG/RS(1982)/WP.11). Some delegations were of the view that the provisions of that working paper might provide a basis for a solution of matters referred to at present in principles XII, XV and also principle XI. Other delegations were of the view that the Brazilian working paper provided a very useful initiative but that it would require further examination and amendments. Some delegations considered that the concept of damage in the second paragraph of the Brazilian working paper should be further qualified. The view was expressed in this connection that damage to the rights and interests of a State is caused by unauthorized dissemination of remote sensing data and information, relating to its territory, with spatial resolutions finer than 50 metres since such data and information would make it possible to acquire detailed knowledge of its natural resources, economic and defence potential. Reference was made in this connection to the working paper submitted at the twenty-first session of the Sub-Committee by the delegation of the Union of Soviet Socialist Republics with respect to dissemination of data and information (WG/RS(1982)/WP.4). The view was also expressed that the dissemination of data should be unrestricted. It was also stated, without expressed reference to spatial resolution, that below a certain threshold the dissemination of data concerning the territory of a State should only be carried out with the agreement of that State.

19. Principle XIII. The Working Group examined the provisions of the present text of the principle together with a working paper submitted at the current session of the Working Group by the delegation of Greece (WG/RS(1983)/WP.1). Following a substantial discussion and informal consultations, the Working Group agreed on an amended version of that working paper (WG/RS(1983)/WP.1/Rev.1) which would replace the present text of draft principle XIII, on the understanding that a footnote should be included with reference to the words "or conducting" in the first line of the new text and that the footnote would refer to the relevant paragraph, namely, the present paragraph 21, of the Chairman's report.

20. However, the new text of principle XIII together with the footnote referred to above with respect to the words "or conducting" in the first line of the text, appears in the draft principles set out in the appendix to this report in square brackets, since at a later stage some delegations while agreeing with the general concept of the text, felt that a number of its elements needed further reflection.

21. However, it was understood that the words "or conducting" in the first line of the new text of principle XIII refer to manned space flights or to remote sensing programmes already being conducted at the moment of adoption of these principles.

22. Some delegations expressed the view that the words "or conducting" could refer to both manned and unmanned space flights. The view was also expressed that a principle should be drafted referring to the obligation of a sensing State to periodically inform the Secretary-General of the United Nations as to the countries from which actual data has been gathered in a given remote sensing programme.

23. The view was expressed that the terms "programmes" and "activities" should be used in all principles where appropriate.

24. Principle XIV. The Working Group examined the question whether the square brackets around the whole principle could be removed. Some delegations believed that these brackets could be removed, while others were of the view that examination of principle XIV should be postponed until other questions of importance in the set of principles had been resolved. The view was also expressed that the problems in this context should be resolved in connection with other principles. In view of those divergencies the Working Group did not reach agreement on the removal of the brackets. The view was expressed that the Working Group was in fact close to consensus on that question. The matter of the removal of the square brackets around the words "[in particular dissemination of data and information]" was also briefly considered but agreement was not possible.

25. Principle XV. Some delegations were of the view that the square brackets around principle XV as a whole should be removed. Other delegations did not agree. A reference was made to the working paper submitted at the twenty-first session of the Legal Sub-Committee by the delegation of Brazil (WG/RS (1982)/WP.11). That working paper, which proposed a new text for principle XII and the deletion of principle XV, was discussed at the present session of the Working Group in connection with principle XII, as noted above in paragraph 18 of this report.

26. Principles XVI and XVII. These principles were not specifically reviewed at the present session.

27. The texts of the draft principles as they appear at the conclusion of the present session of the Working Group are set out in the appendix to the present report.

28. The Working Group held its final meeting on 7 April 1983, when it considered and approved the present report.

APPENDIX

Section A

TEXTS OF DRAFT PRINCIPLES AS CONTAINED IN THE REPORT OF THE LEGAL SUB-COMMITTEE ON THE WORK OF ITS TWENTIETH SESSION (A/AC.105/288, ANNEX I, APPENDIX), WITH CHANGES MADE AT THE PRESENT SESSION

Principle I 1/

For the purpose of these principles with respect to remote sensing of the natural resources of the earth and its environment: 2/

(a) The term "remote sensing of the earth" means "remote sensing of the natural resources of the earth and its environment"; 3/

(b) The term "primary data" means those primary data which are acquired by satellite-borne remote sensors and transmitted from a satellite either by telemetry in the form of electromagnetic signals or physically in any form such as photographic film or magnetic tape, as well as preprocessed products derived from those data which may be used for later analysis;

(c) The term "analysed information"* means the end-product resulting from the analytical process performed on the primary data as defined in paragraph (b) above combined with data and/or knowledge obtained from sources other than satellite-borne remote sensors.

Principle II

Remote sensing of the earth from outer space and international co-operation in that field [shall] [should] be carried out for the benefit and in the interests of

* The content, definition and necessity of the term "analysed information" is still to be clarified.

1/ The question of the application of these principles to international intergovernmental organizations will be considered later.

2/ The formulation "with respect to remote sensing of the natural resources of the earth and its environment" will be reviewed in light of the title to be given to the principles.

3/ This term is still subject to further discussion. In the view of some delegations, it would be necessary in the future work to further define the meaning of the words "remote sensing of the earth and its environment".

all countries, irrespective of their degree of economic or scientific development, and taking into consideration, in international co-operation, the particular needs of the developing countries.

Principle III

Remote sensing of the earth from outer space [shall] [should] be conducted in accordance with international law, including the Charter of the United Nations and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, and the relevant instruments of ITU.

Principle IV

1. States carrying out programmes for remote sensing of the earth from outer space [should] [shall] promote international co-operation in these programmes. To this end, sensing States [should] [shall] make available to other States opportunities for participation in these programmes. Such participation should be based in each case on equitable and mutually acceptable terms due regard being paid to principles ...

2. In order to maximize the availability of benefits from such remote sensing data, States are encouraged to consider agreements for the establishment of shared regional facilities.

Principle V

Remote sensing of the earth from outer space [should] [shall] promote the protection of the natural environment of the earth. To this end States participating in remote sensing [should] [shall] identify and make available information useful for the prevention of phenomena detrimental to the natural environment of the earth.

Principle VI

States participating in remote sensing of the earth from outer space [should] [shall] make available technical assistance to other interested States on mutually agreed terms.

Principle VII

1. The United Nations and the relevant agencies within the United Nations system should promote international co-operation, including technical assistance, and play a role of co-ordination in the area of remote sensing of the earth.

2. States conducting activities in the field remote sensing of the earth [shall] [should] notify the Secretary-General thereof, in compliance with article XI of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

Principle VIII

Remote sensing of the earth from outer space should promote the protection of mankind from natural disaster.*** To this end, States which have identified primary data from remote sensing of the earth and/or analysed information in their possession which would be useful in helping to alert States to impending natural disasters, or in assisting States to deal with natural disasters should as promptly as possible, notify those States affected or likely to be affected of the existence and availability of such data and/or information. Such data and/or information should, upon request, be disseminated as promptly as possible.

Principle IX 1/

Taking into account the principles II and III above, remote sensing data or information derived therefrom [shall] [should] be used by States in a manner compatible with the legitimate rights and interests of other States.* **

Principle X

States participating in remote sensing of the earth either directly or through relevant international organization [shall] [should] be prepared to make available to the United Nations and other interested States, particularly the developing countries, upon their request, any relevant technical information involving possible operational systems which they are free to disclose.

* Some delegations were of the view that, for the sake of consistency it was necessary to consider this principle in the light of draft principle II and III.

** A delegation reserved its position on removing the square brackets around the words "in a manner compatible with" and on the deletion of the words "not" and "to the detriment of".

*** The meaning of this term is subject to further discussion.

1/ Should be considered in connection with the formulation of a principle on dissemination of data or information and subject to later discussion of the terms "information" and "data".

Principle XI

[States [shall] [should] bear international responsibility for [national] activities of remote sensing of the earth [irrespective of whether] [where] such activities are carried out by governmental [or non-governmental] entities, and [shall] [should] [guarantee that such activities will] comply with the provisions of these principles.]

Principle XII

A sensed State [shall] [should] have timely and non-discriminating access to primary data obtained by remote sensing of the earth from outer space, concerning its territory, on [agreed] reasonable terms and [no later than] [before] access is granted to any third State. 1/ 2/ [[To the greatest extent feasible and practicable,] this principle shall also apply to analysed information.]

Principle XIII

[A State intending to conduct or conducting * activities and/or programmes for remote sensing of the earth from outer space shall notify promptly the Secretary-General of the United Nations of the nature, estimated duration of the programme, and the geographic area covered as well as any major modification of the programme. The Secretary-General shall immediately disseminate the information * thus received to the States concerned and shall publish it accordingly. A State conducting activities and/or programmes for remote sensing of the earth from outer space should also furnish such information to the extent practicable directly to any State which so requests.]

Principle XIV

[A State carrying out remote sensing of the earth [shall] [should] without delay consult with a State whose territory is sensed upon request of the latter in regard to such activity, [in particular dissemination of data and information,] in order to promote international co-operation, friendly relations among States and to enhance the mutual benefits to be derived from this activity.]

* With respect to the words "or conducting", reference should be made to paragraph 21 of the Working Group Chairman's report at the twenty-second (1983) session of the Sub-Committee.

1/ The question of from which States access to and provision of data should be obtained, needs further consideration.

2/ Subject to review in the light of the discussion on access by third States.

Principle XV

[States carrying out remote sensing of the earth shall not, without the approval of the States whose territories are affected by these activities, disseminate or dispose of any data or information on the natural resources of these States to third States, international organizations, public or private entities.]

Principle XVI

[Without prejudice to the principle of the freedom of exploration and use of outer space, as set forth in article I 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, remote sensing of the earth [should] [shall] be conducted with respect for the principle of full and permanent sovereignty of all States and peoples over their own wealth and natural resources [with due regard to the rights and interests of other States and their natural and juridical persons in accordance with international law] [as well as their inalienable right to dispose of their natural resources] [and of information concerning those resources].]

Principle XVII

[Any dispute that may arise with respect to the application of [Activities covered by] these principles [shall] [should] be resolved by prompt consultations among the parties to the dispute. Where a mutually acceptable solution cannot be found by such consultations it [shall] [should] be sought through other [established] [existing] procedures for the peaceful means of settlement of disputes mutually agreed upon by the parties concerned.]*

Section B

WORKING PAPERS SUBMITTED TO THE WORKING GROUP AT THE
TWENTY-SECOND SESSION OF THE SUB-COMMITTEE

Greece: working paper

(WG/RS (1983)/WP.1 of 24 March 1983)

Principle XIII

A State intending to conduct remote sensing activities of the earth from outer space shall notify promptly the Secretary-General of the United Nations of the nature and duration of the programme as well as of the geographic area covered. The Secretary-General shall immediately disseminate the information thus received to the States concerned and shall publish it accordingly.

* Subject to review in the light of the full set of agreed principles and a decision on the legal nature of the principles.

Greece: working paper

(WG/RS (1983)/WP.1/Rev.1 of 28 March 1983)

Principle XIII

A State intending to conduct or conducting activities and/or programmes for remote sensing of the earth from outer space shall notify promptly the Secretary-General of the United Nations of the nature, estimated duration of the programme and the geographic area covered as well as any major modification of the programme. The Secretary-General shall immediately disseminate the information thus received to the States concerned and shall publish it accordingly. A State conducting activities and/or programmes for remote sensing of the earth from outer space should also furnish such information to the extent practicable directly to any State which so requests.

Annex II

DRAFT REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON AGENDA ITEM 5

(Consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space)

1. The Sub-Committee, on 22 March 1983, re-established its Working Group on agenda item 5 (Consideration of the possibility of supplementing the norms of international law relevant to the use of nuclear power sources in outer space).
2. The Working Group had before it the report of the Legal Sub-Committee on its twenty-first session in 1982 (A/AC.105/305); the report of the Scientific and Technical Sub-Committee on its eighteenth session in 1981 which contained in annex II the report of its Working Group on the Use of Nuclear Power Sources in Outer Space (A/AC.105/287); and the report of the Scientific and Technical Sub-Committee on its twentieth session in 1983 (A/AC.105/318).
3. The following working papers were submitted at the present session of the Sub-Committee: a working paper submitted by the delegation of Canada (A/AC.105/C.2/L.137); and two working papers submitted by the delegation of the Federal Republic of Germany (A/AC.105/C.2/L.138) and (WG/NPS (1983)/WP.1). The working papers A/AC.105/C.2/L.137 and A/AC.105/C.2/L.138 are attached to the report of the Sub-Committee. Working paper WG/NPS (1983)/WP.1 is attached to the present report.
4. The Working Group examined the question of notification in a case where a space object with nuclear power sources on board is malfunctioning with a risk of re-entry of radioactive materials to the earth; and addressed itself to the matters of format, content and procedure of such notification.
5. Following a suggestion of its Chairman, the Working Group decided to separate the two questions, namely, (a) the format and procedure of notification; and (b) its contents. The latter, having already been agreed upon would be left aside, bearing in mind the conclusions and recommendations reached by the Scientific and Technical Sub-Committee's Working Group on the use of nuclear power sources in outer space at the eighteenth session of the Scientific and Technical Sub-Committee (A/AC.105/287, annex II). Discussions would therefore concentrate on format and procedure of notification.
6. The Working Group, following discussions and a number of informal consultations, agreed that

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

1. System parameters

- 1.1 Name of launching State or States including the address of the authority which may be contacted for additional information or assistance in case of accident
- 1.2 International designation
- 1.3 Date and territory or location of launch
- 1.4 Information required for best prediction of orbit lifetime, trajectory and impact region
- 1.5 General function of spacecraft

2. Information on the radiological risk of nuclear power source(s)

- 2.1 Type of NPS: radio-isotopic/reactor
- 2.2 The probable physical form, amount and general radiological characteristics of the fuel and contaminated and/or activated components likely to reach the ground. The term 'fuel' refers to the nuclear material used as the source of heat or power.

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

7. Thereafter some delegations expressed the view that the title of this item on the agenda of the Legal Sub-Committee should be changed to "Consideration of supplementing the norms of international law relevant to the use of nuclear power sources in outer space with the view to elaborating additional rules through its working group".
8. Other delegations were of the opinion that such a change was not necessary.
9. The Working Group held its final meeting on 7 April 1983 when it considered and approved the present report.

Appendix

WORKING PAPERS SUBMITTED TO THE WORKING GROUP OF THE
TWENTY-SECOND SESSION OF THE SUB-COMMITTEE

Federal Republic of Germany: working paper

(WG/NPS (1983)/WP.1 of 31 March 1983)

We recommend that the sentence underlined below should be added to the paragraph preceding the notification format, irrespective of the exact wording of the remainder of that paragraph. According to discussions on 30 March 1983, the paragraph should read as follows:

"In the event that a space object with a nuclear power source on board is malfunctioning with a risk of re-entry and dispersion of radioactive material in the environment including the upper atmosphere, the launching State should notify the States concerned and the Secretary-General of the United Nations of the anticipated re-entry immediately after the malfunction, and provide information adequate to enable Member States to assess the likelihood and consequences of this particular re-entry and to carry out preparations for search and recovery of the nuclear power source and the protection of their population. The information contained in item 1.4 below should be updated regularly, with daily updatings during the last days before the re-entry. The notification should be in accordance with the following format:"

Annex IIIDOCUMENTS SUBMITTED TO THE LEGAL SUB-COMMITTEE AT ITS
TWENTY-SECOND SESSION

A

CONSIDERATION OF THE POSSIBILITY OF SUPPLEMENTING THE NORMS
OF INTERNATIONAL LAW RELEVANT TO THE USE OF NUCLEAR POWER
SOURCES IN OUTER SPACECanada: working paper

(A/AC.105/C.2/L.137 of 28 March 1983)

Use of nuclear power sources in outer space

The present working paper represents a consolidation of the previous Canadian working papers as contained in documents A/AC.105/C.2/L.129, A/AC.105/C.2/L.134 and A/AC.105/C.2/L.135. It contains ideas that are put forward for the purpose of structuring and facilitating further our deliberations on promoting the developments of principles relevant to the use of nuclear power sources (NPS) in outer space.

A. Information concerning the use of nuclear power sources

1. Each launching State should furnish to the Secretary-General of the United Nations, at least one month prior to launching, the planned date and time of launching of a space object containing a nuclear power source. All changes in the planned date of launching should be communicated to the Secretary-General as soon as practicable.
2. Each launching State should provide the Secretary-General of the United Nations, at least one month prior to launching, with information relating to generic design, safety tests conducted, basic orbital parameters, and primary and back-up devices, systems and procedures. Each launching State should also provide a safety evaluation statement, including an analysis of accident probability, sufficiently comprehensive to assure the international community that the nuclear power source can be utilized safely.
3. The Secretary-General should transmit this information to all Members of the United Nations as early as possible prior to launching.
4. Each launching State should also provide this information for those space objects containing nuclear power sources which have already been launched into and remain in earth orbit.

B. Safety measures regarding radiological protection

1. States should ensure that their use of space objects containing nuclear power sources meets generally accepted international guidelines for radiological protection; inter alia, the radiological risks involved should conform to the recommendations of the International Commission on Radiological Protection. In particular, the intended benefits to those people incurring radiological risks must adequately compensate for such risks.
2. In any case, States using NPS in outer space should ensure that the radiological risks involved do not exceed (...).
3. States should endeavour to ensure that radiation exposure in all phases of a space mission involving use of NPS, including accident situations, does not exceed 0.5 rem per year for members of the general public.
4. Where the type of nuclear power source utilized makes it unfeasible to prevent the release of nuclear radiation under re-entry conditions, earth orbits should be used which are sufficiently high to allow radioactive materials to decay before re-entry to a level that would meet the conditions set out in paragraph 1. Reactors should not be activated until the space vehicle has reached a safe operating altitude.
5. If a launching State considers it necessary to use NPS in outer space in a way inconsistent with generally accepted international guidelines for radiological protection, it should announce that it is doing so for reasons of national security.
6. The launching State should not use more than (X) nuclear reactor(s) in low-earth orbit at the same time and should not launch more than (X) nuclear reactor(s) a year intended for low-earth orbit.
7. Space objects in low earth orbit containing nuclear reactors should be equipped with at least two back-up systems to boost the object into higher orbit in cases where the object is not to be returned to earth in a controlled re-entry. Where the space object is to return to earth at the completion of its mission, the level of control should at least meet the standards for manned spacecraft.
8. The amount of radioactive fuel contained in space objects should not exceed (...).

C. Notification prior to re-entry

1. Whenever it becomes possible to predict with reasonable certainty that a space object containing a nuclear power source will imminently re-enter the earth's atmosphere, the launching State should notify the Secretary-General of the anticipated re-entry and provide him with information adequate to enable Member States to assess the likelihood and consequences of a particular re-entry and to carry out preparations for search and recovery of the nuclear power source and protection of their population. That notification should be in accordance with the following format:

1. System parameters

- *1.1 Name of launching State or States including the address of the authority which may be contacted for additional information or assistance in case of accident
- *1.2 International designation
- *1.3 Date and territory or location of launch
- 1.4 Information required for best prediction of orbit lifetime trajectory and impact region
- *1.5 General function of spacecraft

2. Information on the radiological risk of nuclear power source(s)

- 2.1 Type of NPS: radio-isotopic/reactor
- 2.2 The probable physical form, amount and general radiological characteristics of the fuel and contaminated and/or activated components likely to reach the ground. The term "fuel" refers to the nuclear material used as the source of heat or power.

2. The Secretary-General should transmit this information to all Members of the United Nations as early as possible.

3. In situations where the timely transmission of this information via the Secretary-General is not possible, the launching State should communicate the information direct to those States likely to be affected. States at most risk should be informed first.

D. Assistance to States

1. The State launching a space object containing a nuclear power source that is about to re-enter the earth's atmosphere in an uncontrolled manner, should co-operate to the greatest extent feasible with States along the orbital path of the object in monitoring the object. In doing so, the launching State should bear in mind the need for prompt notification with sufficient information so as to allow those States likely to be affected to assess the situation, in particular in order to take necessary precautionary measures. States other than the launching State possessing space monitoring and tracking facilities should co-operate for the same purpose with States along the orbital path of the object.

2. The State launching a space object containing a nuclear power source that is about to re-enter the earth's atmosphere in an uncontrolled manner should offer to provide all necessary assistance to States likely to be affected by the re-entry or

* Denotes the requirements in the Convention on Registration of Objects Launched into Outer Space (art. IV).

impact of the space object or its component parts. When an uncontrolled re-entry has occurred, the launching State, in accordance with the provisions contained in article 5, paragraph 4, of the 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, should promptly provide necessary assistance to eliminate possible danger of harm if requested to do so by States over whose territory or areas of jurisdiction the space object disintegrated or on whose territory or areas of jurisdiction debris has landed.

3. Other States or international organizations with relevant technical capabilities should, to the extent feasible, be prepared to provide necessary assistance if requested to do so by the affected States. In this connection, States and international organizations should consider co-operating to establish an international registry that would list those countries and international organizations with expertise available in this field, the type of expertise available and those agencies or branches in which it is available. States, particularly launching States of space objects containing nuclear power sources, should also co-operate to establish appropriate training programmes to assist States to prepare for and deal with re-entering space objects containing nuclear power sources. The special needs of developing countries for assistance in developing their capacity to take precautionary measures and to remedy the effects of an uncontrolled re-entry or impact of a space object containing a nuclear power source should be borne in mind.

E. State responsibility

1. The State launching a space object containing a nuclear power source should bear international responsibility in accordance with international law, including the relevant outer space conventions.

2. Such responsibility should include the obligation of the launching State to offer to provide all necessary assistance to States likely to be affected by the re-entry or impact of its space object containing a nuclear power source; promptly to provide the necessary assistance to eliminate possible danger of harm if requested to do so by the affected States; and, in accordance with the 1972 Convention on International Liability for Damage Caused by Space Objects, to pay compensation for all damage caused by the nuclear power source, including all reasonable expenses for search and clean-up, and damages related to measures taken to prevent and limit radiation exposure and related to the number of people exposed and the degree of exposure.

3. Nothing in these principles shall have the effect of reducing the responsibility of States under international law, including the relevant outer space conventions.

4. States launching nuclear power sources into outer space should consider establishing an independent internationally administered fund for the purpose of satisfying claims for compensation.

5. If damage is caused to other States by the return to earth of a space object containing NPS, punitive (treble) damages should be paid.

Federal Republic of Germany: working paper

(A/AC.105/C.2/L.138 of 28 March 1983)

I. RECOMMENDATIONS FOR THE NOTIFICATION PRIOR TO RE-ENTRY
OF A NUCLEAR-POWERED SATELLITE

The issue of notification prior to re-entry of a nuclear-powered satellite has been treated in the report of the Working Group on nuclear power sources of the Scientific and Technical Sub-Committee (A/AC.105/C.1/L.126, February 1981). In view of the experience obtained during the recent years, it seems advisable to improve the notification procedure so as to distribute more detailed and timely information. Therefore, it is recommended that the following requirements be included in the notification procedure.

The launching State should inform the Secretary-General of the United Nations as soon as the re-entry of a nuclear power source (NPS) is foreseeable, following some malfunction onboard a satellite. This information should be given immediately after that malfunction - this can be weeks or months in advance to the expected re-entry - so that there is enough time for thorough preparation and information. The information provided by the launching State should include all items contained in the format for notification of the reference given above. In addition to that, there should be information on the planned or predicted sequence of re-entry. It should be made clear whether intact re-entry or complete burn-up is planned. Technical information should be provided on the containment concept or the burn-up procedure especially as to the materials used in the construction and to the sizes of the components. During the time from the first notification until the final re-entry, the launching State should distribute regular bulletins on the state of the object and on the updated predictions for the re-entry date and hour. The launching State should assist international exchange of the orbital data and the aerodynamic properties of the re-entering object.

Such additional information will demonstrate that a reliable safety concept has been applied and will contribute to create an atmosphere of confidence within the international community. Only if such confidence can be created will the Governments be able to reduce their precautionary measures.

These suggestions are based on the practical experience obtained during the re-entry of the COSMOS-1402 satellite, which can be considered as an example for events of this type. Therefore the history of this event, as experienced in the Federal Republic of Germany, is reported in the following section.

II. EXPERIENCE FROM THE RE-ENTRY OF A NUCLEAR-POWERED SATELLITE

The typical situation of any country before and during the re-entry of a satellite with NPS can be illustrated by the history of the COSMOS-1402 event and the precautionary measures taken in the Federal Republic of Germany. Some important conclusions can be drawn from this event with respect to the necessity of early notification and full information as well as to the benefits of international co-operation.

In January/February of this year, the satellite COSMOS-1402 bearing a nuclear reactor re-entered into the earth's atmosphere. It had been separated into the three objects A, B and C. The dates of their re-entry were as follows:

Object A on 23 January 1983

Object B on 30 December 1982

Object C on 7 February 1983

Start-up of operations

During the first days of January 1983, authorities in the Federal Republic of Germany became aware of the fact that, following some malfunction on board COSMOS-1402, there was the risk of its re-entry into the earth's atmosphere together with its nuclear reactor. Bearing in mind the consequences of such an event experienced in Canada in 1978, where some hundred mostly radioactive pieces of debris were spread over a 600-km length of the subsatellite track, the authorities in the Federal Republic of Germany decided to go ahead with pre-planned precautionary measures in order to be prepared for protecting the population should this become necessary. At that time, there was no information on how that specific case would develop, especially as there was no evidence that it would be different from the COSMOS-954 accident in Canada. Under those circumstances the precautionary measures taken by the Federal Republic of Germany were justified.

On 12 January 1983, several German scientific institutions with considerable manpower and facilities started tracking the two objects A and C - while object B had decayed already - and calculating their further orbital decay. In addition, orbital elements of the two objects were received from the National Aeronautics and Space Administration (NASA), enhancing the reliability of the orbital predictions. The results of these predictions, especially the predicted groundtracks flown over by the satellite over Europe and estimates of the re-entry date, were collected by the German Ministry of the Interior and distributed by telex bulletins not only to all federal authorities involved in the Federal Republic of Germany but also to the authorities of most neighbouring countries in Europe.

In distributing its results and in replying to inquiries from other countries the Federal Republic of Germany followed the recommendations discussed so far in the bodies of the United Nations with respect to NPS accidents.

Tracking of object A

Of the two objects A and C, the object C was considered initially only as a minor fraction without importance, since its size was between 10 and 100 times smaller than object A. Also, it was not known at that time that the satellite had been separated into the fragments intentionally and not by accident. Therefore the main tracking and calculating activities were concentrated on object A. But by 18 January it became evident from the orbital data, that object C was a very compact part (i.e. small but very heavy), which well could represent the core of the nuclear reactor or a part of it. Two days later, on 20 January, the Union of Soviet Socialist Republics confirmed by notification to the Secretary-General

of the United Nations that object C was the reactor core. So the question arose whether all the prediction activities for object A had been in vain. On the other hand, there was no information on how much of the structure material of object A had been activated by neutron radiation from the reactor core. While it was clear that the radioactivity produced in object A by activation would be much less than the activity in the reactor core, there was still considerable uncertainty about this due to lack of information. So it had to be decided to track also object A until its final descent on 23 January at 2220 hours universal time (equal to Greenwich mean time). If the satellite had stayed in its orbit only 1 hour and 10 minutes longer, it would then have crossed the Federal Republic of Germany, posing a risk to this territory, at least with respect to the level of information then available.

By timely information, probably most of the tracking and prediction activities spent on object A could have been saved.

Tracking of object C

After the decay of object A the activities were concentrated on object C. The question whether it would totally burn up during re-entry was still open since there was no information on the materials and the physical sizes of the object (containment or single parts, etc.). For another two weeks the institutions involved in tracking and orbital predictions had to be assigned to that task and all the data transmission and international distribution of the results were continued as described before. Until 4 February the final re-entry of object C was predicted for the night hours between 7 February and 8 February, in conformity with predictions in other countries. Then an unforeseeable eruption on the sun (solar flare) occurred, which produced an increase of atmospheric density of the earth. From then on the final re-entry of object C was predicted for times centring around noon on 7 February (universal time). But the time period of uncertainty was considerable.

The consequences of this uncertainty and the resulting nearly world-wide threat can best be discussed together with figures 1 and 2 attached to this paper. Figure 1 shows the subsatellite tracks flown over by object C during the last three hours before its final re-entry (and also the tracks which it would have passed within three hours after its re-entry if it had not re-entered at that time). Figure 2 shows the tracks over Europe within the same time period in an enlarged scale, some instants of passage being indicated in universal time (UT = GMT).

The actual re-entry occurred over the southern Atlantic Ocean at about 11.00 hours UT. Only about 25 minutes later the satellite would have passed the border area between Austria and the Federal Republic of Germany. So the German precautionary measures had to be maintained until the very end.

In the early morning of the re-entry day, 7 February, the uncertainty of the predicted re-entry time was still \pm three hours, corresponding to the groundtracks shown in figures 1 and 2. At that time all the countries underneath those tracks were subject to the risk of being afflicted by the re-entry.

In the evening before the re-entry, the uncertainty of the predicted re-entry time was even ± eight hours, which corresponds to more than five orbits before and after the actual re-entry. So, then, nearly every country of the world was under one of the ground tracks. This uncertainty was to some extent enhanced by the preceding solar flare and would be less than half as wide under normal circumstances.

Conclusions

It can be seen from this example that every re-entry of a satellite with NPS raises world-wide concern, justified by the geometry of the ground tracks flown over by the re-entering object within the predicted uncertainty period of the final re-entry.

Timely notification and comprehensive information given by the launching State about all circumstances influencing the expected further history of the event would help to reduce this concern.

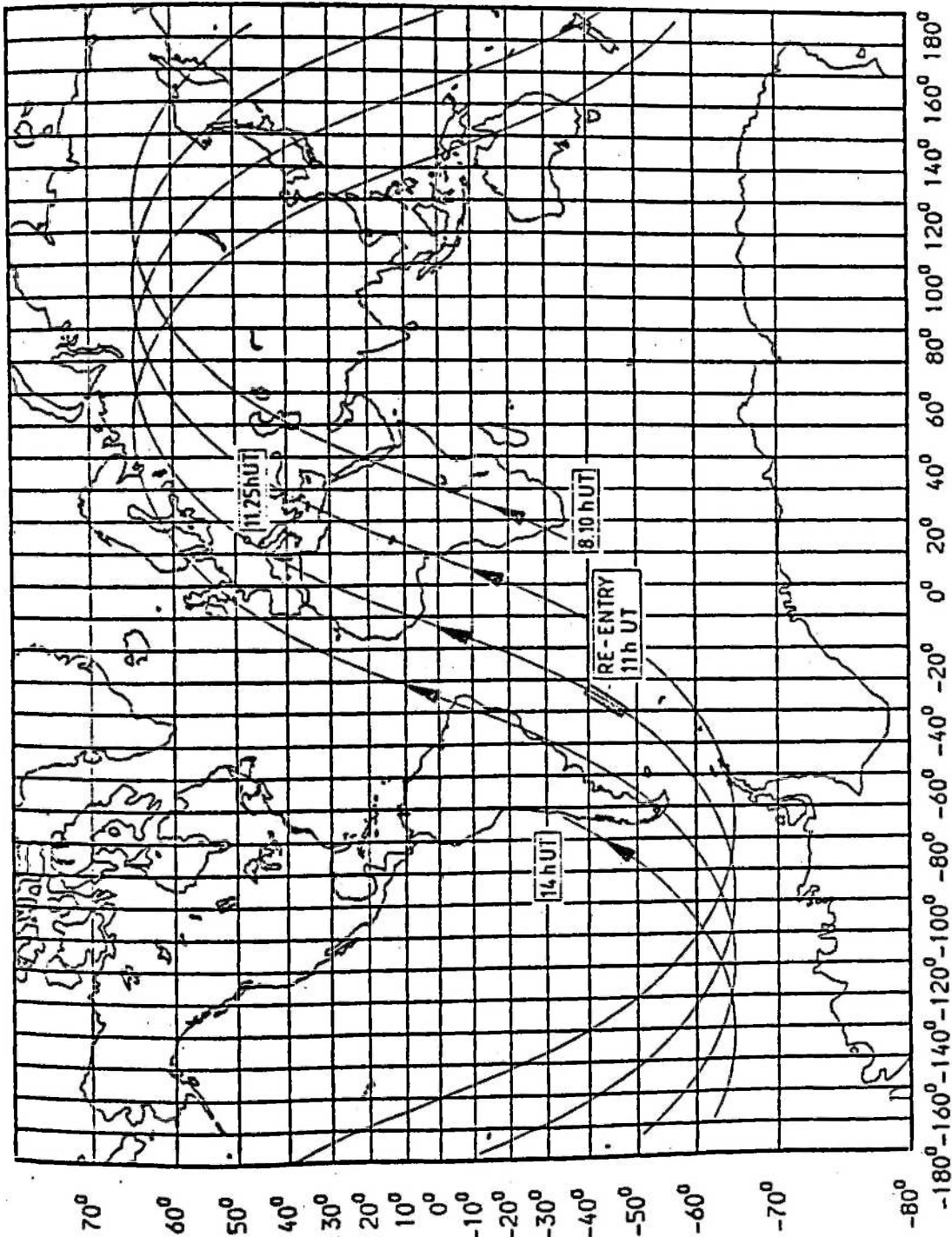


Fig. 1. GROUNDTRACKS OF COSMOS 1402 (OBJECT C) ON FEB 7TH 1983.

— TWO REVOLUTIONS BEFORE AND AFTER ACTUAL DECAY

TURS-IFRR

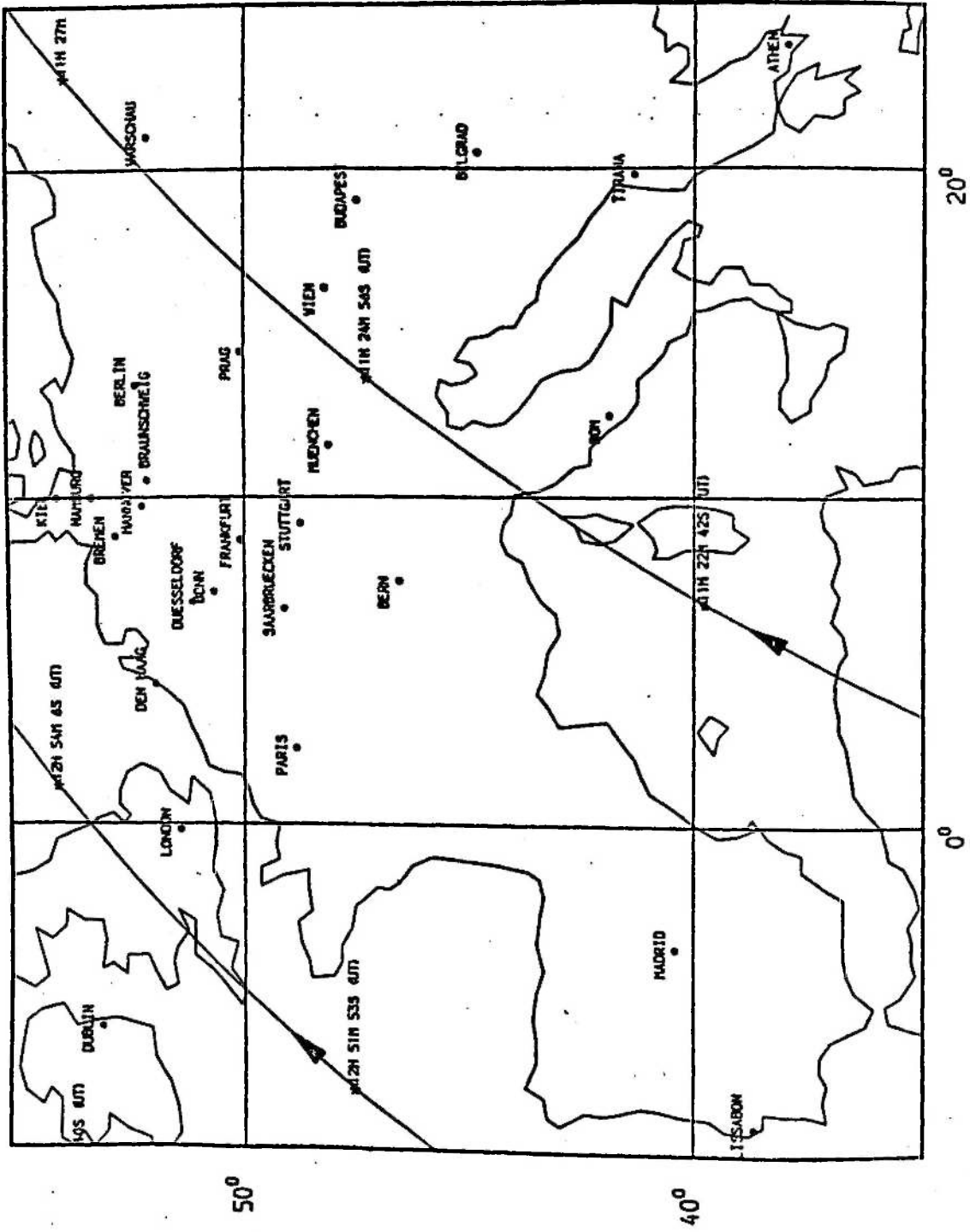


Fig. 2. GROUNDTRACKS OF COSMOS 1402 (OBJECT C) ON FEB 7TH 1983.
TWO TRACKS FOLLOWING THE ACTUAL DECAY
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B

MATTERS RELATING TO THE DEFINITION AND/OR DELIMITATION OF OUTER SPACE AND OUTER SPACE ACTIVITIES, BEARING IN MIND, INTER ALIA, QUESTIONS RELATING TO THE GEOSTATIONARY ORBIT

Union of Soviet Socialist Republics: working paper

(A/AC.105/C.2/L.139 of 4 April 1983)

Approach to the delimitation of air space and outer space

1. The boundary between outer space and air space shall be established by agreement among States at an altitude not exceeding 110 km above sea level, and shall be legally confirmed by the conclusion of an international legal instrument of a binding character.
2. This instrument shall also specify that a space object of any State shall retain the right of innocent (peaceful) passage over the territory of other States at altitudes lower than the agreed boundary for the purpose of reaching orbit or returning to earth.

C

Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Uruguay and Venezuela: working paper

(A/AC.105/C.2/L.142 of 6 April 1983)

DECLARATION BY THE LATIN AMERICAN COUNTRIES MEMBERS OF THE LEGAL SUB-COMMITTEE OF THE COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE

The Group of Latin American countries, members of COPUOS, wish to place on record their views on some points relating to the utilization, exploration and exploitation of outer space, which should be based on the following basic principles:

(a) It should be regulated in accordance with the principles of the Charter of the United Nations, resolution 2625 on friendship and co-operation among peoples, the 1967 Space Treaty and other relevant international instruments, taking into account that space law must be based on international co-operation.

(b) The legal context referred to above is clearly indicative of the obligation incumbent on all States to explore, exploit and utilize outer space, the Moon and other celestial bodies exclusively for peaceful purposes. We consider it essential to avoid the continuation, in actual deeds or in planning, of an increasing militarization and use for military purposes of outer space in flagrant violation of the spirit of the 1967 Treaty, of agreed principles and of existing

positive law. We advocate the early elaboration of an appropriate instrument additional to the 1967 Space Treaty.

With respect to the items on the agenda of this session of the Legal Sub-Committee, the Latin American countries wish to state the following:

1. Remote sensing of the earth by satellites

Any set of principles should include, inter alia, those concerning the sovereign and permanent right of States over their natural resources, as recognized by the relevant resolutions of the General Assembly; priority access for the sensed State to data concerning its territory; and the establishment of a régime of international liability in the event of the dissemination of data and information by the sensing State or its governmental and non-governmental organizations to the detriment of the countries sensed.

2. Use of nuclear power sources in outer space

Such a system should embody specific safety rules covering, inter alia, prior notice of the launching of nuclear-powered space objects, effective rules for radiological protection and specific regulation of international liability arising from an accident originating from any such space object.

3. Matters relating to the definition and/or delimitation of outer space and of the geostationary orbit

The Latin American countries, members of COPUOS, formally requested the establishment of a working group to consider these matters on a priority basis, including the elaboration of general principles to govern the rational and equitable use of geostationary orbit and, to that end, request Member States to submit draft principles; in so doing, account will have to be taken of the different legal régimes governing air space and outer space respectively and the need for technical planning and legal regulation of the use of the geostationary orbit.

The Latin American countries, members of COPUOS, hope that the parallel approaches they have outlined in this document, in connection with the items on the agenda, will at the coming sessions be transformed into legal norms.

The Latin American countries, members of COPUOS, wish to place on record their concern at the very real possibility that meteorological satellites may be transferred to private industry. This would endanger international co-operation since it would impede the efficient and fair pursuit of the traditional system of providing data and exchanging information free of charge.

Finally, the Latin American Group of the Committee on the Peaceful Uses of Outer Space expresses its intention of continuing to urge regional co-operation machinery to strengthen their political action and technical possibilities.