

THE DEVELOPMENT OF INTERNATIONAL LAW RELATING TO
REMOTE SENSING OF THE EARTH FROM OUTER SPACE

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I. INTRODUCTION

A significant review of the legal implications of remote sensing of the Earth from outer space has recently been undertaken by the Legal Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space.¹ Since 1974 that Sub-Committee has devoted substantial time at each of its annual sessions to an examination of the legal issues and questions which have been raised as a growing number of States, other organizations and individuals have become involved in a burgeoning range of remote sensing programs and applications.²

The incentive for this review has come from many sources. The strongest initial impetus, however, seems to have been a concern about what the rapid growth of remote sensing activities, dramatic technological progress, and increasing practical applications would mean for the ability of a State to control the development and exploitation of its natural resources. Although natural resource identification is but one of many possible data applications, the coincidence between the development of remote sensing technology and an intensification of international concern about a shortage of natural resources has focused considerable political attention in particular on the natural resources aspects of present and future remote sensing programs.

The spectrum of issues discussed in the Legal Sub-Committee's review has gradually expanded as that group has attempted to integrate into its analysis an understanding of the technical and organizational characteristics of remote sensing systems. That integration, essential to a useful analysis of the legal implications, has been slow and at times quite uncertain.³ Frequent personnel changes in the participating delegations and assignment by some States of representatives without

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¹The matter of the legal implications of remote sensing of the Earth from outer space has been on the agenda of the Legal Sub-Committee since 1972, but that Sub-Committee did not address that question in any detail until its 13th Session in May 1974. The full Committee is hereinafter referred to as the Outer Space Committee.

²Forty-five countries and five international organizations are actively participating in the Landsat remote sensing program. See Aeronautics and Space Report of the President: 1975 Activities, H.R. Doc. No. 94-541, 94th Cong., 2d Sess. 22 (1976).

³See Statement by the United States Representative to the Legal Sub-Committee of the Outer Space Committee, 24 May 1976; summary in U.N. Doc. A/AC.105/C.2/SR.260 (1976).

either professional expertise in the remote sensing area or familiarity with past discussions of the subject within the United Nations continue to inhibit the progress of this analysis. On the other hand, however, the Legal Sub-Committee has adopted a thorough and constructive pattern of work in this area, and the Outer Space Division of the United Nations Secretariat has produced a number of extremely useful and informative studies which should substantially assist the Sub-Committee in its work.⁴

II. STATUS OF WORK IN THE LEGAL SUB-COMMITTEE

In addition to the international agreements relating to activities in outer space already in force,⁵ the Legal Sub-Committee has before it three specific sets of draft principles, one in the form of a draft treaty,⁶ and a wide range of comments representing different points of view suggested by members of that body. The Sub-Committee is using these texts and comments to facilitate its examination of the legal implications of remote sensing.

The result of this examination is likely to be the elaboration of a series of principles expressly dealing with remote sensing. The UN General Assembly, upon the eventual recommendation of the Outer Space Committee, will be requested to endorse these principles as guidelines which States should respect in conducting such activities. The outlines of five draft principles were initially formulated in May 1976 by a Working Group of the Legal Sub-Committee, and efforts to expand the area of agreement were resumed when that Sub-Committee reconvened last March in New York. The texts of these first five draft principles are as follows, bracketed language being not yet agreed in the working group:⁷

⁴Available Studies, Reports and other Material Relevant to the Consideration of Remote Sensing From Satellites, U.N. Doc. A/AC.105/176 (1976).

⁵International Agreements already in force include: (a) Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, 18 U.S.T. 2410, T.I.A.S. 6347, 610 U.N.T.S. 205 (entered into force October 10, 1967); (b) Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched Into Outer Space, 19 U.S.T. 7570, T.I.A.S. 6599, 672 U.N.T.S. 119 (entered into force for the United States December 3, 1968); (c) Convention on International Liability for Damage Caused by Space Objects, 24 U.S.T. 2389, T.I.A.S. 7762, (entered into force for the United States on October 9, 1973); and (d) Convention on the Registration of Objects Launched Into Outer Space (entered into force September 15, 1976; not yet proclaimed).

⁶The three sets of draft principles include: (a) French-Russian working paper: U.N. Doc. A/AC.105/C.5/L.99 (1974); (b) Brazil-Argentinian draft treaty: U.N. Doc. A/C.1/1047 (1974); and (c) United States working paper: U.N. Doc. A/AC.105/C.2/L.103 (1975).

⁷Report of the Legal Sub-Committee on the Work of Its Fifteenth Session (3-28 May 1976) Annex III, U.N. Doc. A/AC.105/171 (1976).

Principle I

Remote sensing of [the natural resources of earth] [and its environment] from outer space and international co-operation in that field [shall] [should] be carried out for the benefit and in the interests of all countries [mankind], 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 II

Remote sensing of [the natural resources of the earth] [and its environment] 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.

Principle III

1. States carrying out programmes for remote sensing of [the natural resources of the earth] [and its environment] 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 elements....

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 IV

Remote sensing [of the natural resources of the earth] [and its environment] 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 V

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

Since its first session in March of 1963 the Outer Space Committee and each of its Sub-Committees have worked on the basis of a genuine consensus, namely that no decision is made if any participating member raises an objection, and therefore the issues addressed by these initial draft principles are naturally those on which it was easiest to obtain unanimous agreement. Efforts to identify and develop common views on the more complex issues have, of course, been undertaken, but the course of analysis and negotiation has not yet reached the point where additional specific language can be agreed.

III. THE KEY ISSUES

A. *The Right to Sense*

When the Legal Sub-Committee began a serious examination of remote sensing, a number of members announced their beliefs that there was no extant international law which governed remote sensing of the Earth from outer space, that such law should be developed promptly, and that any such law should prohibit sensing the territory of any other State for natural resources data without the consent of the sensed State.⁸ In addition, it was suggested by some that the data obtained by such sensing should not be disseminated to any third States or other third parties without the consent of the sensed State.⁹ Indeed, it was briefly argued that Earth-oriented remote sensing would be illegal until international law affirmatively and expressly sanctioned it.¹⁰

The first question which needed to be clarified, therefore, was the present status of international law in this area. The view of the United States was, and remains, that there is no provision of applicable international law which restricts or inhibits remote sensing of the Earth from outer space. Quite to the contrary, the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies expressly proclaims in Article I that "[o]uter space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind" That Article goes on to assert that "[t]here shall be freedom of scientific investigation in outer space" and that "States shall facilitate and encourage international cooperation in such investigation." In addition, a review of the relevant records of the Legal Sub-Committee of the Outer Space Committee, and the General Assembly reveal no intention by those bodies to exclude activities such as remote sensing of the Earth from the broad endorsement of the freedom of exploration and use of outer space.

A second question is whether recent technological advances in remote sensing have in any way introduced an activity so fundamentally different from those conceived at the time the 1967 Outer Space Treaty was negotiated and so apparently inconsistent with its basic principles that such an activity could not reasonably be considered to be covered by that treaty. In fact, there has been a long history of multinational participation in publicized and uncontested remote sensing of the Earth, including sensing related to natural resources, from the time of the earlier meteorological satellite programs and manned space flights, which well preceded the adoption of the 1967 Outer Space Treaty. Both the increase in sophistication of sensors and the wider proliferation of

⁸Brazil-Argentina draft treaty: U.N. Doc. A/C.1/1047 (1974).

⁹*Id.*; French-Russian working paper: U.N. Doc. A/AC.105/C.2/L.99 (1974).

¹⁰Statement by the Brazilian Representative to the Working Group on Remote Sensing of Earth by Satellites of the UN Outer Space Committee, New York, 19 February 1974 (Brazilian Mission to the United Nations).

practical applications of the data derived have been widely predicted evolutionary advances on earlier capabilities. Thus, neither would seem to constitute any basis for a legal distinction between modern remote sensing activities and the universally accepted class of activities in the peaceful exploration and use of outer space.

Recent discussions in the Legal Sub-Committee have evinced virtually no significant continuing support for the idea that remote sensing is an activity outside the scope of the Outer Space Treaty, or for the idea that such sensing can be undertaken only with the prior consent of the sensed countries. Although one may reasonably conclude from this a general acceptance that the conduct of remote sensing is unrestricted and uninhibited by present international law, one should not also conclude that such acceptance has quieted the anxieties which gave rise to the discussion, namely whether a State's control over development of its natural resources would be diminished by the growth of remote sensing activities.

B. Dissemination of Data

As it appeared that restrictions on the conduct of sensing did not presently exist and were neither generally feasible nor acceptable, the thrust of the discussion in the Legal Sub-Committee turned primarily to the question of the dissemination of data in any future operational remote sensing systems. Of all the issues raised during examination of the legal implications of remote sensing thus far, the most interest, whether legal, political, economic, or technical, and the most diversity of opinion have focused on the questions of how data and information from remote sensing should be disseminated and handled.

In this instance as well there has not emerged any consensus that present international law would impose any inhibition or restriction on open dissemination to any interested party of available data relating to any place on Earth. Unlike the question of sensing itself, however, the Sub-Committee has proceeded to examine in considerable detail whether any such restrictions should be applied in the future to data dissemination.¹¹ As with the question of sensing, the primary incentive of those advocating such restrictions can fairly, if not fully, be described as a concern to protect the ability of states to control activities within their respective territories, principally those activities relating to the development and exploitation of natural resources.

The right of States to exercise such control consistent with relevant principles of international law has repeatedly been supported by virtually all members of the Sub-

¹¹See summary records of the 14th (1975), and 15th (1976) Sessions of the Legal Sub-Committee, U.N. Docs. A/AC.105/C.2/SR.226-245 (1975) and A/AC.105/C.2/SR.246-265 (1976).

Committee.¹² The principal differences of opinion have emerged over the question whether remote sensing activities threaten such control in any way, and, if so, at what point protective measures would be useful, feasible, and desirable.

The United States, among others, has consistently taken the position that open data dissemination to all interested parties is in fact more likely to enhance than to diminish the ability of States to control their natural resources.¹³ As a practical matter the adoption of a restricted dissemination policy would probably establish a privileged class of countries, technologically advanced enough to have their own remote sensing programs and therefore capable of obtaining worldwide or broad regional data directly, and a class consisting of most other countries which could obtain only limited portions of the available data possessed by others. Further, restricting data dissemination in order to protect local control over natural resources would seem to be an unnecessary and counterproductive legal overkill, particularly in light of the fact that neither the dissemination nor the analysis of the data could affect that control. Only at the point that someone attempts to apply that information to implement an actual plan for development or exploitation of particular natural resources is the question of State control affected.

In this context it has been argued that sovereignty over natural resources includes the right to exercise sovereign control over all information regarding those resources, regardless of where that information may be gathered or located.¹⁴ This theory appealed to the imagination of a few delegations, but the fact that it never received broad support has allowed the Legal Sub-Committee to avoid extensive debates on the definition and scope of national sovereignty over natural resources, a concept much discussed in other fora.

During its 1976 session the Legal Sub-Committee for the first time addressed the fundamental but complex distinctions among raw data, processed data, and information derived from the analysis of data. There now seems to be emerging a general understanding, and perhaps agreement, that data dissemination restrictions could in fact significantly reduce the range of benefits available to non-sensing countries and might well be unnecessary to protect their interests.

The thoroughness and detail of the Sub-Committee's examination of the legal implications of remote sensing seem to have helped clarify not only the state of present

¹²For example, even the most outspoken advocate of open data dissemination, namely the United States Delegation, has consistently supported this right. See United States Mission to the UN Press Releases USUN-10 (75) of 19 February 1975, and USUN-116 (75) of 13 October 1975.

¹³See USUN Press Releases, *supra* note 12; U.N. Doc. A/AC.105/C.2/SR.260 (1976).

¹⁴See, e.g., Statement by Brazilian Representative, *supra* note 10, at 6; Statement by the Indian Representative to the 15th Session of the Legal Sub-Committee, U.N. Doc. A6AC.105/c.2/SR.249, at 6 (1976).

law in this area, but also the nature of the concern which some States continue to feel about their abilities to maintain control over their own resources. A more precise definition of that concern might reasonably be expressed as an anxiety among certain countries that others, whether governments, corporations or individuals, may be able through superior technology to learn more about the resources of a country than can the government and people of that country. As a consequence it is feared that the advantages of such foreign entities over those of the local authorities in negotiations for the exploitation of natural resources could be extraordinarily enhanced, even to the point of serious detriment of those who originally possess the resources.

As a gradual refinement in the analysis of the legal implications of remote sensing has evolved, two new types of approaches have been suggested in order to accommodate the strong desire of most States to encourage the development of remote sensing, while guarding against the disadvantages of a State knowing less about its own resources than does some foreign entity. The first of these suggestions is that data with a resolution higher than a specified number of meters should not be disseminated without the sensed country's agreement, while all lower resolution data would be unrestricted.¹⁵ The underlying, if unproven, theory is that only data of high resolution would have relevance to natural resources exploitation.

The second, which has elicited much more interest among members of the Legal Sub-Committee, suggests, among other things, the possibility of certain constraints on the handling of "processed information or analysis concerning the natural resources" of a sensed State, with a view to "respecting the confidentiality of, or the need for prior access of the sensed State to, such information, to the extent necessary to avoid detrimental effects on the interests of the sensed State."¹⁶ Although this proposal has not yet been discussed in detail and needs considerable clarification, the nature of the initial response it received seems to indicate that many delegations which in the past have been advocating data dissemination restrictions may now be moving toward a realization that their basic concerns do not in fact arise from open data dissemination.

In this context, it would seem, at first review, that proposals for agreements on regulation of the dissemination of information gained from analysis of data might be more appropriately the subject of bilateral or perhaps regional consideration among trade, commodities, or economic development experts than the subject of a multilateral declaration of legal principles relating to the peaceful uses of outer space.

Such agreements may well prove quite desirable; for example, the United States and Canada have a long-standing agreement on the simultaneous release of government

¹⁵Proposal by the Soviet Union, See Report of the Scientific and Technical Sub-Committee [of the UN Outer Space Committee] on the Work of Its Thirteenth Session, U.N. Doc. A/AC.105/170, at 15-16 (1976).

¹⁶Proposal by the Canadian Representative to the 15th Session of the Legal Sub-Committee U.N. Doc. A/AC.105/C.2/SR.257, at 5 (1976).

estimates of certain agricultural crop yields. However, an analysis of the feasibility of such regulation quickly demonstrates its complexity and the unlikely prospect that it could primarily be based on the use of data derived from remote sensing. Just as one must understand the integration of economic, political, institutional and technical, as well as the legal, characteristics of the various aspects of remote sensing in order to develop useful guidelines for the conduct of such activities, one must also be aware of the integration of data and information from many different sources which is generally essential to the production of useful analysis and knowledge such as that contained in those crop forecasts.

In such a synthesis, data from remote sensing satellites may play a major or a very minor role. The difficulties of first deciding how to measure that role and second deciding why it should make any difference in the handling of the end product of the analysis, namely the user knowledge, are apparent. In addition, one must consider the difficulties inherent in regulating the dissemination of such user knowledge in a world of diversified legal systems in which, in some cases, such knowledge would only be held by the governments, and in others it would be developed and held by either or both government and private organizations or individuals. As such differences are fundamental to the political structures of those various systems, a single, comprehensive and universal regulatory formula would probably be most difficult to develop.

IV. FUTURE CONSIDERATIONS

If this is indeed the essence of this concern, it raises a fundamental question whether the constructive and effective answer might well lie in the direction of expanding data dissemination and technological capabilities throughout the world, rather than restricting them. Pragmatically, one must assume that such sensing, analysis and negotiations will continue to occur. If this is the case, it would seem that local governments are best protected at a minimum by an assurance that they are able to obtain at least the same data about their resources from such remote sensing systems as any third party might be able to obtain.

Because an ability to analyze the data is obviously an integral part of useful access to them, emphasis on the proliferation of such capabilities would seem to be called for. There are numerous vehicles through which this might be accomplished, regional cooperation appearing to be the most generally attractive in many parts of the world for economic and technical reasons. Realistically, no system can guarantee an absolute equality in analytical skills; nevertheless, a great deal can be done to help ensure that the potentially vast benefits of modern remote sensing technology are shared by all interested countries, rather than adding to the separation between those which are technologically advanced and those which are not. Significant steps in this direction should substantially reduce the concerns of developing countries that the widespread growth of remote sensing activities might disadvantage them. To the contrary, significant steps in this direction, coupled with an expansion in such activities, are likely to redound to their substantial benefit.

If this assessment of the interests represented and of the evolution evinced in the Legal Sub-Committee's review of remote sensing proves correct, the solution to what has been the most complex and controversial of the many issues discussed may in fact lie in the formulation of guiding principles which further encourage the worldwide development and sharing of remote sensing capabilities rather than principles which would inhibit them. Confidence that one is an active and capable participant in the use of this new technology would go far toward minimizing fears of disadvantage, and such participation would also presumably bring substantial benefits to those who become involved. That confidence does not always come easily; it would require a continuation and probably an expansion of present bilateral and multilateral training and assistance programs. It could reasonably be presumed, however, that such efforts, coupled with progressive, positive guiding principles and an institutional network of open international cooperative ventures would generate substantial benefits both to nations individually and the international community as a whole.

The elaboration of recommended guidelines, for the conduct of remote sensing activities, which were based on the open and cooperative principles contained in the relevant provisions of the Outer Space Treaty would seem to be the most constructive contribution which the Legal Sub-Committee could make in this area. It is probably unnecessary, and in any case premature, to attempt to formulate any additional comprehensive multilateral treaty or convention on remote sensing at this time. The elaboration of such recommended guidelines might well prove helpful as present experimental remote sensing programs are gradually replaced by more permanent operational systems. A wide range of issues in addition to those discussed above still await examination by the Legal Sub-Committee, and could constitute the basis of a useful set of principles by which States should be guided in the conduct of remote sensing activities.

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I. INTRODUCTION

Four instruments of international law dealing explicitly with outer space are now in existence: (i) the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, (ii) the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, (iii) the Convention on International Liability for Damage Caused by Space Objects, and (iv) the Convention on Registration of Objects Launched into Outer Space. Moreover, outer space is referred to also in other documents, *e.g.*, in the Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space, and Under Water, ratified in 1963.

The area of application of the above instruments has, however, not been defined and, in a concrete case, diversity of opinion may arise. Such a diversity of opinion arose, for instance, during the World Administrative Radio Conference for the Planning of the Broadcasting Satellite Service in the 12 GHz Frequency Band, held in Geneva from January 10 to February 13, 1977. During that Conference, delegates of equatorial countries raised claims of sovereignty to segments of the geostationary orbit above their countries while delegates of other countries refuted such claims.

Without attempting to touch on the merit of the problem of the geostationary orbit, we give two quotations¹ from that conference in order to illustrate the relation of the above question to the definition of outer space: The delegate of Colombia stated on January 11: "There is no definition of outer space that is valid and satisfactory for the international community such as might be cited to support the argument that the geostationary orbit is included in outer space. Therefore, it is imperative to arrive at a legal definition of outer space, since to apply the 1967 Treaty without one would be merely to ratify the presence of the states that are already using the geostationary orbit...."² The delegate of Australia stated on January 31: "The status of the geostationary orbit is measurably connected with the definition and/or delimitation of Outer Space and it cannot be considered in isolation...."³

*Chief, Outer Space Affairs Division, United Nations Secretariat. This article is an expression of personal views of the author and in no way represents the opinion of the United Nations. This article is an elaboration of a paper presented to the 19th Colloquium on the Law of Outer Space. *See* Perek, Remarks on Scientific Criteria for the Definition of Outer Space, Proc. 19th Colloquium on the Law of Outer Space, 185 (1977).

¹International Telecommunication Union, Broadcasting Satellite Conference (Geneva, 1977).

²*Id.* Doc. No. 81, at 19.

³*Id.* Doc. No. 181, at 1.