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AIRSPACE—OUTER SPACE? THE GEOSTATIONARY ORBIT AND THE NEED FOR A PRECISE DEFINITION OF OUTER SPACE

INTRODUCTION

Although the law pertaining to activities conducted in “airspace”¹ is quite distinct from laws governing “outer space,”² there is no prescribed definition of outer space which establishes a boundary between the two areas.³ A state may legitimately conduct a particular activity in one sphere, which would be unlawful if conducted in the other;⁴ consequently, the application of one body of law, rather than the other, is of significance to any state that launches objects into “space.” Despite this pronounced difference in the two legal regimes, there is currently no accepted demarcation, either by agreement⁵ or by custom,⁶ between the two areas.⁷

One reason for the failure to establish a definition of outer space is the conflict of opinion about the need for such a definition.⁸ This lack

1. The Convention on International Civil Aviation, Dec. 7, 1944, 61 Stat. 1180, T.I.A.S. No. 1591 [hereinafter cited as The Chicago Convention].

2. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, done Jan. 27, 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 2 (entered into force 10 October 1967) [hereinafter cited as The Outer Space Treaty].

3. Although there is no express definition of outer space, one may be inferred from statements made by the International Telecommunications Union (I.T.U.) to the U.N. Secretariat. The Question of the Definition and/or Delimitation of Outer Space: Background Paper prepared by the Secretariat, U.N. Doc. A/AC.105/C.2/7/Add.1 at 5 (1977) [hereinafter cited as Background Paper]. The definitions used by the I.T.U. differ for space stations and earth stations: a “space station” is an object which is “beyond . . . the major portion of the earth’s atmosphere,” while an “earth station” is one “on the earth’s surface or within the major portion of the earth’s atmosphere.” *Id.*

4. Compare art. I of The Chicago Convention, *supra* note 1 (a state may regulate activities conducted in the airspace above its territory under the guise of sovereign rights) with art. II of The Outer Space Treaty, *supra* note 2, (a state may not exercise sovereignty over outer space activities).

5. See The Outer Space Treaty, *supra* note 2; The Chicago Convention, *supra* note 1.

6. Customary law defined the boundary between airspace and outer space according to a “functional” approach. See *infra* note 21 and accompanying text.

7. “Thus, the question still remains: Where does sovereign air space end and free outer space begin?” Rosenfeld, *The Need to Distinguish Air Space from Outer Space*, 1978 PROCEEDINGS ON THE TWENTIETH COLLOQUIUM ON THE LAW OF OUTER SPACE 61.

8. Compare the statements of the Canadian representative to the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), that a definition is not presently needed, Background Paper, *supra* note 3, at 10; with those of the Austrian delegate, stating that a definition is essential in order to know the limits of the application of treaties or conventions on outer space. *Id.* at 9.

of agreement is rooted in the fact that definitions⁹ are more favorable to certain parties. All of the concerned countries believe, however, that there is a need to define the precise scope or applicability of the separate legal regimes. The controversy more precisely concerns the urgency for a definition.¹⁰

The United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS)¹¹ has put the issue on its agenda during several sessions,¹² but the participants have only agreed to continue discussion. They have failed to obtain consensus, not only as to the definitional specifics, i.e., what criteria should be used to establish the definition, but also as to the present need for a definition and delimitation of outer space.¹³

The justifications offered by the countries opposed to a definition of outer space can be summarized as follows:

- 1) no inter-country conflict involving outer space has occurred, despite the absence of a definition;¹⁴
- 2) a definition may not be feasible in terms of current international policy;¹⁵
- 3) the defining of outer space should be postponed until the nature of future astronomical activities is better understood.¹⁶

The countries that are demanding a definition of outer space put

9. For a discussion of the various definitional proposals, see *infra* notes 81-106 and accompanying text.

10. See Goedhuis, *Some Observations on the Problems of the Definition and/or Delimitation of Outer Space*, 2 ANNALS OF AIR & SPACE L. 287, 307 (1977). See also *supra* note 8 for a UNCOPUOS representative's discussion of the issue.

11. UNCOPUOS became a standing committee of the United Nations in 1959 soon after space programs had been initiated. The issues before it are decided by either the Legal Sub-committee or the Scientific and Technical Sub-committee. The issue is being debated by the Legal Sub-committee. See generally Hosenball, *The United Nations Committee on the Peaceful Uses of Outer Space: Past Accomplishments and Future Challenges*, 7 J. SPACE L. 95 (1979).

12. The issue of defining outer space was first placed on the UNCOPUOS agenda in 1967. UNCOPUOS, Summary Record of the 296th Meeting, at 2, U.N. Doc. A/AC.105/C.2/SR. 296 (1978) [hereinafter cited as Summary Record].

13. See generally Background Paper, *supra* note 3, at 8-15.

14. This is the position of the United Kingdom as reported to UNCOPUOS. Background Paper, *supra* note 3, at 15.

15. See Almond, *Legal Definition of Outer Space*, 1979 PROCEEDINGS OF THE TWENTY-FIRST COLLOQUIUM ON THE LAW OF OUTER SPACE 77.

16. This is the position of the United States. Background Paper, *supra* note 3, at 15. This is also Canada's position. *Id.* at 10.

Essentially, the United States maintains that it may prove counterproductive to confine ourselves to an arbitrary definition of outer space, when in a short time space technology could render any such definition obsolete.

forth the following arguments in support of their position:

- 1) any of the legal principles under consideration as a source of definition will produce different results,¹⁷ and there is no precedent for the application of any of these principles;¹⁸
- 2) there is a need to eliminate uncertainty as to legal rights and remedies in outer space;¹⁹
- 3) the constant, rapid growth of scientific technology results in inadequate protection of the rights of those countries which have no astronomical prowess.²⁰

Customary usage has, to date, dictated the boundary between airspace and outer space.²¹ By following a customary "functional" approach,²² the distinction between airspace and outer space was as easily distinguishable as the instrumentalities which travelled through them. New achievements in astronautics have resulted in aircraft flying at higher altitudes and spacecraft at lower ones. The customary law no longer provides a practical or equitable solution to the demarcation of airspace and outer space. A precise limit, defined by international agreement, is necessary to avoid future conflicts and to give practical assurance of the functional boundaries needed in technological planning.²³

17. See *infra* text accompanying notes 29-46, for a more detailed analysis of the legal principles applicable to defining outer space.

18. Austria cited this proposition to explain its position with regard to the need for a definition. Background Paper, *supra* note 3, at 9; see *supra* note 8. The representative of Egypt also cited this proposition in support of their position that the issue was "of prime importance." Background Paper, *supra* note 3, at 11.

19. See generally M. McDUGAL, H. LASWELL & L. VLASIC, *LAW AND PUBLIC ORDER IN OUTER SPACE* 323 (1963) which sets forth some of the delegates' positions during the earlier committee meetings. This position has been advanced by Chile. Background Paper, *supra* note 3 at 10.

20. Countries without space resources have not been able to participate in the formation of customary international law.

21. Custom traditionally plays an important role in the formation of international law. Unwritten codes of behavior adhered to over a course of years may evolve into governing law and the customary practices of the states may establish territorial boundaries. The delimitation of space was accomplished by following this customary law approach. See Gorove, *The Geostationary Orbit: Issues of Law and Policy*, 73 AM. J. INT'L L. 444, 447 (1979). See also McDougal, *The Emerging Customary Law of Space*, 58 NW. U.L. REV. 618, 640 (1964).

22. The functional approach to defining outer space established the boundaries between air and space according to the nature of the instrumentalities travelling through the sphere. For example, a machine having the principal attributes of an aircraft would be governed by the principles of air law. See *infra* text accompanying notes 102-106. See also N. MATTE, *AEROSPACE LAW* 62(1969).

23. The recent space shuttle operations illustrate a problem with a functional definition of outer space. The shuttle is launched as a spacecraft but returns to earth and

The urgency of the situation is best illustrated by the present controversy over the geostationary orbit which is described as, "[t]he band of space in which satellites circle the earth at a speed equal to its rotation, and appear to hang motionless above a fixed point on the earth's surface."²⁴ This important, yet finite, resource is generally considered to be located in outer space. In 1976, however, eight equatorial countries²⁵ expressed their dissatisfaction with this customary definition and proclaimed their sovereign authority over that part of the orbit which lies above their territory.²⁶

The legitimacy of their claim is dependent upon the applicability of air law to the activities conducted in this orbit. While the Convention on International Civil Aviation (The Chicago Convention) allows a state to exercise sovereignty over its airspace,²⁷ prevailing space law doctrines promote and protect the freedom of outer space.²⁸

If the geostationary orbit is considered to be in outer space, the claims of these equatorial countries violate international law. Thus, the controversy centers around the single issue of whether the geostationary satellite orbit is located in airspace or in outer space. The existence of a precise legal definition or demarcation of outer space would end this debate.

I. THE CURRENT LEGAL REGIMES

A. Air Law

In 1944, fifty-two countries met at the International Civil Aviation Conference in Chicago in order to establish the rights of the aircraft

lands as would an aircraft. The overriding question is, "When does the shuttle leave outer space and enter airspace?" This question apparently cannot be answered without first determining the boundary between the two. See Haanappel, *Definition of Outer Space and Outer Space Activities*, 1978 PROCEEDINGS OF THE TWENTIETH COLLOQUIUM ON THE LAW OF OUTER SPACE 53.

24. The Future of Satellite Communications. Resource Management and the Needs of Nations. Second Report of the Twentieth Century Fund Task Force on International Satellite Communications, New York, 1970, p.10, reprinted in Fernandez-Brital, *Geostationary Orbit*, 1979 PROCEEDINGS OF THE TWENTY-FIRST COLLOQUIUM ON THE LAW OF OUTER SPACE 14.

25. These countries are: Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda and Zaire. See *infra text* accompanying note 66.

26. The consequence of this action was explained by Mr. Aguilera, Colombia's representative to UNCOPUOS: "The location of such geostationary satellites shall require the prior permission of the respective equatorial country, and their operation shall be subject to the provisions of the national laws of [the competent] state." U.N. Doc. A/AC.105/PV.173, at 47 (1977).

27. The Chicago Convention, *supra* note 1, art. 1, at 1180.

28. The Outer Space Treaty, *supra* note 2.

and of the nations over which they flew.²⁹ The meeting resulted in the Convention on International Civil Aviation (The Chicago Convention). Part I of the Convention set forth the rights and duties of the aircraft and the nations.³⁰ Part II established the International Civil Aviation Organization (ICAO) which, under a grant of authority stated in Part I, promulgates and enforces both working and substantive rules.³¹

Article 1 of the Convention proclaims that, "[T]he contracting States recognize that every State has complete and exclusive sovereignty over the airspace above its territory."³² The scope of territorial control is found in Article 2, where it is stated that, "[F]or the purposes of this convention, the territory of a State shall be deemed to be the land areas and territorial waters adjacent thereto under the sovereignty, suzerainty, protection or mandate of such State."³³

Thus, under the Chicago Convention, each and every country may, by exercising its sovereign powers over the airspace above its territory, legitimately prohibit civil or military aircraft from using any of its airspace.³⁴ The Convention does not attempt to define "airspace," and it imposes no territorial limitation upon a state's right.³⁵

B. Space Law

There are currently four United Nations agreements relating to activities conducted in outer space: Treaties on Principles Governing the Activities of States in Exploration and Use of Outer Space, including the Moon and other Celestial Bodies³⁶ (Outer Space Treaty); The Agreement on the Rescue of Astronauts, the Return of Astronauts, and

29. Because it followed in such close proximity to World War II, The Chicago Convention has been criticized for focusing on peacetime aeronautical activities and not adequately providing for the adjustment of the various rights and duties needed during war-time. See generally Bowen, *The Chicago International Civil Aviation Conference*, 13 GEO. WASH. L. REV. 308 (1945).

30. The Chicago Convention, *supra* note 1, at 1192.

31. *Id.* at 1180. Part III deals with the managerial aspects of international travel (reports, costs, etc.). *Id.* at 1200. Part IV deals with miscellaneous provisions (definitions) which do not affect the parties' substantive rights. *Id.* at 1203.

32. *Id.* art. 1, at 1180.

33. *Id.* art. 2, at 1181.

34. Background Report by the Secretary-General Assessing United Nations Documents and Other Pertinent Data Related to the Subject of Remote Sensing of the Earth by Satellites, U.N. Doc. A/AC.105/118 (1973) at 53 [hereinafter cited as Pertinent Data]. For a discussion of the evolution of air law, see D. JOHNSON, *RIGHTS IN AIR SPACE* (1965) and Lee, *Sovereignty of the Air*, 7 AM. J. INT'L L. 470 (1913).

35. See ROSENFELD, *supra* note 7, at 61.

36. The Outer Space Treaty, *supra* note 2.

the Return of Objects Launched into Outer Space;³⁷ The Convention on International Liability for Damage Caused by Space Objects;³⁸ and The Convention on the Registry of Space Objects Launched into Outer Space.³⁹ The Outer Space Treaty includes the provisions of the other three and is generally considered to be the charter of space law.⁴⁰

The Outer Space Treaty was preceded by several United Nations General Assembly resolutions, the principal one entitled, "Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space."⁴¹ The Treaty, like the resolutions adopted before it, was enacted to ensure the cooperative exploration of the newest frontier.⁴² It has been stated that the Outer Space Treaty did not create new law but, rather, in espousing the principles of freedom and nonappropriation of space, codified existing customary law.⁴³

Under the Treaty, a country may explore and use outer space, free from any discrimination, once it has astronomical prowess, whether developed on its own or purchased from a more technologically developed country.

Article I states, "Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind on a basis of equality and in accordance with international law. . . ." Article II guarantees that, "Outer space,

37. The Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Landed into Outer Space, *done* Apr. 22, 1968, 19 U.S.T. 7570, T.I.A.S. No. 6599, 672 U.N.T.S. 119 [hereinafter cited as The Treaty on the Return and Rescue of Astronauts].

38. Convention on International Liability for Damage Caused by Space Objects, *done* Mar. 29, 1972, 24 U.S.T. 2389, T.I.A.S. No. 7762 [hereinafter cited as the Convention of Liability].

39. Registration of Objects Launched into Outer Space, *opened for signature* Sept. 1976, 28 U.S.T. 695, T.I.A.S. No. 8480 [hereinafter cited as The Registration Convention].

40. Compare the terms of articles V, VII and VIII of The Outer Space Treaty, *supra* note 2, at 2414, 2415 and 2416 respectively, with those of The Treaty on the Return and Rescue of Astronauts, *supra* note 37, The Convention on Liability, *supra* note 38 and The Convention on the Registration of Space Objects, *supra* note 39, respectively, to see the similarity of language and interest.

41. G.A. Res. 1962, 18 U.N. GAOR Supp. (No. 18), U.N. Doc. A/5515 (1962).

42. See Hosenball, *supra* note 11, at 97.

43. See generally Goedhuis, *Reflections on the Evolution of Space Law*, 13 NETH. INT'L REV. 109, 112 (1966).

44. The Outer Space Treaty, *supra* note 2, art. I. This is a conditional freedom. The treaty's provisions mandate that the use must be in accordance with international law (article III); nuclear weapons may not be introduced into orbit (article IV); the activities of one state should not cause environmental damage (article IX), or interfere with another state's peaceful uses of outer space (article IX). The U.N. Secretary-General and the public, when feasible, must be informed of any scheduled space activities to respect

including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."⁴⁵ In essence, outer space is not subject to any state's regulation.

It is evident that the current law of outer space is diametrically opposed to that of airspace in both principle and practice.⁴⁶ While a country may deny an aircraft access through the airspace above its territory, it may not restrict the activities of spacecraft in outer space. The present lack of delineation between the boundaries of outer space and airspace has created uncertainty and conflict and requires immediate clarification.

II. THE GEOSTATIONARY ORBIT

Basic knowledge of the nature and use of the geostationary orbit is necessary in order to better understand the nature of the conflict regarding it.

The geostationary satellite orbit has a radius of 42,164 km., and lies at an altitude of approximately 35,786 km.⁴⁷ Because of its orbital revolution, a satellite placed in this orbit will appear stationary with respect to the earth's surface.⁴⁸ Its principal importance lies in its use.⁴⁹

The International Telecommunication Union's⁵⁰ (I.T.U.) Radio Regulations define a geosynchronous satellite as: "an earth *satellite*

other states' corresponding interests (article XI). The Outer Space Treaty, *supra* note 2. Thus, the freedom granted states is a restricted one. See Pertinent Data, *supra* note 34, at 52. See also Dudakov, *International Legal Problems on the Use of the Geostationary Orbit*, 1977 PROCEEDINGS ON THE NINETEENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 406, 408.

45. The Outer Space Treaty, *supra* note 2, art. II.

46. "The idea of State sovereignty in space, even if it should relate only to a part of space, is squarely opposed to the theory of the freedom of space." MATTE, *supra* note 22, at 58.

47. Gehrig, *Geostationary Orbit—Technology and Law*, 1976 PROCEEDINGS OF THE NINETEENTH COLLOQUIUM ON THE LAW OF OUTER SPACE, 267, 268.

48. The duration of the geostationary orbital revolution is practically identical to that of the earth's rotation. A geostationary satellite completes one orbital rotation every 1,436.1 minutes, i.e., once in 23 hours, 56 minutes, 4.1 seconds. *Id.* The orbital rotation of the earth occurs once every 23 hours, 56 minutes, 4.09 seconds. 6 *Encyclopedia Britannica* 59 (1974).

49. See *infra* text accompanying note 57.

50. The I.T.U. is recognized by the United Nations as the specialized agency of international communications. See generally Gehrig, *supra* note 47, at 272. Gehrig notes that the United States considers the I.T.U. as "the principal competent and appropriate international organization for the purpose of formulating international regulations on telecommunications matters." *Id.* at 273.

whose period of revolution is equal to the period of rotation of the earth about its axis."⁵¹ A geostationary satellite is a geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a satellite which remains approximately fixed relative to the Earth.⁵²

The geostationary orbit may be best understood in terms of a ribbon surrounding the earth. Geostationary satellites travel through this "three dimensional corridor" at different speeds and altitudes.⁵³

The I.T.U. Convention⁵⁴ of 1973 defines the geostationary orbit as a "limited natural resource."⁵⁵ This definition does not refer to a resource such as minerals but rather, a spatial resource of nature, limited by the fact that it may accommodate only a finite number of satellites⁵⁶ before it is saturated.⁵⁷

The increasing use of the geostationary orbit is the prime reason for its importance.⁵⁸ The UNCOPUOS report⁵⁹ sets forth seven possible uses of the geostationary orbit. These include satellite communication, meteorology, earth resources and environment, navigation and

51. I.T.U. Radio Regulations, I, Art. I § RR8.12 (original page RR1-18).

52. *Id.* at § RR8.13. Thus, while all geostationary satellites may be considered geosynchronous, not all geosynchronous satellites are geostationary. See Gehrig, *supra* note 51, at 267.

53. See Gehrig, *supra* note 47, at 268; Fernandez-Brital, *supra* note 24, at 14.

54. International Telecommunications Convention, done Oct. 25, 1973, 28 U.S.T. 2495, T.I.A.S. No. 8572.

55. *Id.* art. 33, § 131(2).

56. Experts have not reached agreement on how many space objects can be in geostationary orbit at a given time. See Attributes, *infra* note 59, at Add. 1 (1978). At one time it was generally accepted that geostationary satellites using the same frequency band on the radio spectrum had to be spaced at least 2 degrees apart from each other, thereby limiting the geostationary orbit to 180 satellites of the same frequency. See Pertinent Data, *supra* note 34, at 57. This "string of pearls" analogy is now criticized as "mechanistic and unrelated to space science and technology." C. CHRISTOL, *THE MODERN INTERNATIONAL LAW OF OUTER SPACE* 454 (1982). Essentially, limitations on the use of the geostationary orbital positions are a function of how rapidly technology develops. See W. Hinchman, *Issues in Spectrum Resource Management*, in *THE FUTURE OF SATELLITE COMMUNICATIONS: RESOURCE MANAGEMENT AND THE NEEDS OF NATIONS* (1970) for a discussion of how antenna farms and laser and microwave beams affect the number of satellites the geostationary orbit can accommodate.

57. See generally Gehrig, *supra* note 47; Gorove, *The Geostationary Orbit: Issues of Law and Policy*, 73 AM. J. INT'L L. 444 (1979).

58. See Fernandez-Brital, *supra* note 24, at 14. "Most space activities, especially those connected directly with human relations on earth . . . obtain significant advantages by placing their instrumentalities there." *Id.*

59. Physical Nature and Technical Attributes of the Geostationary Orbit: Study Prepared by the Secretariat, U.N. Doc. A/AC.105/203 (1977) [hereinafter cited as Attributes].

aircraft control, testing of new systems, astronomy and tracking and data relay.⁶⁰

It has been estimated that by 1991 an additional 274 geostationary satellites will have been launched.⁶¹ Removal of inactive satellites from the geostationary orbit currently does not and is not expected to occur within the foreseeable future. Thus, conceding spatial orbital finiteness, it is apparent that conservation and maximum utilization of present space is necessary.

A. *The Bogota Declaration*

*The geostationary is a scarce natural resource, whose importance and value increase rapidly together with the development of space technology and with the growing need for communication; therefore, the Equatorial countries meeting in Bogota have decided to proclaim and defend on behalf of their peoples, the existence of their sovereignty over this natural resource.*⁶²

The increasing utilization of the orbit, the importance of these uses to development and the finite nature of the orbit have led some of the countries that have not yet acquired the technical expertise to place their own satellites in the orbit⁶³ to seek regulation of the geostationary orbit in anticipation of their eventual acquisition of this important technology.⁶⁴

In November 1976, the eight equatorial countries convened in Bogota, Republic of Colombia in order to study the various legal, technological and political aspects of the geostationary orbit and the consequences of exercising sovereignty over that part of the orbit which lies above their respective territories. The meeting resulted in Declaration of the First Meeting of Equatorial Countries⁶⁵ (The Bogota Declara-

60. *Id.* at 15-16. See Fernandez-Brital, *supra* note 24, at 15.

61. Memorandum from Robert Lottman, National Aeronautics and Space Administration, to James J. Gehrig, *cited in* Gehrig, *supra* note 47, at 269-70.

62. Declaration of the First Meeting of the Equatorial Countries, signed Dec. 3, 1976, I.T.U. Doc. WARC-BS 81-E (1977) reprinted in 2 N. JASENTULIYANA & R. LEE, *MANUAL ON SPACE LAW* 383 (1979) [hereinafter cited as *The Bogota Declaration*].

63. Countries are not precluded from participating in space activities because they have not developed technologically. The Space Powers have extended an invitation to participate in their programs; or countries may purchase astronautical skills from more developed countries. See U.N. Doc. A/AC. 105/C.2/SR. 297, at 10 where Mr. Kolosov, the Soviet representative to UNCOPUOS, extended just such an invitation. *Id.*

64. Generally, the resources of outer space are available on a "first come, first served" basis. See generally Gorove, *supra* note 57, at 449.

65. *The Bogota Declaration*, *supra* note 62.

tion). In this declaration, the eight equatorial countries rejected the majority position, stating that the geostationary orbit is not a part of outer space but, rather, is a natural resource over which they may and do, exercise their sovereign rights.⁶⁶

They cite the following arguments in support of their position. The geostationary orbit's existence depends solely on the gravitational force of the earth, therefore, it is not a part of outer space.⁶⁷ There is no definition of outer space which supports the majority position that the geostationary orbit is in outer space; the absence of a definition implies that article II of the Outer Space Treaty does not apply to it.⁶⁸ The countries also rely upon the I.T.U. Convention's definition of the geostationary orbit as a scarce, natural resource;⁶⁹ they point out that under United Nations General Assembly resolutions 2692⁷⁰ and 3281,⁷¹ each state may exercise sovereign power over its natural resources.⁷² Thus, they claim that the geostationary orbit is under the sovereignty of the equatorial states.⁷³

66. *Id.* See also *supra* note 26.

67. The Bogota Declaration, *supra* note 62, at para. 1. *But cf.* Gorbriel, *The Legal Status of the Geostationary Orbit: Some Remarks*, 6 J. SPACE L. 171, 176 (1979). Gorbriel states:

Space technology experts agree that the position of an artificial satellite in the geostationary orbit is dependent upon several factors, such as: the launch and station keeping propulsion, the attraction of the earth, the moon and the sun, and the solar radiation pressure. Therefore the force of the earth's attraction is merely one of the elements.

Id. Accord Attributes, *supra* note 59, at 6.

68. The Bogota Declaration, *supra* note 62, at para. 4. *But see* Gorbriel, *supra* note 67, at 177. The author believes that the failure of the treaty to define outer space does not make it impossible to define its scope. This is accomplished by recognizing that the intent of the treaty is to establish a principle of cooperative, but free, use of outer space. This includes objects launched and placed in orbit. "The acceptance of an opposite assumption deprives the 1967 Treaty, and other international conventions based on it, of a reason for their existence." *Id.*

69. The Bogota Declaration, *supra* note 62, at para. 1 (referring to article 33 of the 1973 I.T.U. Convention; see *supra* note 54).

70. G.A. Res. 2692, 25 U.N. GAOR Supp. (No. 28) at 63, U.N. Doc. A/8028 (1970). "The General Assembly . . . Reaffirms the right of peoples and nations to permanent sovereignty over their natural wealth and resources, which must be exercised in the interest of their national development and of the well-being of the people of the State concerned." *Id.*

71. G.A. Res. 3281, 29 U.N. GAOR Supp. (No. 31) at Ch. II, Art 2, U.N. Doc. A/9631 (1974). "Every State has and shall freely exercise full permanent sovereignty, including possession, use and disposal, over all its wealth, natural resources and economic activities." *Id.* at 52.

72. The Bogota Declaration, *supra* note 62, para. 2, at 384.

73. *Id.* at 385. *Contra* Gorbriel, *supra* note 67, at 177. "One should conclude that the legal status of the geostationary orbit cannot be different from that of the whole outer

The Bogota Declaration sets forth, in addition to the claims of the parties to the declaration and the arguments in support of those claims, the implications of their assertion. The countries insist that their proclamation renders illegitimate the existence of those satellites already placed in the geostationary orbit until the countries over which the satellites are placed expressly authorize their positions.⁷⁴

They do not object to the orbital transit of satellites so long as such transit is conducted outside of their sovereign territory.⁷⁵ That part of the geostationary orbit which lies above any part of the sea not subject to the jurisdiction of the state is considered the "common heritage of mankind," and not subject to appropriation.⁷⁶

B. *Alternative Approaches*

Regulation of the geostationary orbit under the guise of protecting the sovereign rights of states is merely one of the conservation alternatives available for consideration. Unlike the Bogota Declaration, other proposals do not necessitate the immediate adoption of a definition of outer space. For example, there are proposals to allocate "parking places" in the orbit.⁷⁷ Some states are requesting a moratorium on space activities involving the orbit until an agreement can be reached between the space powers and the less technologically developed countries.⁷⁸ There are also scientific conservation measures being considered. Fewer satellites would need to be placed in the geostationary orbit if each satellite were designed for several distinct, yet compatible tasks.⁷⁹ Yet another solution is the removal of inactive satellites from

space and in consequence, any national appropriation of it is inadmissible." *Id.*

74. The Bogota Declaration, *supra* note 62, para. 3, at 385. Similarly, any geostationary satellite to be placed in the orbit must receive express authorization prior to launching. *Id.* See also *supra* note 26.

75. The Bogota Declaration, *supra* note 62, para. 3, at 385.

76. The equatorial countries' claim has not been received with enthusiasm. For the most part, states have rejected it. See Gorove, *supra* note 57, at 453-54. See generally U.N. Doc. A/PV.2376 (1975); and U.N. Doc. A/AC.105/C.2/SR.269 (1977).

77. This was one of the solutions discussed at the 1977 World Administrative Radio Conference. Positions on the geostationary orbit would be allocated to each country, thereby assuring each state a position regardless of its ability to, in fact, use it. This cannot be considered a conservationist measure, since it wastes room in the orbital corridor. See Pertinent Data, *supra* note 34, at 58.

78. Yet another proposed solution is that satellites be obliged to orbit outside the geostationary orbit whenever possible in order to accommodate satellites needing the geostationary orbit to function. *Id.* This solution was adopted by the I.T.U. at the 1971 World Administrative Radio Conference-Space Telecommunications as a voluntary measure. Telecommunication Convention and Final Protocol, 23 U.S.T. 1527, T.I.A.S. No. 7435 at para. 639 AF (1971).

79. See Attributes, *supra* note 59, Add. 1, at 11-12. See also *supra* note 56.

the geostationary orbit in order to make room for newer, active ones. Removing the inactive satellites is accomplished by reserving a relatively small amount of the satellite's propellant in order to thrust it into a higher orbit for permanent storage.

Because these scientific proposals are not regulatory in nature, they are the most compatible with the Outer Space Treaty and current international law. They are not, however, presently available. Believing that conservation is urgently needed, the equatorial countries chose to act rather than wait for the deliberate process of scientific research and development; and by their action, the necessity for a definition and/or delimitation of outer space became apparent.

III. SUGGESTIONS

The current conflict over the geostationary satellite orbit has been used to illustrate the necessity for a definition and/or delimitation of outer space. With a definition, the applicability of air law or space law to the activities conducted within the orbit would be uncontroverted, for the orbit would lie within one or the other sphere. When the applicable legal regime and the corresponding rights and duties of each country, with respect to the orbit, are determined, the issue of orbital conservation and protection of each state's interest in the orbit can be addressed. Although some countries continue to argue against the present need for the definition,⁸⁰ many urgently advocate its adoption.⁸¹ Furthermore, some countries have presented to UNCOPUOS suggested criteria to be used in establishing the definition.⁸² These suggestions can be generally categorized as either "spatial"⁸³ or "functional"⁸⁴ approaches.

Essentially, the spatial proposals rely upon specific physical characteristics of the atmosphere in order to arrive at a demarcation between airspace and outer space.⁸⁵ Various criteria of the spatial theory have been espoused by UNCOPUOS members.

The Belgium delegation proposes a demarcation based upon the divisions of the atmosphere.⁸⁶ Pursuant to this approach, the physical characteristics of the atmosphere—temperature, physical and chemical composition—are used to distinguish between atmospheric layers.⁸⁷

80. See *supra* text accompanying notes 14-16.

81. See *supra* text accompanying notes 14-20.

82. See Background Paper, *supra* note 3, at 16-31.

83. See *infra* note 85 and accompanying text.

84. See *infra* note 102 and accompanying text.

85. See Background Paper, *supra* note 3, at 16-26.

86. Natural boundaries in space, U.N. Doc. A/AC.105/C.1/L.76 (1976).

87. See Background Paper, *supra* note 3, at 17-19.

Airspace would end and outer space would begin in the layer that the air's principal components do not predominate.⁸⁸

The theory of navigable airspace is advocated by the Italian delegation.⁸⁹ Theoretically, air activities cannot be conducted beyond an altitude of 60 km., while space activities cannot be sustained below 120 km.⁹⁰ If one takes the median between the respective upper and lower limits,⁹¹ a boundary between airspace and outer space can be established at an altitude of 90 km.⁹² There has also been a proposal to establish a demarcation based upon where the earth's gravitational pull ceases.⁹³

Finally, it has been suggested that the demarcation should be based upon a division of space zones.⁹⁴ The upper limit for airspace would be set at the maximum altitude in which aircraft could function,⁹⁵ and the lower boundary for outer space would be 130 km., a satellite's perigee.⁹⁶ The zones would be subject to the principles of the Chicago Convention and the Outer Space Treaty, respectively. The region between them would be known as "mesospace."⁹⁷ Mesospace is described by its advocates as

the region where no vehicle can stay for a period of considerable duration: satellites arising in that space will descend to earth in . . . a few hours at most; the region is also inaccessible to airplanes or balloons. It can only be traversed or penetrated by rockets, or rocket-propulsed airplanes.⁹⁸

Mesospace would be subject to the jurisdiction of the underlying state which would, as a matter of course, grant the right of innocent passage⁹⁹ to ascending and descending spacecraft.¹⁰⁰

88. *Supra* note 86, at para. 15, p. 13. The Belgium delegation would thus establish a boundary at an altitude of 100 km. See Background Paper, *supra* note 3, at 19.

89. See Background Paper, *supra* note 3, at 19.

90. *Id.*

91. This allows a margin for technological development.

92. Background Paper, *supra* note 3, at 20.

93. *Id.* at 23.

94. *Id.* at 24.

95. At approximately 50 km. *Id.* at 24.

96. *Id.*

97. *Id.* This term was reportedly adopted in order to avoid the legal implications of the name initially suggested, i.e., "No-man's space." *Id.*

98. de Jager & Reijnen, *Mesospace: The Region Between Airspace and Outer Space*, 1976 PROCEEDINGS OF THE EIGHTEENTH COLLOQUIUM ON THE LAW OF OUTER SPACE 107, 109.

99. Passage is considered "innocent" so long as it would not be prejudicial to the underlying state, and the activity is conducted for peaceful purposes. See Background Paper, *supra* note 3, at para. 78 (citing M. DAUSES, *DIE GRENZE DES STAATSGEBIETES IM RAUM* 127-28 (1972)).

The benefits of the spatial approach lie in the fact that it is precise and allows for an instantaneous determination of when an object is in either airspace or outer space. It is criticized, though, because it is inherently arbitrary and inflexible; and the scientific criteria relied upon are often not sufficiently precise for an operational solution.¹⁰¹

"Functional" advocates would define the boundaries of airspace and outer space according to the nature of the various instrumentalities thrust into it.¹⁰² Objects having the principal characteristics of an "aircraft" would be governed by the Chicago Convention, and those that are predominately "spacecraft" would be governed by the Outer Space Treaty.¹⁰³ The permissible restrictions on a craft would be made dependent upon the characteristics of the craft, rather than where its activities are conducted.¹⁰⁴

The functional approach, unlike the spatial approach, has the flexibility required of a definition of outer space in light of the rapid scientific advances. It has been criticized as being latent with uncertainty,¹⁰⁵ as well as burdensome and time consuming to use in concrete cases.¹⁰⁶

CONCLUSION

There is a need for a definition of outer space. Although it is true that space activities have been successfully conducted for decades with neither a precise definition nor a conflict,¹⁰⁷ that fact can no longer justify postponing the establishment of a definition, for conflict now exists.¹⁰⁸ The countries that have not established space programs fear

100. This approach is criticized on the ground that it simply introduces greater confusion and uncertainty in an area replete with both. See *infra* text accompanying notes 105-06.

101. Background Paper, *supra* note 3, at 16 (citing M. LACHS, *THE LAW OF OUTER SPACE* 56 (1972); M. MARCOFF, *TRAITE DE DROIT INTERNATIONAL PUBLIC DE L'ESPACE* 300-16, 324, 325 (1973); L. BOTA, *Sur la Definition de L'espace Extra-Atmospherique*, *REVUE ROUMAINE D'ETUDES INTERNATIONALES* 140 (1973)).

102. Background Paper, *supra* note 3 at 27-30.

103. *Id.*

104. *Id.* See also N. MATTE, *supra* note 22.

105. "[T]he linking of boundary criteria to the characteristics of man-made flight instrumentalities in constant change would be to infect the process of accommodation with an intolerable uncertainty." M. McDOUGAL, H. LASWELL & I. VLASIC, *supra* note 19, at 338. See generally U.N. Doc. A/AC.105/C.2/7, para. 179-80.

106. Determining what function an object is performing is more difficult than measuring distance alone. See generally Perek, *Scientific Criteria for the Delimitation of Outer Space*, 5 *J. SPACE L.* 111, 115 (1977).

107. This is why the United Kingdom does not believe there is a need for a definition of outer space. U.N. Doc. A/AC.105/C.2/SR.269, at 8. (1977).

108. See *supra* text accompanying notes 62-76.

that the space powers will exploit the principles of freedom of use and nonappropriation to their own advantage and disregard the interests of the lesser developed countries.¹⁰⁹ Since this possibility is unacceptable to them, these countries feel compelled to take positions of questionable legality. The legitimacy of the exercise of sovereign authority over the geostationary orbit could easily be determined if there existed a definition of outer space. An orbit found to be lying within the airspace of an underlying territory would be subject to that state's regulations. Those lying in outer space would be free from any national appropriation.¹¹⁰

It is therefore suggested that a definition of outer space be adopted. Although the specifics should be worked out by the UN-COPUOS members, the following criteria should be included in any definition ultimately adopted.¹¹¹

The definition should be expressed in terms as simple as technological considerations permit.¹¹² In this way, determination of the relative position of the object in question to the limiting surface can be achieved with speed, ease and certainty. The definition should also be flexible so that it is able to remain contemporary with space technology and activities. The definition must consider global interests, and finally, it must be the same for all countries, regardless of technological prowess.¹¹³

The existence of the definition would not *ipso facto*, alleviate the concerns of those countries who fear that the current legal regimes do not adequately protect their interests. It would, however, indicate a

109. This is why, for example, Colombia demands a definition. Mr. Aguilar, Colombia's representative on UNCOPUOS, stated:

Until we have that definition, those Powers possessing the necessary economic and technological capabilities to explore and exploit space will have a veritable license to do as they please, taking advantage of this great legal vacuum. . . .

We understand full well why some countries are not particularly interested in arriving at such a definition.

U.N. Doc. A/AC. 105/PV.173, at 53-55 (1977). See also, Goedhuis, *Influence of the Conquest of Outer Space on National Sovereignty: Some Observations* 6 J. SPACE L. 37 (1978).

110. See *supra* text accompanying notes 27-28.

111. See generally Perek, *supra* note 106, at 115-16, for a discussion of requirements and guidelines for a workable definition of outer space.

112. *Id.* Cooperation between the scientist and the lawyer would be necessary to achieve this end. *Id.*

113. *Id.*

spirit of cooperation among the states. This kind of cooperation in outer space activities best serves the global community interests of mankind.

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