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Limited Space: Allocating the Geostationary Orbit

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I. INTRODUCTION

Cape Canaveral, Florida, April 12, 1981. For two thunderous minutes this morning, a plume of white fire ascended into the Florida sky before disappearing, and a mighty cheer arose from the crowd below.

"Goodbye, you beautiful Columbia," a woman yelled. In common with approximately one million other spectators, she had spent a mostly sleepless night swatting mosquitoes and listening to announcements. Tears streaming from her eyes, she added, "Come home to us safely!"

For everyone, the launching of the space shuttle had been a great show, as beautiful as a Fourth of July fireworks display. Those who had come for the show went away satisfied.

For many, the launching of the shuttle was a welcomed reaffirmation of the United States' ability to meet difficult challenges.[1]

In many ways, the space shuttle inaugurated a new phase in the development of space as an international resource. The shuttle may be used to launch satellites into orbit and has the additional capability of retrieving and repairing satellites. As the number of satellites in orbit increases, the problem of interference among satellites escalates. The issue centers around the geostationary orbit and the electromagnetic spectrum as well as direct satellite broadcasting from orbiting transmission stations to individual receivers.

The geostationary orbit is an area in space which allows a satellite to remain in orbit over a single point of the earth's surface because of the gravitational pull of the earth, moon, and other planets.[2] The electromagnetic spectrum is the range of frequencies capable of transmitting signals from satellites.[3] The importance of the geostationary orbit becomes apparent when one considers that most telecommunications, broadcasting, and weather satellites must be in an orbit over a specific point of the earth, usually over a receiving station. Seven nonmilitary uses for the geostationary orbit have been set forth by the United Nations Committee on Peaceful Uses of Outer Space: communications, meteorol-

[1] N.Y.Times, Apr. 13, 1981, at A9, col. 5.

[2] Arnopolous, *The International Politics of the Orbit-Spectrum Issue*, 7 ANNALS AIR & SPACE L. 216, 216 (1982).

[3] *Id.*

ogy, earth resources and environment, navigation and aircraft control, testing of new systems, astronomy, and data relay.[4] While these seven uses are by no means exclusive, they illustrate the many diversified technological activities that rely on the geostationary orbit.

The geostationary orbit is located at an altitude of approximately 35,786 kilometers from the equator of the earth[5] and has a radius of 42,164 kilometers.[6] Although the radius is quite expansive, it does not allow for an unlimited number of satellites. The reason for this limitation is that, while occupying a slot in space, a satellite requires a specific radio frequency in the electromagnetic spectrum.[7] These radio frequencies must be different and the satellites must be approximately eighteen kilometers apart so that there is no interference between the different transmissions.[8] Theoretically, the total number of satellites capable of remaining in geostationary orbit is approximately 2000.[9] The current number of satellites in geostationary orbit is 220.[10] Crowding of the geostationary orbit is a concern not only among the technologically-advanced nations making use of this international resource, but also among developing countries which fear no room will remain for them to launch geostationary satellites in the future.

A separate but related issue involves the controversy over transmission of broadcasting signals from the geostationary orbit. Most of these signals are television broadcasts which must be transmitted from a geostationary satellite in order to be received properly. Controversy has arisen among nations which feel national sovereignty is violated by direct broadcasting[11] and those which believe direct broadcasting is consistent with a policy of fostering the free flow of information.[12]

This Comment will examine the current legal and probable future state of the international zone known as the geostationary orbit and the corresponding issue of direct satellite broadcasting. Additionally, this

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4 Physical Nature and Technical Attributes of the Geostationary Orbit: Study Prepared by the Secretariat, U.N. Doc. A/AC.105/203, at 15-16 (1977) [hereinafter U.N. Orbit Study].

5 35,786 kilometers equals approximately 22,366 miles. Gehrig, *Geostationary Orbit—Technology and Law*, 19 COLLOQUIUM ON THE LAW OF OUTER SPACE 267, 268 (1976).

6 42,164 kilometers equals approximately 26,352 miles. *Id.*

7 Arnopoulos, *supra* note 2, at 216.

8 Arnopoulos, *A Situation Study of the Orbit-Sectrum Issue (Model and Applications)*, 8 ANNALS AIR & SPACE L. 288 (1983).

9 Arnopoulos, *supra* note 2, at 216.

10 U.N. Orbit Study, *supra* note 4, at 2.

11 *See* Comment, *Current and Future Legal Issues of Direct Broadcast Satellites in International Law*, 45 LA. L. REV. 701, 703 (1985) ("[T]he major concern of any country is loss of control over [television and radio] program content available to its population.") [hereinafter Comment, *Legal Issues*].

12 *Id.* at 713.

Comment will analyze the impact of the varying positions of states regarding the geostationary orbit, direct satellite broadcasting, and the likelihood of international agreement on issues regarding these concerns. Finally, this Comment will propose possible solutions consistent with current international law.

II. The Legal Status of the Geostationary Orbit

A. The Bogotá Declaration

The geostationary orbit over the Western Hemisphere has been the focus of recent attention because eight countries[13] have claimed sovereignty to a substantial portion of it. On December 3, 1976, eight equatorial countries signed the Bogotá Declaration.[14] As stated in the Declaration, the purpose of these countries' claims is that:

> The geostationary orbit is a scarce natural resource, whose importance and value increase rapidly with the development of space technology and with the growing need for communication; therefore, the Equatorial countries meeting in Bogotá have decided to proclaim and defend on behalf of their peoples, the existence of their sovereignty over this natural resource.[15]

The Bogotá Declaration theoretically could be used to prevent nations from launching satellites into geostationary orbit. Its signatories contend that the rationale for their claim of sovereignty is that the geostationary orbit is a phenomenon caused by the gravitational pull of the earth within their boundaries. The signatories to the Bogotá Declaration claim that: "The geostationary orbit's existence depends solely on the gravitational force of the earth, therefore, it is not part of outer space."[16] Such a claim of sovereignty is rejected by nations that have launched satellites into geostationary orbit and developing nations which have not yet launched such satellites.[17] A majority of nations believe the geostationary orbit is a part of outer space and, as such, is governed by the provisions of the 1967 Outer Space Treaty.[18]

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13 The eight countries are: Brazil, Colombia, Congo, Ecuador, Indonesia, Kenya, Uganda, and Zaire. Declaration of the First Meeting of the Equatorial Countries, 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 Bogotá Declaration].

14 *Id.*

15 *Id.*

16 *Id.* ¶ 1.

17 Jakhu, *The Legal Studies of the Geostationary Orbit*, 7 Annals Air & Space L. 333, 343 (1982). As of 1981, the United States had more than 90 satellites in the geostationary orbit, the Soviet Union had 50, other developed countries had approximately 50, and the lesser developed countries had less than 30. 21 U.N. GAOR Comm. on the Peaceful Uses of Outer Space Legal Sub-Comm. 2, U.N. Doc. A/C.105/C.2/SR.377 (1982) [hereinafter Peaceful Uses].

18 Arnopoulos, *supra* note 2, at 225.

Most experts in the field do not agree with the Bogotá Declaration's claim that the orbit's existence "depends solely on the gravitational force of the earth."[19]

> 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.[20]

Even if the gravitational force of the earth were the sole cause of the geostationary orbit, it would be inaccurate to assume that the countries lying on the equator create the gravitational force. "Achieving a geostationary orbit is actually dependent on the velocity and position of the satellite as well as gravitational attraction which is, of course, created by the total mass of the object being orbited."[21]

Indonesia, a signatory of the Bogotá Declaration, counters the experts' testimony by insisting there is a special relationship between the geostationary orbit and equatorial states. The Indonesian delegation to the United Nations Committee on Peaceful Uses of Outer Space has argued:

> The fact that placing a satellite over, say, the South Pole would fail to produce the same effect as placing it over the equator meant precisely that a special physical relationship did exist. The argument that the geostationary orbit was the property of the earth as a whole might be true *in abstracto*, but, unfortunately perhaps, the earth's territory happened to be divided into sovereign States. The logical extension of the argument would be to say that the earth as a whole belonged equally to all States, something which was manifestly not the case. Because of the special physical relationship existing between the equator and the geostationary orbit, equatorial countries were particularly sensitive to the presence of satellites in the orbit, at least with regard to remote sensing from such satellites.[22]

B. The Chicago Convention

While the claim of sovereignty over a portion of space some 35,786 kilometers from each country's surface may seem far-reaching, if not far-fetched, such claims have their base in modern international law.[23] In 1944, fifty-four countries[24] met at the Chicago Convention on Interna-

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19 *Id.*

20 Gorbiel, *The Legal Status of the Geostationary Orbit: Some Remarks*, 6 J. SPACE L. 171, 176 (1979).

21 Comment, *Legal Issues*, *supra* note 11, at 710 (parenthesis omitted).

22 Peaceful Uses, *supra* note 17, at 8.

23 Qizhi, *The Problem of Definition and Delimitation of Outer Space*, 10 J. SPACE L. 157, 158 (1982).

24 Those 54 countries are: Afghanistan, Australia, Belgium, Bolivia, Brazil, Canada, Chile,

tional Civil Aviation and passed resolutions in the form of a convention. Article I of the convention proclaims that: "[T]he contracting States recognize that every State has complete and exclusive sovereignty over the airspace above its territory."[25] The definition of territory is contained in Article II of the convention which states that: "[F]or the purposes of this convention, 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."[26]

The convention does not define airspace. As the convention imposes no territorial limitation upon a state's right to define airspace, the countries that signed the Bogotá Declaration contend they may claim sovereignty to the geostationary orbit.[27] Contrary to this position however, it is argued that the Chicago Convention was drafted for the purpose of establishing the rights of aircraft and of the nations over which such aircraft fly.[28] This argument becomes more persuasive when one considers the fact that the Chicago Convention was convened more than a decade before the Soviet Union launched Sputnik.[29] Thus, while the application of the Chicago Convention to a sphere of the universe untouched at the time of the convention's drafting is innovative, it is also somewhat specious. Nevertheless, if it is accepted that the geostationary orbit is outside the definition of airspace and falls within the definition of outer space, other principles of international law may be applied for the purpose of defining nations' rights to use the geostationary orbit.

C. The 1967 Outer Space Treaty

Under the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, signed on January 27, 1967

China, Colombia, Costa Rica, Cuba, Czechoslovakia, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, France, Greece, Guatemala, Haiti, Honduras, Iceland, India, Iran, Iraq, Ireland, Lebanon, Liberia, Luxembourg, Mexico, the Netherlands, New Zealand, Nicaragua, Norway, Paraguay, Panama, Peru, the Philippines, Poland, Portugal, South Africa, Spain, Sweden, Switzerland, Syria, Thailand, Turkey, United Kingdom, United States, Uruguay, Venezuela, and Yugoslavia. Convention on International Civil Aviation, Dec. 7, 1944, 61 Stat. 1180, T.I.A.S. No. 1591, 15 U.N.T.S. 295 [hereinafter Chicago Convention].

25 *Id.*

26 *Id.* at 1181; Comment, *Airspace—Outer Space? The Geostationary Orbit and the Need for a Precise Definition of Outer Space*, 4 N.Y.J. INT'L & COMP. L. 115, 119 (1982).

27 *See* Rosenfield, *The Need to Distinguish Air Space from Outer Space*, 20 COLLOQUIUM ON THE LAW OF OUTER SPACE 61 (1977).

28 Bowen, *The Chicago International Civil Aviation Conference*, 13 GEO. WASH. L. REV. 308 (1945).

29 Sputnik was launched into orbit by the Soviet Union on Oct. 4, 1957. N.Y. Times, Oct. 5, 1957, at 1, col. 8.

("1967 Outer Space Treaty"),[30] the signatories[31] retained "open access to, and free use of all parts of this national environment."[32] Article I of the 1967 Outer Space Treaty declares: "The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries . . . and shall be the province of all mankind. Outer space, including the moon and other celestial bodies, shall be free for exploration by all States . . . ."[33] Thus, the question of whether the eight equatorial countries that signed the Bogotá Declaration have a right to claim national sovereignty over the portions of the geostationary orbit that lie above their countries is best answered by asking the question: Is the geostationary orbit part of a country's airspace or part of outer space? If it can be determined that the geostationary orbit is part of outer space, then the terms of the 1967 Outer Space Treaty apply.[34]

The countries which signed the Bogotá Declaration are adamant in their denial that the 1967 Outer Space Treaty applies to the geostationary orbit. A portion of the Bogotá Declaration states that, "[t]here is no valid or satisfactory definition of outer space which may be advanced to support the argument that the geostationary orbit is included in outer space."[35] Yet, the equatorial nations may be basing their stance regarding the location of the geostationary orbit more on self-interest than out of scientific data. In fact, the 1967 Outer Space Treaty prohibits the type of claim made by the signatories to the Bogotá Declaration. Article II of the 1967 Outer Space Treaty states, in part, that outer space, "is not subject to national appropriation by claim of sovereignty by means of use

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30 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205 [hereinafter 1967 Outer Space Treaty].

31 The following signatories are parties to the 1967 Outer Space Treaty: Antigua & Barbuda, Argentina, Australia, Austria, the Bahamas, Barbados, Belgium, Brazil, Brunei, Bulgaria, Burkina Faso, Burma, Byelorussian Soviet Socialist Republic, Canada, Chile, China, Cuba, Cyprus, Czechoslovakia, Denmark, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Finland, France, German Democratic Republic, Federal Republic of Germany, Greece, Grenada, Guinea-Bissau, Hungary, Iceland, India, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Keyna, Korea, Kuwait, Laos, Lebanon, Libya, Madagascar, Mali, Mauritius, Mexico, Mongolia, Morocco, Nepal, the Netherlands, New Zealand, Niger, Nigeria, Norway, Pakistan, Papua New Guinea, Peru, Poland, Romania, St. Christopher & Nevis, St. Lucia, San Marino, Saudi Arabia, Seychelles, Sierra Leone, Singapore, Solomon Islands, South Africa, Spain, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Thailand, Tonga, Tunisia, Turkey, Uganda, Ukrainian Soviet Socialist Republic, Union of Soviet Socialist Republics, United Kingdom, United States, Uruguay, Venezuela, Socialist Republic of Vietnam, Yemen (Aden), and Zambia.

32 1967 Outer Space Treaty, *supra* note 30.

33 *Id.*

34 Jakhu, *supra* note 17, at 355.

35 *See* Bogotá Declaration, *supra* note 13, art. II.

or occupation or by any other means."[36] Thus, a determination that the geostationary orbit is in outer space would result in the invalidation of sovereignty claims of the Bogotá Declaration under the 1967 Outer Space Treaty.

III. Demarcation of Outer Space

Contrary to the Bogotá Declaration's claim that there is no satisfactory definition supporting the argument that the geostationary orbit is located in outer space,[37] modern science provides a great deal of evidence regarding the demarcation of outer space and airspace. It is generally accepted that airspace activities cannot take place beyond an altitude of sixty kilometers.[38] This would suggest that the sovereignty of airspace issue, based on the international law of the 1944 Chicago Convention, stops at a level of sixty kilometers. Beyond that altitude, the 1944 Chicago Convention does not apply. The signatories of the Bogotá Convention, nevertheless, may argue that the top limit of airspace need not necessarily be the bottom limit of outer space.[39] Thus, outer space may not begin immediately beyond the sixty kilometer airspace limit. Other data would be required to determine the lower boundary of outer space. Granting the equatorial nations of the Bogotá Convention this point, it becomes necessary to search for a means of determining the beginning point of outer space.

A logical lower boundary limit for outer space would be the lowest possible point of orbit sufficient to maintain a satellite. This approach means that "all satellites launched into orbits up to now are in outer space and outside the realm of state sovereignty."[40] Thus, the beginning point of outer space can be determined by calculating the lowest possible altitude of an orbiting satellite. At present, that point is approximately ninety to 100 kilometers above the surface of the earth.[41]

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36 *See* 1967 Outer Space Treaty, *supra* note 30, art. II.

37 *See* Bogotá Declaration, *supra* note 13, art. II.

38 Although there is no express definition of outer space, one may be inferred from statements made by the International Telecommunications Union to the U.N. Secretariat limiting airspace to a sixty-kilometer altitude. The Question of the Definition and/or Delimination of Outer Space: Background Paper prepared by the Secretariat, 5, U.N. Doc. A/AC.105/C.2/7/Add.1 (1977) [hereinafter Background Paper].

39 It has been hypothesized that there exists an area between airspace and outer space, which has been termed menospace. Peaceful Uses, *supra* note 17, at 2.

40 Qizhi, *supra* note 23, at 160.

41 Background Paper, *supra* note 38, at 22.

> In principle it would be possible to construct a special purpose artificial satellite which would survive below [ninety kilometers] or at any height for that matter. There would, however, be no gain in any application of such a satellite, and its cost would be out of proportion because such

Simple arithmetic demonstrates that the 35,786 kilometer altitude of the geostationary orbit is clearly above the ninety to 100 kilometer lower boundary limit set by the lowest orbiting satellites. This conclusion has been reached by the Soviet Union which advocates the demarcation of the boundary between airspace and outer space at an altitude of 100 kilometers.[42] The Soviet Union's delegation to the United Nations Committee on Peaceful Uses of Outer Space has submitted a proposal stating that: "The region above 100 kilometers altitude from the sea level of the earth is outer space."[43] The Soviet Union has been even more unequivocal in affirming its position that the geostationary orbit is located in outer space. The Soviet Union's delegation has remarked that the geostationary orbit is obviously situated in outer space.

The United States has also arrived at a position on the location of the geostationary orbit. Its delegation to the United Nations Committee on the Peaceful Uses of Outer Space has stated that: "[A]t an altitude of approximately 35,000 km, the GSO [Geostationary Orbit] was clearly subject to the provisions in the 1967 Outer Space Treaty prohibiting any appropriation by claim of sovereignty and stipulating that outer space should be free for exploration and use by all States without discrimination of any kind and on a basis of equality."[44]

The superpowers are not alone in declaring the geostationary orbit to be well within the bounds of outer space and thus subject to the provisions of the 1967 Outer Space Treaty. Countries which have been exponents of the position that the geostationary orbit lies in outer space include: Belgium, Czechoslovakia, the Federal Republic of Germany, the German Democratic Republic, Italy, Japan, Sweden, and the United Kingdom.[45] Such a list of countries appears impressive, not merely because of its clout, but also because of its diversity.

The signatories of the Bogotá Declaration not only face opposition to their claims of sovereignty from countries in the Northern Hemisphere, but must also contend with dissension among their ranks. Ecuador, a signatory of the Bogotá Declaration, has expressed the opinion

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an extreme mass-to-area ratio can be achieved only be[sic] using heavy materials such as lead, gold, uranium, or platinum in large quantities.

42 This method of determining the lower boundary of outer space is not absolute. The boundary would increasingly become lower as technological advances allow satellites to achieve lower orbit. This fact is irrelevant to use of the lower boundary, however, because the claims of the Bogotá Declaration are well above the current lowest feasible satellite orbits. *See* Cheng, *The Legal Regime of Air Space and Outer Space: The Boundary Problem, Functionalism versus Spatialism: The Major Premises*, 5 ANNALS AIR & SPACE L. 323, 326 (1980).

43 *Id.*

44 Peaceful Uses, *supra* note 17, at 2.

45 Jakhu, *supra* note 17, at 340 n.23.

that it would be useful to delimit outer space by setting the upper limit of air space at an altitude of about 100 kilometers.[46] Such an opinion implicitly accepts the geostationary orbit as being within the boundary of outer space.[47] The signatories to the Bogotá Declaration may have decided to give up their claim of sovereignty based on newly available scientific evidence regarding the limits of outer space. A more likely hypothesis, however, is that the equatorial countries were never very serious about gaining property rights to the geostationary orbit, but were using the issue to assert their position vis-a-vis the developed nations.

It has been suggested that, "the equatorial countries used the Bogotá Declaration as a political tool rather than to seriously assert their sovereignty claims."[48] This would explain Ecuador's willingness to accept the proposals for a lower boundary of outer space. As stated by Ram S. Jakhu, an expert on the geostationary orbit issue: "[T]he real purpose of the Bogotá Declaration seems to be the application of political pressure on a few developed countries that are monopolizing the geostationary orbit and consequently restraining the use of the orbit by late-comer developing countries."[49] In the words of another expert, Linda R. Sittenfeld, "Claiming sovereignty over the geostationary orbit is an apparent attempt by states currently without satellite technology to protect their territory as against those states with satellite technology."[50]

Such motives would explain testimony by Colombia's representative at the 1982 meeting of the Legal Subcommittee of the Committee on Peaceful Uses of Outer Space. Colombia's representative stated that the Bogotá Declaration:

> [S]ought to ensure genuine benefits for the international community as a whole, through equitable utilization of the geostationary orbit in such a way as to take into account the needs and safeguard the rights and interests of the developing countries in the various regions of the world. It was for that reason that not only the equatorial countries, but the developing world as a whole, had been urging, with ever increasing emphasis, the need to update the 1967 Treaty. Only in that way could a more equitable, harmonious, and consistent body of space law be established.[51]

This statement suggests that the signatories to the Bogotá Declaration were not concerned that their claim of sovereignty over the geostationary orbit directly conflicted with the 1967 Outer Space Treaty.

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46 Peaceful Uses, *supra* note 17, at 6.

47 Jakhu, *supra* note 17, at 343.

48 *Id.* at 344.

49 *Id.* at 341.

50 Comment, *The Evolution of a New and Viable Concept of Sovereignty for Outer Space*, 4 FORDHAM INT'L L.J. 199, 209 (1980).

51 Peaceful Uses, *supra* note 17, at 4.

Rather, the equatorial countries sought to challenge the provisions of the 1967 Outer Space Treaty by claiming sovereignty over the geostationary orbit. Assuming this argument to be true — and the evidence suggests there is more to the geostationary orbit issue than friendly international squabbling — then the entire problem may be seen as part of the larger political struggle of developing countries to gain economic and political power in world affairs. Some commentators feel that the geostationary orbit issue is at the center of developing nations' call for a new international economic order.[52] Yet, it would be an oversimplification to suggest that the geostationary orbit issue is merely another variation of the "haves" against the "have nots."

IV. Direct Satellite Broadcasting

A more practical aspect of the direct satellite broadcasting controversy involves the rights of countries to limit the signals received by their citizens. This problem is termed "spillover" and is best understood by a brief explanation of signal transmissions. In order for a satellite to broadcast directly to receiver stations, it must be in geostationary orbit. From this orbit, the signals can reach a wide transmission area of approximately one million square miles.[53] Thus, depending upon the shape and area of a country, a direct satellite broadcast aimed at one country may be received by citizens of another country.

The most outspoken proponent of strict limits on direct satellite broadcasting is the Soviet Union. The Soviet Union's main fear is the westernization of its citizens.[54] A similar concern has been expressed by some developing countries which fear that their citizens might lose their cultural identity.[55] The opposing position may best be summarized by the United States and the United Kingdom, nations which advocate "complete freedom of the flow of ideas and information without any regulation, based on the notion that these concepts are so fundamental to individuals that no restrictions could be tolerated."[56]

The 1967 Outer Space Treaty — the only treaty which may be considered applicable to the direct satellite broadcasting controversy[57] —

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52 Arnopoulos, *supra* note 2, at 218-19.

53 Comment, *Legal Issues*, *supra* note 11, at 708.

54 *Id.* at 712.

55 Le Duc, *Direct Broadcast Satellites: Parallel Policy Patterns in Europe and the United States*, 27:2 J. Broadcasting 99, 100 (1983).

56 Comment, *Legal Issues*, *supra* note 11, at 713.

57 Treaties which address outer space include the Moon Treaty, G.A. Res. 34/68, 34 U.N. GAOR Supp. (No. 46), U.N. Doc. A34/68 (1979); Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, T.I.A.S. No. 8480, 1023 U.N.T.S. 15; Article II of

makes a reference to United Nations General Assembly Resolution 110(11) which condemns "propaganda designed or likely to provoke or encourage any threat to peace."[58] Reference to this clause, combined with the general principles of Article I — the "open access" article — and Article II — prohibiting national appropriation of outer space — is used by the Soviet Union to justify its call for strict regulation of direct satellite broadcasting. However, the international community as a whole has regarded the 1967 Outer Space Treaty as allowing any peaceful use of outer space.[59]

Developing countries have attempted to argue that, under the Bogotá Declaration, direct broadcasting satellites violate the national sovereignty of the equatorial nations.[60] Yet, the criticisms of the Bogotá Declaration discussed above may be reiterated when considering such arguments. Furthermore, Article I of the 1967 Outer Space Treaty, used by the Soviet Union to justify its position, may be used to counter both the Soviet Union's and developing countries' positions since Article I established the basic rights of all nations to freely use the resources of outer space. The international community, through custom and treaty, has indicated "that the [Bogotá] Declaration places no restrictions on [direct satellite broadcasting]."[61]

V. Resource Allocation

The geostationary orbit and direct satellite broadcasting controversies are the result of the inevitable conflict between the equitable and efficient allocation of resources. The geostationary orbit issue places the developed countries which have the technological resources and skills required to make use of the attributes of the geostationary orbit at odds with those countries which are afraid that, when they acquire the required skill to make use of the geostationary orbit, the resource will have vanished. At the same time, the direct satellite broadcasting issue places countries respecting the free flow of information in opposition to those countries seeking to control the dissemination of information.

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the Convention on International Liability for Damage Caused by Space Objects, Sept. 1, 1972, 24 U.S.T. 2389, T.I.A.S. No. 7762; and Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, Apr. 23, 1968, 19 U.S.T. 7570, T.I.A.S. No. 6599, 672 U.N.T.S. 119. None of these, however, are applicable to direct satellite broadcasting.

58 1967 Outer Space Treaty, *supra* note 30.

59 Brooks, *Technological and Legal Aspects of Environmental Monitoring*, 1 J. Space L. 6, 35 (1973).

60 It may be observed that the U.S.S.R. cannot make this claim without jeopardizing its position on the geostationary orbit issue.

61 Comment, *Legal Issues*, *supra* note 11, at 710.

An analysis of the problem of information control leads to the realization that the cause of the concerns of the Soviet Union and developing countries is not simply the broadcasting of signals by other countries, but the reception of those signals by their citizens. The controversy dissipates when one realizes the need for receivers capable of decoding the transmissions. Yet the Soviet Union, a state which has shown itself capable of controlling the information available to its citizens, believes it is more effective to control information disseminated by direct satellite broadcasting at its source.

The solution to the spillover aspect of the geostationary satellite controversy is for the countries supporting the free flow of information to respond to the proposed restrictions by stating: "We deny your right to restrict satellite transmissions at their source." Thus, countries such as the Soviet Union which seek to control the availability of information to their citizens should bear the costs of restricting the reception of direct broadcasting signals, rather than their transmission. The advantage of placing such costs on the restricting party is that an international controversy is relegated to the status of a domestic problem, a fact which is appropriate when one considers that the potential controversy is caused by the restricting nation's domestic policies.

The cultural identity problem may also be handled separately by each country. This is most practical because cultural identity, like information control, is domestic in nature.[62]

Addressing the broader problem of the geostationary orbit as an international resource, some countries, such as those that signed the Bogotá Declaration, would like to see a strict allocation of the slots within the geostationary orbit.[63] Yet, even if it were decided that strict allocation was the best solution to the resource allocation problem, the more challenging problem of how to allocate the resource would remain. Should the slots created in the geostationary orbit be apportioned on a one-nation-one-slot basis, like votes in the United Nations General Assembly? Alternatively, should the technological advances of some countries be recognized and credited? In other words, what does one do about the space already being taken up by satellites most of which are owned by technologically-advanced countries? Or should the satellite ac-

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62 The cultural identity problem is not universally recognized as a genuine problem. It may be argued that prohibiting a citizen's access to information from other countries as a means of preserving that citizen's cultural identity is merely a smoke screen to keep the citizen ignorant of the world beyond national boundaries.

63 Comment, *Communication Satellites and the Geostationary Orbit: Reconciling Equitable Access with Efficient Use*, 14 L. & POL'Y INT'L BUS. 859, 861 (1982) [hereinafter Comment, *Communication*].

tivities of techologically-advanced countries be placed on hold until the developing countries catch up?

The current situation, favored by some countries such as the United Kingdom and the United States, is a prior-in-time, prior-in-right system.[64] As explained by Martin L. Stern:

> Under the current regulatory scheme, a user's only real obligation is to avoid harmful interference with prior users who are operating pursuant to Radio Regulations. This scheme implicitly protects users that are first in time, and requires newcomers to approach the existing stakeholders and seek such accommodation as they are willing to provide.[65]

This is the system the equatorial nations, through their Bogotá Declaration, and other developing nations, are attempting to change. "Developing countries contend that this priority of use will preclude their access to the resource even when they reach a level of technological sophistication sufficient to support their own satellite systems."[66]

Yet a prior-in-time, prior-in-right plan has precedent in the law of real property. In many respects, it is similar to land use zoning "where prior users retain virtual permanent advantage."[67] A compromise solution that has some support in the United States is termed "block allotment planning."[68]

> A block allotment plan allocates to a service and orbital location a "block" or continuous position of frequency and is predicated on the theory that an individual country should be allowed to meet its particular communications requirements in the most efficient way it can once it is ready to implement its system . . . . [A] nation would be granted one or more slots, a block of frequency, and specified service areas. Within these parameters, a nation could allocate the resource to its domestic users as it saw fit.[69]

The block allotment plan retains flexibility and allocative efficiency, because a nation in need of blocks could purchase or lease unused or unwanted blocks from another nation. Small nations could combine their resources and create a multinational system.[70] Unlike the strict allocation system, block allotment planning might combine the resources

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64 *Id.* at 866.

65 *Id.* (quoting Ruthowski, *The 1979 World Administrative Radio Conference: The I.T.U. in a Changing World*, 13 INT'L LAW. 289, 291 (1979)).

66 Office of International Communications Policy, U.S. Dep't of State, Delegation to the 1979 General World Administrative Radio Conference 74-80 (T.D. Serial No. 116).

67 S. BROWN, N. CORNELL, L. FABIAN, & E. WEISS, REGIMES FOR THE OCEAN, OUTER SPACE, AND WEATHER 176, 181 (1977).

68 RARC-83 Advisory Committee, Third Progress Report of Working Group 2B of Subcommittee 2, at 2 (Mar. 3, 1982).

69 Comment, *Communication*, *supra* note 63, at 874-75.

70 Ad Hoc 176, Interdepartmental Radio Advisory Committee, Block Allotment Planning 2-2 (Nov. 1981).

of very small countries, so as not to waste the resource of an entire block. The block allotment planning system is based upon market principles. Assuming a world market for the resources created, efficient allocation would occur through market forces. Obviously, attempts might be made to create a cartel within the block allotment planning system. International safeguards, however, tailored after national antitrust laws, could be used to help ensure the integrity of such a market system.

It should be stressed that block allotment planning does not address the problem of determining the quantity of blocks to be allotted to each country. Such an allotment would require compromises among nations; but compromise may not be impossible. One reason is that the industrially-developed nations have expressed interest in block allotment planning. Developing countries have an incentive to compromise because the status quo is unacceptable to them and their bargaining position is not strong. If developing countries insist on strict allocation, they may find themselves alone in the conference room, while the technologically-advanced countries are busy launching satellites to fill the remaining space within the geostationary orbit.

The same market forces that will allow the block allotment planning system to work efficiently will create incentives to find new solutions to the geostationary orbit saturation problem. With today's shuttle technology, it is possible to launch and repair orbiting satellites. Market forces will encourage countries to remove inactive satellites from the geostationary orbit when it becomes economically efficient to replace them with more active and powerful satellites.

Allowing market forces to create efficient allocation of the geostationary orbit resources will stimulate new technological advances. One such benefit which may currently be foreseen is the increased efficiency of satellites and satellite transmissions. For example, it is not unrealistic to assume that the buffer space required between satellites may be greatly reduced through technological advances. As with advances in computer technology (which in the last twenty years have greatly reduced the size and cost of computer hardware), advances in satellite technology may lead to geometric increases in the capabilities of satellite systems.

VI. CONCLUSION

Spillover from direct satellite broadcasting is not completely a problem of international proportions. The agitation resulting from spillover is a symptom, in part, of internal political troubles of states desiring to restrict their citizens' access to the free flow of information. Those nations responsible for direct satellite broadcasting may justifiably claim

the right to continue broadcasting under the 1967 Outer Space Treaty. Nations which object to direct satellite broadcasting because it interferes with their political objectives will simply have to implement their restrictions on the domestic rather than the international level and bear the costs of such restrictions themselves.

Nations claiming to fear the impact of direct satellite broadcasting on their cultural identity should not be permitted to disrupt the advances sought and achieved by other countries. The cultural identity problem must be removed from the international arena and consigned to the domestic level as well.

The broader concerns of resource allocation of the geostationary orbit could be resolved through an international forum such as the United Nations. Block allotment planning appears to be the best solution since it addresses the rights of the developing countries while allowing market forces to efficiently allocate and maximize the resource.

The technology blamed for consuming the limited resources of the geostationary orbit may provide the solution to these concerns. The key to meeting the challenge is to create a system that allows for resource maximization. The time has come for the nations of the world to implement such a system.

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