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Municipal Law Regulation of Remote Sensing in Outer Space

I. INTRODUCTION

A. *The "New Eye in Space"*

Platforms in space provide a unique vantage point for studying global problems such as pollution, drought and climatic changes,¹ as well as analyzing natural resources. One by-product of the 1960's space race was a unique series of deep space photographs of the earth.² Using these photographs, the National Aeronautics and Space Administration (NASA) recognized the potential of space-based systems to acquire data for civilian purposes, and subsequently established the Earth Resources Survey Program in 1965.³ The best known and most important component of that program is Landsat.⁴ Landsats 1 and 2, launched in 1972 and 1975, respectively, demonstrated that "the application of satellite-acquired data on the Earth's surface is a practical reality."⁵ Landsat 1 was capable of continually acquiring data at a fraction of the cost of traditional methods.⁶ It located mineral deposits,⁷ surveyed crops,⁸ identified polluted waters⁹ and mapped geographical formations.¹⁰ One example of Landsat's efficiency is its completion of an on-going mapping project in just one day. Only one-quarter of the project had been completed in five summers of work without the satellite.¹¹

Landsat circles the earth in a near-polar orbit fourteen times each day.¹² The same point on the earth comes under Landsat's sen-

1. N. SHORT, P. LOWMAN, JR., S. FREDEN & W. FINCH, JR., *MISSION TO EARTH: LANDSAT VIEWS THE WORLD 5* (1976) [hereinafter cited as *MISSION TO EARTH*].

2. The photographs were products of the Apollo program. *Id.*

3. *Id.*

4. ERTS was renamed Landsat in 1975 in order to make it more "recognizable" by the public. *Id.*

5. *Id.* Landsat 3 was launched in 1978. Weir, *Remote Sensing and the Law of Geophysical Trespass*, 1 *NORTHRUP U.L.J.* 83 (1980).

6. *New Eye in Space*, *NEWSWEEK*, Aug. 7, 1972, at 43.

7. DeSaussure, *Remote Sensing by Satellite: What Future for an International Regime?*, 71 *AM. J. INT'L L.* 707, 714 (1977).

8. *MISSION TO EARTH*, *supra* note 1, at 5.

9. *Id.* at 25-26.

10. *Id.* at 12.

11. *Id.* at 15.

12. Vlasic, *Principles Relating to Remote Sensing of the Earth from Space*, in *I MANUAL*

sors every eighteen days.¹³ The onboard sensors include return beam vidicon (RBV) television cameras using three special bands of the light spectrum.¹⁴ Landsat also carries a multi-spectral scanner (MSS) which differentiates between the various types of light received.¹⁵ Different materials on the earth's surface reflect different wavelengths of light of varying intensity.¹⁶ A given material registers on the four bands of the multi-spectral scanner with its own "spectral signature."¹⁷ This spectral reading is then matched with a previous reading confirmed at ground level in order to identify the nature of the sensed material.¹⁸

The MSS converts the intensity of the reflected earth light into a digital code which corresponds to the wavelength and intensity of the light reflected.¹⁹ The signal is then transmitted down to an earth receiving station.²⁰ Computers translate the digital codes into black and white images, which are further transformed into color images.²¹ These images can be purchased for as little as a few dollars from the Earth Resources Observation System Data Center.²²

The analyzed information represents a catalogue of a region's natural resources and physical characteristics.²³ For example, data derived from Landsat images led to a discovery of copper ore in Pakistan.²⁴ In 1981, Brazil reported thirty-nine projects using Land-

ON SPACE LAW 303, 309 (N. Jasentuliyana & R. Lee eds. 1979). A polar orbit is roughly perpendicular to the Earth's equator. MISSION TO EARTH, *supra* note 1, at 1.

13. Vlastic, *supra* note 12, at 305.

14. C. CHRISTOL, THE MODERN INTERNATIONAL LAW OF OUTER SPACE 723-24 (1982); MISSION TO EARTH, *supra* note 1, at 2. The RBV consists of three television-type cameras, each responding to a different part of the light spectrum. *Id.* at 438.

15. MISSION TO EARTH, *supra* note 1, at 2. The multi-spectral scanner produces a continuous image built up from successive scan lines which extend perpendicular to the satellite's forward motion. The entering light strikes different sensors, each of which responds to a different segment of the spectrum and an image is produced. *Id.*

16. C. CHRISTOL, *supra* note 14, at 723.

17. MISSION TO EARTH, *supra* note 1, at 2.

18. C. CHRISTOL, *supra* note 14, at 723.

19. MISSION TO EARTH, *supra* note 1, at 2.

20. *Id.*

21. *Id.* The color image is known as a "false color image." The coloring of objects does not necessarily match our normal visual images, i.e., water may be blue or black, while vegetation tends to look red. *Id.*

22. Weir, *supra* note 5, at 83.

23. See Morley, *Remote Sensing Satellites — What Do They Actually Measure and How Sensitive Is the Information?*, in THE LEGAL IMPLICATIONS OF REMOTE SENSING FROM OUTER SPACE 13 (Matte & DeSaussure eds. 1976).

24. DeSaussure, *supra* note 7, at 714.

sat data in various natural resource areas.²⁵ Urban planners in the United States at both state and local levels are enthusiastic about Landsat data and want the program expanded.²⁶ The present breadth of fields serviced is notable: environment, agriculture and forestry, geography, geology, hydrology, oceanography, and marine resources.²⁷

Although Landsat is a major component of the United States remote sensing program, there are other American systems and foreign competitors. Space Shuttle crews have engaged in high resolution photography which has resulted in several remarkable images.²⁸

This brief introduction suggests the breadth of information available and the scope of remote sensing. Because remote sensing from space is still in its adolescence and likely to mature in the next few decades,²⁹ the legal questions surrounding the use of remote sensing should be addressed as soon as possible. On July 23, 1972, the United States launched Landsat 1.³⁰ Landsat D-Prime, the fifth satellite in the Landsat series, was launched on March 1, 1984.³¹ Since its inception, the remarkable nature of the Landsat system has been both recognized³² and feared³³ as a threat to state sovereignty

25. U.N. Doc. A/A.C.105/297/Add.2 at 2-40.

26. DeSaussure, *supra* note 7, at 708.

27. C. CHRISTOL, *supra* note 14, at 722.

28. L.A. Times, Jan. 17, 1984, part 1, at 2, col. 1; *Shuttle Crew Photographs Soviet Sites*, AVIATION WK. & SPACE TECH., Jan. 9, 1984, at 19. The Space Shuttle Mission 9/Space Lab 1 astronauts took photographs of secret Soviet space launch sites at Tyuratam. The details of these photographs were previously only available from military reconnaissance sources. *Id.* A second image showed a new Soviet rocket. L.A. Times, Jan. 17, 1984, part 1, at 2, col. 1. The picture was sufficiently clear to calculate the rocket's anticipated thrust and indicate that it was launch-ready. *Id.*

29. See *Two-step Operational Landsat Plan Set*, AVIATION WK. & SPACE TECH., July 14, 1980, at 108.

30. *New Eye in Space*, *supra* note 6, at 43.

31. Lowndes, *NASA Will Stress Environmental Studies*, AVIATION WK. & SPACE TECH., Mar. 12, 1984, at 107.

32. Arch B. Parks, Director of the Earth Resources Survey Program, stated:

[t]he thing that ERTS [Landsat] will do that is almost impossible to do any other way . . . is to provide both a timely and accurate inventory of resources, not just of our country, but of a great huge part of the world.

New Eye in Space, *supra* note 6, at 43.

33. The capability to acquire detailed information about states without their permission "alarm[ed] those who fear that the information gathered by the satellite might well be used by some nations or even individuals for political advantage or economic gain." *Id.* This concern has continued to be echoed as a major justification for regulating remote sensing. See DeSaussure, *supra* note 7, at 714.

and privacy. However, in the twelve years since Landsat first made commercial remote sensing a reality,³⁴ no definitive accord preventing its abuse has been reached.³⁵

B. Existing Legal Viewpoints and Municipal Law

The advent of Landsat 1 and other remote sensing systems³⁶ present new and pressing questions to the international legal community. The central question to be addressed is whether international law is violated when information is collected about a state from outer space without the sensed³⁷ state's permission.³⁸

One view, expressed mostly by commentators in the United States, is that remote sensing does not violate international law.³⁹ Remote sensing is considered analogous to such internationally accepted activities as using the airspace over international waters as a vantage point from which to observe other states.⁴⁰ The opposing view disputes this pro-legality argument by stressing that remote sensing impacts the earth regardless of where the activity takes place, and that a state has the right to exercise its sovereignty to protect its resources and activities.⁴¹

This Comment will evaluate how the two legal viewpoints noted above have withstood a decade of debate and consideration. Additionally, this Comment will discuss the ultimate issue underlying-

34. Remote sensing became part of the agenda of the Legal Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) in 1972. Stowe, *The Development of International Law Relating to Remote Sensing of the Earth from Outer Space*, 5 J. SPACE L. 101, 101 n.1 (1977).

35. See Report of the Chairman of the Working Group on Remote Sensing, U.N. Doc. A/AC.105/305/Annex 1 at 1 (1982). For example, items 10 through 17 discuss the differing views expressed by delegations concerning remote sensing regulation. *Id.* at 2-5.

36. A good example of foreign competition is the French SPOT Program. SPOT, scheduled to become operational in 1984, carries a high resolution package superior to Landsat. *France Studies Reconnaissance Version of SPOT Spacecraft*, AVIATION WK. & SPACE TECH., Aug. 10, 1981, at 58. The television camera mode has a resolution of 10 meters, while the multiband mode is 20 meters. *Id.* By contrast, Landsat D's multi-spectral scanner's resolution is only 80 meters. Covault, *Landsat D to Yield More Precise Data*, AVIATION WK. & SPACE TECH., July 5, 1982, at 40, 46.

37. "Sensed" will be used to denote the state whose territory is being observed. "Sensing" will denote the state which is acquiring the data.

38. See G. REIJNEN, UTILIZATION OF OUTER SPACE AND INTERNATIONAL LAW 67 (1981); see also Stowe, *supra* note 34, at 101.

39. C. CHRISTOL, *supra* note 14, at 733-34; Vlastic, *supra* note 12, at 309.

40. See DeSaussure, *supra* note 7, at 710 (suggesting it would be "unrealistic and artificial" to distinguish between earth-oriented and other space activities); C. CHRISTOL, *supra* note 14, at 731-32.

41. C. CHRISTOL, *supra* note 14, at 732.

ing this debate, namely the remedial measures a state might take to protect itself from the negative effects of remote sensing.

II. STATE SOVEREIGNTY VS. FREE ACCESS

A. Does Remote Sensing Violate International Law?

Unfortunately, Landsat does not possess the ability to discern political borders. "The natural swath of the satellite sensors commonly cuts across many national boundaries. The exercise of separating the billions of data bits along the lines of political boundaries is both financially prohibitive and scientifically disadvantageous."⁴² As a consequence, the United States program produces information about the entire world, all of it available at reasonable prices.⁴³ Images of both the Soviet Union and the People's Republic of China are readily available from the United States government, even though neither the Soviet Union nor China has agreed to such a program.⁴⁴ The unrestricted availability of information without the consent of the sensed state is the focus of the debate concerning remote sensing.

Article I of the Outer Space Treaty of 1967 declares that all outer space activities must be carried out "in accordance with international law."⁴⁵ This phrase is repeated in Article III.⁴⁶ Therefore, outer space activities are governed by customary international law,⁴⁷ as modified by the treaty. Nevertheless, two distinct viewpoints have developed concerning remote sensing.⁴⁸ The first argues that a state's sovereignty includes the power to control information about itself and, consequently, that unconsented acquisition and distribution of this information violates a state's sovereign rights.⁴⁹ The opposing view, which has been most closely associated with the views of the United States, claims that remote sensing is legal and that the free collection and dissemination of remotely sensed data is in ac-

42. Address by Ambassador W.T. Bennet, Jr., before First Committee of the U.N. General Assembly, Oct. 13, 1975, *quoted in* Vlastic, *supra* note 12, at 322.

43. Quinn, *Photogrammetry Updated for the Legal Profession*, 4 NORTHROP U.L.J. 183 (1983); DeSaussure, *supra* note 7, at 709.

44. DeSaussure, *supra* note 7, at 709.

45. 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, art. I, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205 [hereinafter cited as Outer Space Treaty].

46. *Id.* art. III.

47. G. REIJNEN, *supra* note 38, at 71.

48. See C. CHRISTOL, *supra* note 14, at 732.

49. *Id.* at 732-33.

cord with international law.⁵⁰ The former view is commonly referred to as the restrictive view and the latter as the free access view.

The particular characterization of "territory" is the foundation for each of the differing viewpoints on whether remote sensing violates international law. Under international law, "territory" is characterized as:

- a. a State's own territory;
- b. the territory of another State within which a given State may not exercise its power in any form; and
- c. territory not belonging to any State, which is, in its turn, divided into two categories: *territorium nullius* (= territory of nobody) and *territorium extra commercium* (= territory outside commerce) (the high seas and outer space).⁵¹

The two viewpoints vary in their outcome depending upon the determination of where the remote sensing "occurs" with respect to these territorial definitions.

B. The Free Access View

The free access argument is based upon an analogy to the peripheral photographic and electronic reconnaissance which occurred during the nineteen fifties and sixties.⁵² In those instances, reconnaissance aircraft flew the contours of different states' borders, meticulously avoiding crossing over any political boundaries. Many states, including the United States, believe such surveillance conducted from either the high seas or international airspace is legal.⁵³ These states acknowledge that a state has complete and exclusive sovereignty over the airspace directly above its territory.⁵⁴ They point out, however, that as long as there is no physical violation of another state's airspace, the other state's sovereignty is not violated and the activity is lawful.⁵⁵

50. *Id.*

51. G. REIJNEN, *supra* note 38, 709.

52. C. CHRISTOL, *supra* note 14, at 732.

53. Orlando, *Collection and Dissemination of Data Through Remote Sensing*, 1 NORTHROP U.L.J. 121, 131 (1980).

54. Convention on International Civil Aviation, Dec. 7, 1944, art. I, 61 Stat. 1180, T.I.A.S. No. 1591, 15 U.N.T.S. 295.

55. C. CHRISTOL, *supra* note 14, at 732. The U-2 incident of May 1, 1960, provides a striking example. There, an American airplane actually penetrated Soviet airspace and was legally shot down. A contemporaneous program of U.S. RB-47 aircraft doing functionally the same mission from international airspace was considered legal and not interfered with. *Id.* at 731-32.

Support for this theory is also found in Article II of the Outer Space Treaty. Outer space is considered *territorium extra commercium* under Article II, which states that “[o]uter space . . . is not subject to national appropriation by claim of sovereignty, by means of the use or occupation or by any other means.”⁵⁶ If this territory, like the high seas or international airspace, is not within another state’s sovereign territory, then remote sensing from outer space must be legal.⁵⁷

There are two problems with this territorial analogy. First, although military reconnaissance from international airspace is considered legal, it is also consensual.⁵⁸ For example, recognizing the need to allow both sides to verify compliance with the SALT II Treaty, the treaty impliedly permitted use of “national technical means of verification.”⁵⁹ There appears to be no similar national security incentive to allow such surveillance for a civilian-oriented system.⁶⁰ Second, the type of data acquired tends to be different because of its economic potential and intended use.⁶¹

C. State Sovereignty: The Restrictive View

From its inception, the potential for abuse of remote sensing data was recognized and formed part of the foundation of the restrictive viewpoint.⁶² In 1972, the anticipated capability of Landsat “alarmed those who [thought that] the information gathered by the satellite might well be used by some nations or even individuals for political advantage or economic gain.”⁶³ As previously stated, the restrictive view is based upon a state’s sovereignty and its right to protect against the intrusive effects of another sensing its territory.⁶⁴ A fundamental aspect of state sovereignty⁶⁵ is control over national

56. Outer Space Treaty, *supra* note 45, art. II.

57. C. CHRISTOL, *supra* note 14, at 732.

58. See M. FORKOSCH, OUTER SPACE AND LEGAL LIABILITY 132, 163 n.31 (1982).

59. *Id.* at 164 n.32 (citing BUREAU OF PUBLIC AFFAIRS, U.S. DEP’T ST. BULL., Pub. No. 8979, Zbigniew Brzezinski, Apr. 4, 1979, at 3, col. 3).

60. See DeSaussure, *supra* note 7, at 713 (noting that earth resource satellites pose no immediate threat to a state’s national security or political security).

61. See *supra* text accompanying notes 23-27.

62. *New Eye in Space*, *supra* note 6, at 43; DeSaussure, *supra* note 7, at 714.

63. *New Eye in Space*, *supra* note 6, at 43.

64. C. CHRISTOL, *supra* note 14, at 732; Polter, *Remote Sensing and State Sovereignty*, 4 J. SPACE L. 99, 105-06 (1976).

65. For a discussion of sovereignty and its relation to space law, see G. RELJENEN, *supra* note 38, at 5-12.

resources and wealth.⁶⁶ The restrictive viewpoint, largely supported by Third World nations, asserts that information about resources is tantamount to the resource itself and, therefore, is subject to exclusive sovereign control.⁶⁷

The restrictive viewpoint received support in the Bogota Declaration of 1976.⁶⁸ This Declaration claimed that segments of the geostationary orbit⁶⁹ are part of the sovereign territory of the equatorial states below.⁷⁰ The signatory states⁷¹ argued four basic points:

- a) The geostationary orbit is a physical fact rising from the nature of our planet because its existence depends exclusively on its relation to gravitational phenomena caused by the Earth and for that reason should not be considered as part of outer space.
- b) The geostationary orbit is a scarce national resource.
- c) The international community is now calling into question *all the terms* of international law laid down in the Outer Space Treaty of 1967, which were drawn up at a time when the developing countries could not count on adequate scientific advice. The terms, according to the Declaration, were prepared by the industrialized states for their own benefit.
- d) As there is no definition of outer space, the provision in the Space Treaty regarding nonappropriation of this space is inapplicable⁷²

The third and fourth points are significant because they question the fundamental principles of freedom of use and non-appropriation of outer space⁷³ as stated in the Outer Space Treaty.⁷⁴ If all of the provisions of the Outer Space Treaty are being questioned on the ground that the treaty was aimed at economic oppression by the industrialized states,⁷⁵ its applicability to all space issues becomes

66. DeSaussure, *supra* note 7, at 711.

67. Polter, *supra* note 64, at 108.

68. Bogota Declaration of 1976, *reprinted in* C. CHRISTOL, *supra* note 14, at 891.

69. The geostationary synchronous orbit is a near circular orbit on the equatorial plane which completes one orbit in the same time the earth makes one rotation. As a result, the satellite appears to stay in one place over the surface of the earth. *Id.*

70. *Id.*

71. The signatories are Brazil, Colombia, Congo, Ecuador, Kenya, Indonesia, Uganda and Zaire. *Id.* at 895.

72. Goedhuis, *Influence on the Conquest of Outer Space on National Sovereignty*, 6 J. SPACE L. 37, 38-39 (1978) (emphasis added). The nonappropriation provision of the Outer Space Treaty is Article II. Outer Space Treaty, *supra* note 45, art. II.

73. Goedhuis, *supra* note 72, at 39. *See generally* C. CHRISTOL, *supra* note 14, at 520.

74. Outer Space Treaty, *supra* note 45, arts. I & II.

75. Bogota Declaration, pt. 4, *reprinted in* C. CHRISTOL, *supra* note 14, at 894.

suspect.⁷⁶

The view expressed in the Declaration, however, has been severely criticized⁷⁷ on both scientific and legal grounds.⁷⁸ First, the claim that the geostationary orbit is based on gravity—a function of the earth and not of space—belies other forces at work.⁷⁹ A geostationary satellite must be maintained in its correct orbit through periodic adjustments in positioning, speed and altitude, just as any other orbital object.⁸⁰ Moreover, the gravity holding the object “in place” is not just a product of the state below, but of the whole earth.⁸¹

Second, the legal claim that the geostationary orbit is not in outer space is unfounded.⁸² The signatory states argue that freedom of use and exploitation, the same issues which arise in remote sensing, were not an integral part of international legal norms at the time the Outer Space Treaty was adopted in 1967.⁸³ Professor Goedhuis suggests the 1967 treaty did not create international space law but merely codified existing law.⁸⁴ Therefore, the complaint of the Bogota Declaration signatories is specious because the states were already bound to follow the two basic principles of freedom of use and non-appropriation.⁸⁵

Because the claims of the Bogota Declaration are unpersuasive, it is unlikely that they will have any impact on remote sensing.⁸⁶ Nevertheless, the Bogota Declaration has garnered some support.⁸⁷ Two points deserve notice, even if the underlying argument is faulty: (1) the claims are based upon state sovereignty and, since the

76. The underlying claim of the signatory states is that at the time of the execution of the treaty they were at a technical and economic disadvantage and that as a result the treaty gave an unfair advantage to the space powers. Therefore, they argue, they should not be held to the treaty's terms because all of its provisions are suspect. *Id.*

77. For an excellent summary of various scholars' rejection of the Bogota Declaration, see C. CHRISTOL, *supra* note 14, at 513-21.

78. *Id.*; Goedhuis, *supra* note 72, at 39-40.

79. Rosenfield, *Where Airspace Ends and Outer Space Begins*, 7 J. SPACE L. 137, 142 (1977); Goedhuis, *supra* note 72, at 39.

80. Rosenfield, *supra* note 79, at 142.

81. Goedhuis, *supra* note 72, at 39.

82. Rosenfield, *supra* note 79, at 142.

83. See, e.g., C. CHRISTOL, *supra* note 14, at 464 (Colombia expressed this opinion in 1975).

84. Goedhuis, *supra* note 72, at 40; see also C. CHRISTOL, *supra* note 14, at 518.

85. Goedhuis, *supra* note 72, at 40.

86. Rosenfield, *supra* note 79, at 142. Even Brazil, a sister equatorial state, has refused to join in the declaration. *Id.*

87. C. CHRISTOL, *supra* note 14, at 520, 546 n.401 (discussing views expressed by G. MARCOFF, *TRAITE DE DROIT INTERNATIONAL PUBLIC DE L'ESCAPE* 618-20 (1973)).

treaty did not by its terms divide sovereign airspace and sovereignty-free outer space, there is some room for legitimate disagreement; and (2) the Declaration is retaliatory in nature, i.e., it is an attempt to gain control in this area in order to overcome feelings of helplessness and insecurity.⁸⁸ Both of these reasons could also be applied to the remote sensing debate. However, the Declaration's effect on the remote sensing debate should be negligible, since its overall impetus is weak on the geostationary orbit issue—an issue that has been overwhelmingly rejected by the international legal community.⁸⁹

Moreover, it is unnecessary to discard the Outer Space Treaty's precepts of freedom of use and exploitation via the Bogota Declaration in order to conclude that remote sensing is illegal. Utilizing territorial definitions of international law,⁹⁰ Professor Reijnen asserts, as do United States commentators, that the place where the information gathering occurs, and not the nature of the information gathered, determines the legality of the gathering activity.⁹¹ However, Professor Reijnen reached a conclusion contrary to United States commentators: "Territorial sovereignty implies . . . that remote sensing by one State's satellite cannot be carried out in the territory of another State, unless it is with that State's consent."⁹² This conclusion necessarily implies that Professor Reijnen considers the activity to occur within the sensed state's sovereign territory. In addition, Professor Reijnen believes that any state which uses remote sensing without the permission of the sensed state is violating an existing rule of international law.⁹³

IV. MUNICIPAL RESTRICTIONS ON REMOTE SENSING FROM OUTER SPACE

A. The Impetus for Municipal Restrictions

As the foregoing discussion points out, present international law apparently does not restrict remote sensing. Nevertheless, states which are the object of remote sensing have legitimate concerns regarding the unrestricted acquisition and dissemination of the data.⁹⁴

88. *Id.* at 520.

89. *See supra* text accompanying note 86.

90. *See supra* text accompanying note 51.

91. G. REIJNEN, *supra* note 38, at 71.

92. *Id.*

93. *Id.*

94. DeSaussure, *supra* note 7, at 714.

These concerns are twofold because remote sensing involves both a state's economic and military security.⁹⁵ The economic threat is illustrated in the following scenario: State *A* learns of either a bumper crop or crop devastation in state *B*. This information may put state *B* at state *A*'s mercy, economically.⁹⁶ Use of remote sensing data could thus remove state *B*'s control over its own economy.

A second problem involves data which has military implications.⁹⁷ Although images from civilian remote sensing satellites do not equal those from military reconnaissance satellites,⁹⁸ this does not mean the civilian information has no military importance. Relatively mundane information, such as topographical maps, may be considered sensitive by a sensed state.⁹⁹ Even more sensitive military data could also be acquired. For example, violations of the United States-USSR interim SALT I Agreement and the Anti-Balistic Missile Treaty were discovered in Landsat images.¹⁰⁰

Thus, both a state's sovereign interests in national security and economic independence may be infringed through unrestricted remote sensing. What can a state do in response to such a potential threat? The answer may lie in the state's own municipal law.¹⁰¹

B. Nationality Jurisdiction and the Outer Space Treaty

The preliminary issue is whether, absent any express prohibition in the Outer Space Treaty, a state has jurisdiction¹⁰² over an activity in the sovereignty-free zone of space by basing its jurisdictional power upon customary international law.

The Outer Space Treaty includes what has been termed the "nationality" basis for jurisdiction,¹⁰³ although "such a confirmation of jurisdiction need not be exclusive"¹⁰⁴ and "another basis of juris-

95. *Id.*; Morley, *supra* note 23, at 15.

96. DeSaussure, *supra* note 7, at 714.

97. Morley, *supra* note 23, at 15.

98. *Id.*

99. *Id.*

100. B. JASANI, OUTER SPACE: BATTLEFIELD OF THE FUTURE? 26 (1978).

101. "Municipal law" is the law or rule of an individual state or nation. BLACK'S LAW DICTIONARY 918 (5th ed. 1979).

102. Jurisdiction has two meanings. First, it may be "prescriptive," i.e., authority to make a rule of law. RESTATEMENT (SECOND) FOREIGN RELATIONS OF THE UNITED STATES §§ 7, 8 (1965) [hereinafter cited as RESTATEMENT (SECOND) FOREIGN RELATIONS]. Jurisdiction is also the authority to enforce the rule promulgated pursuant to a state's prescriptive jurisdiction. A state may have one but not necessarily the other in a given situation. *Id.*

103. DeSaussure, *supra* note 7, at 718-19; Outer Space Treaty, *supra* note 45, art. VIII.

104. DeSaussure, *supra* note 7, at 719.

diction, territoriality, may apply concurrently."¹⁰⁵ Article VIII of the treaty, although recognizing nationality jurisdiction, does not exclude any other basis.¹⁰⁶

1. *The Lotus*

One jurisdictional theory which has been advanced is based upon a Permanent Court of International Justice decision¹⁰⁷ involving two vessels which collided while on the high seas. The *Lotus*, a French mail steamer, collided with a Turkish vessel, the *Boz-Kourt*, in international waters off the coast of Turkey.¹⁰⁸ The *Boz-Kourt* sank, claiming the lives of eight Turkish citizens.¹⁰⁹ The *Lotus* attempted a rescue before proceeding on to Constantinople, which is Turkish territory. After an investigation, both the captain of the *Boz-Kourt* and the watch officer of the *Lotus* were arrested.¹¹⁰

The watch officer, a Frenchman, was prosecuted under a section of the Turkish Penal Code¹¹¹ which authorized Turkey to prosecute any person who injures the state of Turkey or a Turkish citizen while outside Turkish territory.¹¹² The watch officer was convicted, fined and sentenced to prison.¹¹³ The prosecution of the *Lotus*' watch officer resulted in the case being brought before the International Court.¹¹⁴ The question framed for the court was simply "whether criminal jurisdiction does or does not exist in this case."¹¹⁵ France protested jurisdiction from the outset,¹¹⁶ claiming that, as the flag nation of the *Lotus*, it had exclusive jurisdiction over everything that occurred aboard the ship.¹¹⁷ Turkey answered by arguing that jurisdiction is proper "whenever such jurisdiction does

105. RESTATEMENT (SECOND) FOREIGN RELATIONS, *supra* note 102, § 18.

106. DeSaussure, *supra* note 7, at 719.

107. *Id.* at 718. *The Lotus*, (Fr. v. Turk.) 1927 P.C.I.J., ser. A, No. 9.

108. 1927 P.C.I.J., ser. A, No. 9, at 10.

109. *Id.*

110. *Id.* at 11.

111. "Any foreigner who . . . commits an offense abroad to the prejudice of Turkey or of a Turkish subject . . . shall be punished with the Turkish penal code provided that he is arrested in Turkey." Turkish Penal Code, art. VI, Law No. 765, of Mar. 1, 1927, *reprinted in* 27 P.C.I.J., ser. A., No. 9, at 14-15.

112. 1927 P.C.I.J., ser. A., No. 9, at 14-15.

113. *Id.* at 11.

114. *Id.* at 13.

115. *Id.*

116. *Id.*

117. *Id.* at 22.

not come into conflict with a principle of international law."¹¹⁸ The fundamental difference between these two positions is that the French view presumes a restriction¹¹⁹ upon Turkey's prescriptive jurisdiction in that there is no express rule which gives it the right to have legislated over acts in international territory. Turkey's view is based upon the inherent power and independence of states.¹²⁰

The court adopted the Turkish theory,¹²¹ holding that, while there is a general prohibition against a state exercising jurisdiction outside of its territory,¹²² the prohibition does not preclude the assertion of jurisdiction over acts occurring outside of the state's territory:¹²³

Far from laying down a general prohibition to the effect that states may not extend the application of their laws and jurisdiction of their courts to persons, property and acts outside their territory . . . [states have jurisdiction] which is only limited in certain cases by prohibitive rules: as regards other cases, every state remains free to adopt the principles it regards as best and most suitable.¹²⁴

The court then proceeded to analyze whether, under the facts of the case, Turkey had violated any express restrictions of international law.¹²⁵ France contended it was a violation of international law to exercise jurisdiction over the watch officer merely because of the nationality of the victim.¹²⁶ The court rejected this contention, because it ignores the fact that the effect of the watch officer's negligence was felt aboard a Turkish vessel.¹²⁷ The test the court applied is based in territoriality.¹²⁸ The court observed that states may claim jurisdiction even though the actor is not within the country during the commission of the crime "if one of the constituent elements to

118. *Id.* at 18.

119. *Id.*

120. *Id.*

121. *Id.*

122. *Id.* at 18-19.

123. *Id.* at 19. Here, although the acts occurred outside of Turkish territory, the defendant was within Turkish territory at the time of prosecution. The exercise of jurisdiction was only for acts outside of its territory, not for persons.

124. *Id.* at 22.

125. *Id.* at 22-23.

126. *Id.* The French contended that this was legally insufficient to assert criminal jurisdiction. The court reserved its opinion on the correctness of that conclusion. *Id.*

127. *Id.* A ship is "assimilated" into the territory of the nation whose flag it flies. *Id.*

128. *Id.*

the offense, and more especially its effects, have taken place.”¹²⁹

The court's holding, therefore, will allow a state to claim jurisdiction over acts which occur outside its own territory if any constituent part of the illegal activity or its effects invade the state's territory.

2. Extraterritorial application of United States antitrust laws

The theory applied in *The Lotus* was subsequently restated by a federal court in *United States v. Aluminum Co. of America (Alcoa)*.¹³⁰ In *Alcoa*, the government challenged various agreements Alcoa had with European aluminum manufacturers and European corporations which allegedly violated United States antitrust laws. One of the questions presented to the court was whether United States antitrust laws apply to a foreign corporation which did no business in the United States.¹³¹ The court accepted the United States' view, which it thought consonant with international law, that a state may attach liability for actions occurring wholly outside its boundaries when the effects of those actions occur within.¹³² This theory is more widely known as the “objective theory” of territorial jurisdiction.¹³³

The objective theory of territorial jurisdiction allows a state to hold parties liable for their violations which are commenced abroad but consummated within its territory.¹³⁴ The application of municipal antitrust law to foreign persons and activities was necessitated by the increase in the number of multinational corporations.¹³⁵ According to the United States Justice Department, antitrust laws are designed to include foreign activity “to prevent national boundaries from providing a haven from which Americans may flout laws designed to protect our domestic competition.”¹³⁶ If a strictly territo-

129. *Id.*

130. 148 F.2d 416 (2d Cir. 1945).

131. *Id.* at 443.

132. *Id.* at 444.

133. Jennings, *Extraterritorial Jurisdiction and the United States Antitrust Laws*, 33 BRIT. Y.B. INT'L L. 146, 156 (1957). See generally Comment, *The Expanding Extraterritorial Jurisdiction of the Sherman Antitrust Act: Intent and Effects in the Balance?*, 6 LOY. L.A. INT'L & COMP. L.J. 463 (1983).

134. Shenefield, *The Perspective of the U.S. Department of Justice*, in PERSPECTIVES ON THE EXTRATERRITORIAL APPLICATION OF THE U.S. ANTITRUST AND OTHER LAWS 16 (J. Griffin ed. 1979).

135. Jennings, *supra* note 133, at 146-47.

136. Shenefield, *supra* note 134, at 13.

rial view were followed, the antitrust laws would probably fail to protect a vital American interest, i.e., free competition.¹³⁷ The tremendous impact multinational organizations have on a single nation's economy underscores the need for an enforcement tool which can be used wherever the violation occurs.¹³⁸

Another justification for extraterritorial application of antitrust laws is the lack of international regulation.¹³⁹ As stated by one Justice Department official:

[s]ignificant differences in local political and economic philosophies, and the lack of an effective international administrative mechanism, preclude, for the foreseeable future, the development of supranational regulation. . . . But for the present, *individual countries have no choice but to utilize their municipal law to attempt to control those external arrangements directly threatening to their domestic economies.*¹⁴⁰

The justification for using municipal antitrust laws directly parallels remote sensing concerns. States could use municipal legislation aimed at protecting themselves and their citizens as much as possible from the negative effects of remote sensing. Many states have laws that, for example, protect the right of a landowner from having his property surveyed or his unique objects photographed without his permission, or his privacy invaded.¹⁴¹ A state could exercise its police power and attach liability, civil or criminal, to behavior which violates such rights.

3. Analogous United States cases

The American theory of jurisdiction to control behavior abroad which is not controlled by international convention is not restricted to antitrust law. In other areas which are considered vital, statutes are often given extraterritorial application.¹⁴² For example, in *Ford v. United States*,¹⁴³ rum smugglers were charged with conspiring to illegally import liquor into the United States. Two of the accused smugglers objected, arguing that they could not be convicted be-

137. *Id.*; Jennings, *supra* note 133, at 146.

138. Shenefield, *supra* note 134, at 13.

139. *Id.* at 14.

140. *Id.* (emphasis added).

141. See *supra* text accompanying notes 103-06.

142. For a discussion of this topic, see generally Weir, *supra* note 5, at 88-98.

143. 273 U.S. 593 (1926). The basis for this type of assertion of jurisdiction is actually quite old in United States law. See, e.g., *Strassheim v. Daily*, 221 U.S. 280, 284-85 (1910).

cause neither was present in the United States during the term of the conspiracy.¹⁴⁴ The Court rejected this argument on the ground that additional co-conspirators were present within United States territory.¹⁴⁵ This fact put the conspiracy within the United States' jurisdiction, notwithstanding the fact that neither of these two defendants had set foot on American soil.¹⁴⁶

The district court in *United States v. Rodriguez*¹⁴⁷ found a jurisdictional basis for the prosecution of foreign nationals who had conspired to violate United States immigration laws.¹⁴⁸ All of the alleged acts took place in foreign territory; nonetheless, the court concluded that Congress intended to reach this type of conspiracy.¹⁴⁹ Furthermore, the court concluded that the United States had the "power to try an alien for a crime committed abroad."¹⁵⁰

In *Rivard v. United States*,¹⁵¹ the appellant was charged with conspiracy to smuggle heroin into the United States.¹⁵² The Fifth Circuit stated the issue before it as follows:

[t]he first question we are called upon to decide is whether the District Court had jurisdiction to try an alien for a conspiracy . . . formed without the United States, several of the overt acts having been committed within the United States by a co-conspirator.¹⁵³

Applying the objective territorial principle,¹⁵⁴ the Fifth Circuit held that the district court had jurisdiction over an alien not present in the United States at the time of the offense.¹⁵⁵ The court stressed that Rivard, the absent co-conspirator, had intentionally sent others into the United States while he remained in another country, and that the conspiracy was directed toward violating United States law.¹⁵⁶

These cases aside, there are limits to extraterritorial application

144. 273 U.S. at 619-20.

145. *Id.* at 624.

146. *Id.*

147. 182 F. Supp. 479 (S.D. Cal. 1960).

148. *Id.* at 493-94.

149. *Id.* at 491.

150. *Id.* at 493.

151. 375 F.2d 882 (5th Cir. 1967).

152. *Id.* at 884.

153. *Id.* at 886.

154. *Id.* at 886-87.

155. *Id.*

156. *Id.* at 886.

of United States law.¹⁵⁷ In the *Timberlane* case, the Ninth Circuit held that at some point the interest of the United States became too weak to justify jurisdiction when balanced against the discord created overseas.¹⁵⁸ At that point, the domestic court should dismiss the action.¹⁵⁹

C. *A Model for the Control of Remote Sensing*

How do the foregoing examples provide a model for states who wish to control remote sensing from outer space? Put simply, states could make the unauthorized acquisition, transfer or use of remote sensing data a violation of their municipal law. This remedy might seem useless in that a smaller Third World state does not have the enforcement capabilities of a superpower such as the United States. Nevertheless, several factors may make this approach feasible. First, the nature of the parties which are actively remote sensing will change in the near future from governmental to private entities such as corporations.¹⁶⁰ Second, private industry is the single largest user of remote sensing data; the most frequent private user is the petroleum industry.¹⁶¹

Two municipal law formulae could use this trend toward private use and ownership to the state's advantage. A state could attach liability, civil or criminal, to unauthorized remote sensing activity. Of course, making the acquisition of data illegal may have little effect on those companies which never physically enter the sensed state and therefore never become subject to the state's enforcement jurisdiction. In all of the previously discussed cases, the United States had physical custody of the defendants.¹⁶² The question that arises is whether the purchasers of remote sensing data would be willing to use it if to do so they must (1) violate the law of the state

157. See, e.g., *United States v. Mitchell*, 553 F.2d 996, 1002-03 (5th Cir. 1977) (where activity was legal in foreign state, no application of United States law was intended by Congress); *El Cid, Ltd. v. New Jersey Zinc Co.*, 551 F. Supp. 626, 629-31 (S.D.N.Y. 1982) (where effect on United States of alleged violation of Sherman Antitrust Act would be de minimis, there is no jurisdiction); *Timberlane Lumber Co. v. Bank of Am., Nat'l Trust & Sav. Ass'n*, 549 F.2d 597 (9th Cir. 1976).

158. *Timberlane*, 549 F.2d at 609.

159. *Id.* at 615.

160. Marsh, *Landsat Extension to Rest on Private Sector Support*, AVIATION WK. & SPACE TECH., July 27, 1981, at 26. The prime contenders to purchase the U.S. Landsat system were Comsat General Corp., Ittek Corp., Terra-Mar and Hughes Aircraft. *Id.*

161. Weir, *supra* note 5, at 84.

162. See *supra* text accompanying notes 143, 147 & 151.

whose territory is being sensed; and (2) submit themselves to the enforcement jurisdiction of the state to utilize the information purchased? If a petroleum corporation (Petro Corp.), for example, were to discover signs of oil in a given state, the criminal or civil liability it would incur in either actually remote sensing or buying the data from a remote sensing company may effectively preclude any further development.¹⁶³ Merely purchasing the data would be a crime if it was considered a conspiracy to violate the remote sensing restrictions, because, under *Ford v. United States*, Petro Corp. would be criminally liable for the acts of the actual data acquisition done by the absent defendant.¹⁶⁴

Another control structure may be more beneficial to the sensed state. Because a state may be disadvantaged if large multinational corporations know more about the state's natural resources than the state itself does, the state could require disclosure of all material data which the corporation relied upon in deciding whether to complete a transaction within the state. In the petroleum example above, assume Petro Corp. used remote sensing data to identify potential oil deposits within state *A*. Petro Corp. is obligated to purchase some kind of mineral extraction right in order to use this information. State *A* could require Petro Corp. to turn over to it, or require the party with whom Petro Corp. is contracting to disclose, all of the remote sensing data Petro Corp. possesses concerning the purchase of mineral rights. Both parties to the contract would then be in equal bargaining positions and neither could complain later about unfair access to information.

As possible sanctions, there are the ordinary criminal statutes, although civil remedies may actually work better. If a corporation is found to have used undisclosed remote sensing data, this could work a forfeiture of any and all contract or property rights acquired and any improvements made in reliance upon them. If two years later Petro Corp. is found to have not disclosed remote sensing data to its grantor or optioner, it would lose both the grant or option it purchased as well as any oil wells, structures or other improvements it had made. This sanction, of course, could be applied, based upon the discussion above, even if the data is only used in a foreign

163. The United States Government has adopted this view as part of its justification for unfettered dissemination of geological information. It reasons that geological data, no matter how detailed, is useless without the right to develop the surveyed land. Wier, *supra* note 5, at 99-100.

164. See *supra* text accompanying notes 143-46.

country.¹⁶⁵

Neither concept, required disclosure or forfeiture for failure to comply with statutes, is alien to United States law. For example, in securities transactions, disclosure of all material facts is mandated by the Securities and Exchange Commission's Rule 10b-5.¹⁶⁶ Under Rule 10b-5, all untrue statements as well as any material omissions made in connection with a securities transaction are illegal.¹⁶⁷ A material fact is one which, under the circumstances, is necessary to make any statement made not misleading.¹⁶⁸ This rule furthers Congress' intent to put all investors on an equal footing with respect to investment information.¹⁶⁹ A sensed state that fears an imbalance of knowledge concerning natural resources could use a similarly constructed statute to compel disclosure of any remotely sensed data before it can be used.

The use of forfeiture as a deterrent to misconduct has also been used in the United States. California has a statute which bars a building contractor from maintaining an action for services performed while unlicensed.¹⁷⁰ The practical effect of the statute is to work a forfeiture of the builder's services and material.¹⁷¹ The underlying rationale is one of deterrence, stressing protection of the buying public even at the cost of great inequity in some circumstances.¹⁷²

A sensed state could similarly require compliance with its disclosure requirements or even non-use of remote sensing data with a threat of forfeiture. The risk that all capital improvements and purchase payments might be forfeited for non-compliance would be a substantial deterrent to corporations which must develop resources before profiting from them.

165. See *supra* text accompanying note 129.

166. 17 C.F.R. § 240.10b-5 (1983).

167. *Id.* § 240.10b-5(b).

168. *Id.*

169. *S.E.C. v. Texas Gulf Sulphur Co.*, 401 F.2d 833, 851-52 (2d Cir. 1968).

170. CAL. BUS. & PROF. CODE § 7031 (West 1975).

171. *Lewis & Queen v. N.M. Ball & Sons*, 48 Cal. 2d 141, 150, 308 P.2d 713, 719 (1957).

172. *Id.* at 150-51, 308 P.2d at 719.

As an alternative to this proposed model for the control of remote sensing, see generally Comment, *Remote Sensing of the Earth from Outer Space: Considerations Toward Development of a Functional International Regime*, 2 LOY. L.A. INT'L & COMP. L.J. 157 (1979) (argues for control of remote sensing by the United Nations).

V. CONCLUSION

The ongoing legal debate surrounding remote sensing reflects the rapid growth of technology in this century. Remote sensing issues are but a small sample of issues which will arise more and more frequently as the process of shrinking the world by technological advancement continues. The remedy offered above may not be best suited to a world in need of ready access to natural resources, but it is based upon a concept, sovereignty, which is today still at the heart of international law. Any system for controlling remote sensing, whether achieved through United Nations deliberations or bilaterally, will have to take this factor into account. A state's claim to sovereignty must shrink as the world does in order to accommodate the needs of mankind as a whole, especially in combatting worldwide problems such as hunger, drought and pollution, the types of problems with which remote sensing is best able to deal. Therefore, any eventual international regime should attempt to maximize the use of remote sensing for the benefit of all mankind, taking away the need for the remedial domestic legislation proposed above.

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