

**The Legal Implications of
Remote Sensing in Outer Space
on National Sovereignty**

by

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Remote sensing has been defined by the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS) as

A system of methods for identifying the nature and/or determining the conditions of objects on the earth's surface and of phenomena on, below, or above it, by means of observations from airborne or spaceborne platforms.¹

Remote sensing itself is not a new concept; captive balloons were used for this purpose in the French Revolution to observe enemy troop movements,² while throughout this century and through two world wars, aerial reconnaissance has developed into what is now its present state.³ However it is only since the launching of Sputnik I on the 4th October 1957⁴ that space vehicles have been used for the analysis of the planet on which we live. Such satellites, which increase yearly in both number and complexity, are defined as either active or passive;⁵ their uses range from military reconnaissance to cartography and they have the ability to pinpoint anything from forest fires to mineral deposits, to detect and track hurricanes, or even to identify Penguin colonies on Antarctic ice flows.⁶

While much of remote sensing activity is of great benefit to mankind

¹ Matte & deSaussure, *Legal Implications of Remote Sensing from Outer Space*, (1976) 19.

² Taylor, *History of Aviation* (2nd ed, 1975) 22.

³ *Ibid*, 457.

⁴ *Ibid*, 429.

⁵ Active satellites emit radiation and measure the reflected energy, while passive satellites measure the reflected radiation of the sun or the radiation emitted from the surface of the earth. *Supra* at note 1 at 13.

⁶ Porter, *The Versatile Satellite*, (1977).

in general; satellites are open to abuse. Information sensed may be of a sensitive nature, or the activity itself be against the wishes of the sensed state. It is therefore necessary to ask whether any legal controls currently exist on the use of such satellites when they overfly the territory of another state and, if not, should such controls exist?

It has been recognised since the 1919 Paris Convention⁷ and confirmed subsequently by the 1944 Chicago Convention,⁸ that every state has the right to complete and exclusive sovereignty over the airspace above its land areas and territorial sea.⁹ Apart from a few exceptions to this principle¹⁰ a country has the right to prevent any intrusion into its airspace whatsoever, regardless of whether remote sensing was being carried out at the time or not. This point was graphically illustrated in the 1961 U2 incident which involved an American high altitude reconnaissance aircraft which had been shot down by a Soviet missile after which its pilot was tried as a spy. At no stage did the United States ever dispute the Soviet Union's right to prevent the aircraft overflying the land mass of the Soviet Union.¹¹ Numerous other examples demonstrate that intrusions into another state's airspace can be forcibly and legally prevented under International Law.¹²

The position in outer space however, is quite different. Under the Outer Space Treaty 1967,¹³ to which 78 states, including New Zealand,¹⁴ are parties, no territorial claims of sovereignty are recognised. Article 1 of the treaty states that Outer Space '... shall be free for exploration and use of all states ... and that there shall be freedom of scientific investigation'. This is supported by Article 2 which states categorically that Outer Space is not subject to national appropriation by claim of sovereignty by means of use or occupation or by any other means. The result of the Treaty is that a state would be unable to object to remote sensing from outer space on the grounds of infringement of territory as such a concept is not one legally recognised. The initial issue to be determined therefore, is where the boundary is to be drawn between airspace and outer space so that existing legal constraints can be applied.

The upper limits of airspace were never defined in the Chicago Convention, while the Outer Space Treaty neglected to specify the lower limits of Outer Space. This neglect leaves a jurisdictional conflict between air and space law. The debate on the nature and form such a boundary should take has raged since before the so-called 'space race'

⁷ 1919 Convention for the Regulation of Aerial Navigation, Paris.

⁸ 1944 Convention on International Civil Aviation, Chicago.

⁹ McNair, *The Law of the Air* (3rd ed, 1964) 5-6.

¹⁰ *Supra* at note 8, at Article 9.

¹¹ Lissitzyn, *Editorial Comment; Some Legal Implications of the U2 and RB-47 Incidents*, (1962) 56 Am JIL 137.

¹² Lissitzyn, *The Treatment of Aerial Intruders* (1953) 47 Am JIL 559.

¹³ 1967 Treaty on Principles Governing the Activities of States of the Exploration and Use of Outer Space; Including the Moon and Other Celestial Bodies.

¹⁴ Bakotic, "Some Questions (Without Answers) Concerning the Consent of States to be Bound by Treaties Governing Activities in Outer Space" II-SL-14, *The Twenty-Second Colloquium on the Law of Outer Space*, (1979) 93.

even began, but the major participants are still no nearer to consensus on the issue than they were thirty years ago.¹⁵

The many theories that have been proposed as solutions to the problem can be broadly divided into two categories: the first is based upon the functional uses of the spacecraft involved,¹⁶ that is, whether the satellite is a remote sensing or communications satellite; and the spatial approach, whereby it is necessary to define a boundary line between air and outer space.¹⁷

The functionalist approach has largely lost favour since the late 1960s, primarily because as a solution it still ignores the problem of air-outer space differentiation, which for security reasons is in the interest of states to establish.¹⁸ On the other hand, the spatial approach deals with attempts to define the physical boundaries of air space and/or outer space. This definition has spawned theories on the upper limits of air space which range from 32 to 256,000 kilometres above the earth,¹⁹ a diversity which helps to explain the difficulties encountered in gaining an agreement on a acceptable definition.

While to date no theory has managed to achieve universal acceptability, two authors have stated:

we can proceed on the assumption that at some point there is a limit or limits to the extension of terrestrial national sovereignty [into space] and that in time, practical international necessities will lead to a relinquishment of [at least] extreme [national] claims and [thus allow a universal limit to be set].²⁰

Despite this, several major powers, the United States among them, have consistently argued that the establishment of such a boundary is not necessary at the present time lest their freedom in future space programmes be curtailed.²¹

Others argue against the theory of a physical boundary on the basis that the sole necessity for such a dividing line is a consequence of conflicting human objectives²² arising out of a desire for national security.²³ That is, no nations would like to see outer space appropriated by a more technically advanced nation before that nation itself possessed the requisite technology to exploit the same area.

Any solution must be a solution in human terms for what is essen-

¹⁵ Vingradou, "Outer Space Activities and Environmental Protection" II-SL-32, *The Twenty-Second Colloquium on the Law of Outer Space*, (1979) 245.

¹⁶ Cheng, "The Legal Regime of Airspace and Outer Space: The Boundary Problem, Functionalism versus Spatialism: the Major Premises", *Annals of Air and Space Law* Vol V (1980) 323-325.

¹⁷ *Ibid.*

¹⁸ *Ibid.*, 326.

¹⁹ *Supra* at note 9, at 15-18. *Infra* at note 20, at 43-46. B.I.I.C.L., *Current Problems in Space Law, A Symposium*, International Law Series 6, 88-90. *Supra* at note 16, at 351-358. Jasentuliyana and Lee (Ed) *Manual on Space Law* Vol II (1979) 383-387.

²⁰ Lay and Tauberfield, *The Law Relating to Activities of Man in Space* (1970) 51.

²¹ *Supra* at note 16, at 327.

²² Mishra and Pavasek, "On the Lack of Physical Bases for Defining a Boundary" *Annals of Air and Space Law* Vol VII (1982) 399.

²³ *Ibid.*, 413.

tially a human political problem. The present need for a boundary to be quickly established would necessitate an arbitrary line being drawn, below which the regime of airspace would operate, above which — outer space.^{23a}

While difficulties would arise in reaching a consensus over an appropriate altitude for such a boundary; the advantage would be that the altitude would be able to be selected after taking into account the greatest number of interests — this is in contradiction to a physical boundary which by its very nature is unable to take into account the interests which make the boundary essential in the first place.²⁴ If this boundary is recognised from its outset as being a political solution it will be more amenable to revision at a later date at a time when world political interests no longer dictate the need for the boundary.²⁵

At the present time it appears that when a boundary is imposed, it will probably occur below the altitude where most remote sensing takes place. It would follow, therefore, that when such a boundary was introduced a legal regime for remote sensing would fall under the jurisdiction of the Outer Space Treaty 1967.

The question therefore arises whether remote sensing of the earth is an inherently lawful activity in international law when such an activity is conducted in outer space, regardless of whether a boundary has in fact been established. The answer to this question will in turn affect the question of whether a state has any rights of sovereignty over any information sensed in their country by foreign satellites, or even if the sensing state is under any duty to inform the sensed state that such activity is occurring at all.²⁶

In answer to the first question, several writers have argued that remote sensing at its worst, especially in its military context, is a form of espionage.²⁷ If this is the case it is argued as long as the observations are not actually aggressive so as to breach Article 4 of the Outer Space Treaty, remote sensing is inherently lawful on the grounds that in international law spying in peacetime has never been deemed to have been an unlawful act. Rather, espionage has been seen as a matter for municipal control in which states are free to legislate to protect their countries' secrets. In wartime this power is recognised in the Hague Convention 1907 whereby states are given powers under the treaty to try individuals for acts of spying committed against their country.²⁸ However, these same writers hasten to add that when surveillance is taking place from outside a state's jurisdiction, for example on the high seas or in outer

^{23a} Ibid.

²⁴ Ibid.

²⁵ Ibid.

²⁶ de Graaf and Reijnen, "Data Protection in the Technique of Remote Sensing by Satellites" II-SI-23, *The Twenty-Second Colloquium on the Law of Outer Space* (1979) 245.

²⁷ Christol, "Remote Sensing and International Law" *Annals of Air and Space Law* Vol V (1980) 375.

²⁸ Article 30, The Regulations of the Hague 1907 Convention IV.

space, it is not spying and therefore cannot be controlled by the state under observation as a matter of domestic policy. An example of this was the interception and destruction of an American RB-47 reconnaissance aircraft by Soviet Fighters in July 1960 while flying over international waters. It was tacitly recognised by the Soviet Union, albeit after the event, in not trying the surviving crewmembers for espionage — that such observation from beyond territorial airspace was in fact lawful.²⁹ The shortcomings of this approach are underlined by the fact that if there were to be no legal controls upon the extent of remote sensing, nor any means by which a sensed state could exercise its sovereignty above the air-outer space boundary the sensed states would never agree to the establishment of an arbitrary boundary so low that it would deprive them of all control over remote sensing activities. At the same time until a boundary has been finally agreed upon, it cannot be categorically stated that the Outer Space regime exists at the level from which remote sensing activities are conducted, but that rather such activities could arguably still be within the sensed states 'air space'.

An alternative view argues remote sensing is inherently unlawful³⁰ in the absence of a clearly defined boundary and cannot be carried out in the territory of any state unless the consent of that state is first obtained. Therefore any state which has its satellites remotely sense another state's territory is acting against a rule of International Law. The same writers argue that even if a boundary such as has been discussed was to be drawn up, remote sensing would remain unlawful as in their view remote sensing by definition means that it is being conducted from beyond state boundaries.³¹ Furthermore, any remote sensing which is being carried out for military purposes would, in addition to being unlawful on general principles, also violate Article 2 of the Outer Space Treaty. This particular point is disputed by other writers who draw a distinction between 'aggressive' military purposes and passive sensing which is a peaceful use despite its utilisation by the military establishment.³² However this seems a fallacious distinction made in order to contrive justification for military surveillance by satellites under the Outer Space Treaty and a distinction that does not take away the essentially military nature of the sensing.

From these conflicting views over the legal nature of remote sensing it can be seen that there is a need for a set of principles to govern its development. Such principles would have to be interwoven with the need to define a boundary in order to protect the interests of all states as well as take account of state sovereignty and the issue of prior consent to the remote sensing itself.³³

These principles should also determine what aspects of remote sens-

²⁹ *Supra* at note 11, at 139.

³⁰ *Supra* at note 26, at 190–191.

³¹ *Ibid*, 191.

³² Christol, "The International Law of Outer Space" *US Naval War College — International Law Studies*, (1962) 270–272.

³³ *Supra* at note 26, at 191.

ing are acceptable and what should be subject to control, and in addition, should attempt to define the military position of remote sensing. With this in mind such a set of principles has been forwarded by the Legal Sub-Committee of the United Nations Committee on the Peaceful Uses of Outer Space.³⁴ The main object of the draft principles is to identify the lowest common denominator upon which a universal set of principles can be based. While this draft set of 17 principles is at this stage still only a matter of discussion, it is both useful and necessary to examine it to gain some idea of the future direction of international law on the question of remote sensing.

Principle I attempts to define Remote Sensing as relating to the "sensing of the natural resources of the earth and its environment". This definition does not, therefore, include sensing for military purposes, as the remote sensing of secret military installations is unlikely to be defined as being part of the natural resources of the earth. Thus, it may be inferred, that at this stage it is likely that the remaining principles have no effect on sensing for military purposes and that there would be no change in the present legal status, that of the inherent unlawfulness, of such sensing. This definition is still subject to change, however, as several of the delegations to the Legal Sub-Committee favoured a wider meaning of remote sensing of the earth and its environment which might encompass military sensing.³⁵

Principle I further draws a distinction between the 'primary data', or the data as it has been sensed, and the 'analysed information', the end product of the primary data after analysis to determine what it actually means.

Principle II establishes that remote sensing may be carried out for the benefit of all countries irrespective of their degree of development, while taking into consideration the particular needs of developing countries. Whether or not this would be a mandatory or merely a guiding principle has also yet to be decided. It has been noted that such an approach goes against the 1967 Outer Space Treaty which requires that all states be treated alike in the exploration and use of outer space irrespective of their degree of economic or scientific development and therefore along with Principle X conflicts with Principle III which states that nations shall conduct remote sensing in accordance with international law, the United Nations Charter and the Outer Space Treaty.³⁶ It is probable therefore that Principle II is intended as a specific exception to the general provisions of the Outer Space Treaty and as such is applicable to the remote sensing situation only.

The aim of Principle IV is to promote international cooperation by allowing sensed states (among others) to share in sensing programmes with the sensed state. Another aspect of this is the promotion of shared ground facilities such as was seen in the Landsat programme where

³⁴ *Supra* at note 27, at 421-425.

³⁵ *Ibid*, 384-385.

³⁶ *Ibid*, 404.

several ground stations were constructed in states outside of the United States to receive sensed data.³⁷ This concept is extended by Principle VI which seeks to make available technical assistance, arising from the sensing activities, to interested states in a manner consistent with the earlier provisions of the Outer Space Treaty.

Principle V attempts to impose an environmental conservation measure on remote sensing states to ensure that the natural environment of the earth is not disrupted by sensing activities. This principle is also consistent with Articles 9 and 11 of the Outer Space Treaty which provide for similar measures to protect the natural environment of the earth. Most sensing methods used today would not be a danger to the earth's environment; instead, it is the satellites themselves that can provide the most obvious threat. This was demonstrated in 1977 when the Soviet Cosmos 954 satellite crashed in Canada after re-entering the earth's atmosphere and in so doing spread radioactive waste material from its on-board reactor over 28000 square kilometres.³⁸

Thus this principle attempts to imply an onus on sensing states to give information to relevant parties if there is any danger of one of their satellites affecting the natural environment of the earth. Similarly, when the principle is read in conjunction with Article 5 of the Outer Space Treaty it also implies that should a sensing state discover a phenomena in outer space which could affect the earth, they are to report it immediately so that the concerned states can take the relevant steps to minimise the danger.³⁹

The seventh principle allows for the United Nations to play an important part in the development of remote sensing in promoting international co-operation and co-ordinating remote sensing activities. Paragraph (2) of the principle also states that remote sensing states should notify the Secretary-General of the United Nations, in compliance with Article II that such activities are being carried out. It is this principle, in establishing that United Nations interests in the field of remote sensing exist, that can be used as a basis for an International Agency for governing the development of remote sensing.

Principle VIII is primarily the establishment of a mechanism by which remote sensing states are under an obligation to disclose promptly any information relevant to an impending natural disaster. While "Natural Disaster" has not as yet been defined, the principle would probably take effect in situations where the sensing state has obtained advance information, either from raw or analysed data, that a disaster is likely to occur. Examples of such could include earthquakes, tidal waves, hurricanes or even advance warning of impending crop failure. If this principle were properly applied the resulting forewarning would be one of the greatest benefits from remote sensing for the world at large.

³⁷ *Supra* at note 6, at 94-95.

³⁸ Heaps, *Operation Morning Light — Cosmos 954* (1978).

³⁹ *Supra* at note 27, at 405.

The ninth principle is a contentious issue at the present time for in taking into account the effect of principles II and III it states that remotely sensed data should be used by states in a manner compatible with the legitimate rights and interests of other states. The extent of "national rights and interests" attracts little consensus; sensed states can argue their legitimate sovereignty over satellites above their airspace, while, on the other hand, sensing states can hold that such a principle allows a continuation of remote sensing without restriction.

Principle X is an extension of Principle IX, and states that remote sensing states or organisations 'shall' or 'should' be prepared to make relevant technical information on sensing operations available to the United Nations and any other interested nations particularly the developing countries. The effect of the provision is limited however by the words "which they are free to disclose", which means that sensing states are in actual fact under no obligation to give any information which for any reason they are unwilling to give. Such a loophole is another hindrance to the establishment of an effective legal regime for remote sensing.

Principle XI is also the source of much debate at the present time. The basic meaning of the principle is that states should bear responsibility for remote sensing activities regardless of whether the remote sensing is being carried out by either a governmental or non-governmental agency, and, thus, ensure that all of the principles are being complied with. This principle is probably the result of a very real fear that many states have of the United States' attempts to open up outer space to commercial interests.⁴⁰ States not only fear the prospect of paying exorbitant sums for essential remote sensing data but are also wary of the discrimination of sensitive data when the sensing organisation is motivated by profit. This could lead to the disuse of expensive ground stations which were set up to receive the Landsat data⁴¹ if and when the commercial space agencies moved to monopolise the data to make their operations commercially viable. Additionally there is a danger that such data could tend to fall into the hands of the highest bidder which could in turn lead to the exploitation of the poorer nations.⁴² This would be in violation of the spirit of some of the other principles, especially IX, X and XII. Furthermore, there is a need for international responsibility in the event of a disaster, such as the re-entry of Skylab in 1979, caused directly or indirectly from remote sensing. Principle XI is thus an attempt to maintain some sort of governmental responsibility in remote sensing activities whether they are directly involved in the sensing or not.

Principle XII gives the sensed data the right to 'timely' and non-discriminatory access to primary data obtained by remote sensing. The

⁴⁰ Logsdon and Monk, "Remote Sensing from Space", *Annals of Air and Space Law* Vol VIII (1983) 409.

⁴¹ *Ibid*, 420-421.

⁴² *Ibid*, 418-419.

effect of such a principle would be to alleviate the 'information lag' problem, whereby the slowness of obtaining the data which has been sensed, especially in the discovery of new natural resources, has often been the primary objection many states have to remote sensing. Such a principle would be in line with Principles IX and X to give a better understanding of the legal rights of the sensed state — in this case the right of access to sensed data. However, at the present time it is still open to review, especially as regards whether the access to the data should be by right or as the result of an express agreement between the sensing and sensed states,⁴³ or whether analysed information should also be subject to Principle XII. There is also considerable discussion as to whether sensed states have the right to such data ahead of third states; in the opinion of some writers such a right is seen by them as an extension of territorial sovereignty into outer space.⁴⁴ However, there would have to be such a right of access if the 'information lag' problem is to be realistically overcome to the satisfaction of the sensed states.

The thirteenth principle has at the present time received no consensus at all from interested parties. The principle essentially consists of an obligation upon the sensing states to notify both the sensed state and the United Nations of all facts pertaining to the flight, including nature, direction and duration. This requirement has therefore been seen in some quarters as an unnecessary restriction to the free use of outer space while conversely other interests have argued that such a principle aids in the defining of a legal regime for remote sensing and is a necessary protection for the rights of the sensed states. The effect of Principle XIII is reinforced by Principle XIV which provides that if notification of sensing activities has not been given, then the sensed state can consult with the sensing state about the nature of the sensing and the discrimination of such data in order to promote 'friendly relations' and 'mutual benefits' between the sensing and sensed states. Such a principle is probably an attempt to calm the indignation of a sensed state who discovers that they have been sensed without any advance notification or knowledge of the sensing, and therefore, provides a loophole if Principle XIII is not complied with.

Principle XV sets out to limit the right of remote sensing states to disseminate or dispose of sensed data to states or organisations without the permission of the sensed state. When this is coupled with Principle XII and the provisions of Principle XVI which state that remote sensing:

... should be conducted with respect for the principle of full and permanent sovereignty of all states and people over their own wealth and natural resources ... giving them the inalienable right to dispose of their natural resources and the information concerning those resources.

The effect of this is to establish a fundamental principle of state sovereignty over data which has been sensed from the state.⁴⁵ This prin-

⁴³ *Supra* at note 27, at 406.

⁴⁴ *Ibid.*, 413.

⁴⁵ *Ibid.*, 412-414.

principle has been criticised as being inconsistent with Article 1 and 2 of the Outer Space Treaty, as both limiting the freedom of space exploration and specifically violating the non-appropriation of space rule in Article 2. Furthermore, such a principle would also be contrary to the principle that remote sensing is alien to sensing from the high seas which is recognised as being beyond a state's sovereign jurisdiction in international law.⁴⁶ The result is that modifications will be necessary to both Principles XV and XVI before they will gain widespread acceptance among the Space-Faring Nations.

The final principle, Principle XVII promotes the concept of disputes resolution procedure to hear matters relating to remote sensing, primarily by consultation, but if that is not successful, then the parties to the dispute would refer it to a mutually agreed adjudicating body such as the International Court of Justice. The need for such a principle is readily apparent to all parties but the final nature of the resolution procedure cannot be finalised until such time as the substance of the remainder of the other principles has been agreed to.⁴⁷

These principles, even if they were adopted immediately, would not wholly solve the problems facing the legal status of remote sensing from outer space. There are still too many vagaries in the legal definitions to ensure that a satisfactory legal regime would be created if the principles were adopted. They would, however, form a basis for the development of a future legal regime as it is no longer satisfactory for states to continue to avoid a definition of the legal rights and duties inherent in remote sensing with arguments that the existing legal regime is adequate.

The first step remains the effective delineation of the air/outer space boundary and this problem should be given a high priority until such time as it is resolved. After this has been achieved then there is a need for a complete set of legal principles to control and guide the future development of remote sensing. These principles can be based on the 1979 draft principles discussed. The weaknesses of the original draft principles, especially in its toleration of non compliance reflects the inherent and fundamental flaw in modern international law that a strong set of rules is conditional upon the willingness of an overwhelming majority of nations to be bound by them. Consequently if such rules are not seen to be in the national interests of states, particularly those engaged in remote sensing activities, such consent to strong legal rules will not be forthcoming. There remains no easy solution to this particular problem, but the most workable answer would be to establish an independent international organisation which would have the necessary power invested in it to control effectively and impartially, the legal regime for remote sensing, without unnecessary restriction on the freedom of peaceful access to space. This solution is one of the few

⁴⁶ *Supra* at note 32, at 293.

⁴⁷ *Supra* at note 27, at 411.

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available which can eliminate the division and dissent, so often motivated by vested interests which has plagued this aspect of space law since its inception.