Remote Sensing : Capabilities And Legal Issues

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ABSTRACT

Principle 1(a) of United Nation Principles Relating to Remote Sensing of the Earth From Space defined the term 'Remote Sensing' as the sensing of the earth's surface from space by making use of the properties of electromagnetic waves emitted, reflected or diffracted by the sensed objects, for the purpose of improving natural resources management, land use and the protection of environment need.

Many areas of human activity have benefited from sensing activities: monitoring of the global environment, archeologists to address issues in human settlement, environmental interaction and climate change, the monitoring of agricultural growth patens and diseases and not forgetting, the military activities.

Remote sensing activities have impact on the global space market, which includes satellite manufacturing, satellite data and data distribution, processing and interpretation services.

There are question to be answered. Can a country invoke Exclusive State jurisdiction in order to prevent to limit remote sensing of its territory by a foreign satellite? Can the information be itself regarded as a natural resource over which it has sovereignty? Who shall have the control over the dissemination of information gathered by satellite? Whether prior permission of the sensed state would be required in cases of such remote sensing of another state? Does 'interference' include to provision of information and ideas to or the desire to seek information about, any other state?

Arguably, the United Nations Principles Relating to Remote Sensing of the Earth from Space are imperfect and do not offer much solution to the legal issues.

INTRODUCTION

The term 'remote sensing' is not yet a household word, but it may soon be. As a species, we have been literally blind to the universe around us. Socrates once said "man must rise above the Earth to the top of the atmosphere and beyond, for only thus will he fully understand the world in which he lives"[1]. Remote Sensing is the observation of an object from a distance. It involves an activity we all have engaged in – taking photographs – with two twists[2]. First, in place of a camera, remote sensing has traditionally involved the use of mirror-like sensors to "photograph"

particular images in a digital format. Second, the sensors are housed on board a satellite that is usually placed on a low polar orbit so that it may vertically scan the Earth while the Earth is revolving around its axis. Simply put, remote sensing is the technology for taking photographs of the Earth from outer space. The United Nations defined the term "remote sensing" as the sensing of the Earth's surface from space by making use of the properties electromagnetic waves emitted, reflected or diffracted by the sensed objects, for the purpose of improving natural resources management, land use and the protection of the environment.[3]

Many areas of human activity have benefited from remote sensing activities in the past few years. Few uses of space have helped man more directly and immediately than has monitoring of the global environment – air, land and sea. Satellite weather photographs are not only featured on the rightly news but such satellite data is an essential component of our global weather forecasting capability. It has been an important contributor to increasingly reliable weather forecasts for periods up to several days or more. By monitoring weather at sea, satellites improve forecasts of hurricanes and other severe storms, significantly reducing their damage and saving lives.

Much of human history can be traced through the impacts of human actions upon the environment. The use of remote sensing technology offers the archeologist the opportunity to detect these impacts which are often invisible to the naked eye. This information can be used to address issues in human settlement, environmental interaction and climate change.

The unique perspective of space has also expanded mankind's sense of oneness with each other and with our fragile planet. Satellite photographs of the terrestrial surface have revealed the enormous global pace of deforestation and urbanization and the degree to which grazing and agricultural practices can hasten desertification and related economic losses. They have also permitted the monitoring of agricultural growth patterns and diseases, the movement of glaciers, the extent of snow pack and probable spring runoff, pollutant levels in the atmosphere, waterways and even the evolution of plankton blooms at sea which affect the population and migration of fish.

Nevertheless, as has been pointed out "the most obvious example of a remote sensor and closest to man is his eyes. The eyes visually sense information from the world around us".[4] There in nutshell is the problem before us. We only have to compare the advantages enjoyed by a person endowed with eyesight and good hearing with the disabilities of a person deprived of them, or the advantages of a person being able to enhance his eyesight and hearing with optical, electronic and other means, such as binoculars, telescopes, radars, infra-red cameras, and ultra-sensitive microphones, with the handicaps of his rivals who do not have the same facilities. At the same time, we should also think of the many ways and devices people resort to in order to prevent themselves, their property or what they may be doing from being seen or heard by others, and the length to which they may go in doing so. Curtains, gates, fences, walls, guards, prohibited arrears, lead-lined rooms and so forth. In addition, we have laws that protect privacy,

intellectual and industrial property, official secrets, as well as laws against trespass, nuisance, peeping Toms and espionage, whether industrial, political or military.[5]

SCOPE OF THIS PAPER

In this brief paper, we will first look into the capabilities of the "remote sensing satellites" both in terms of technological and economical. The second part of this paper shall discuss the position of the "remote sensing satellites" from the eyes of the international law especially the legal principles of the United Nations.

PART 1 : REMOTE SENSING –CAPABILITIES

Technological

There are three primary advantages to observing Earth from space : coverage, costs and repeatability. Satellites travelling seven km per second around the Earth at altitudes of hundreds of kilometers to 1,000 km or more can map 20,000 km per second, roughly 2,000 times more than can be accomplished by high-flying aircraft. Moreover, such satellites can map the entire globe twice per day, including vast expenses of ocean and polar regions. Geostationary satellites, hovering over a single point on Earth, can repeat observations within much of a hemisphere at any desired interval, from minutes to days or more.[6]

The costs advantage for satellites stems principally from these enormous coverage capabilities. Although satellites have a high initial cost, once launched they can provide continual global coverage without major additional effort. Thus the coverage advantage of satellites relative to aircraft or other alternatives more than outweights the fact that space-born instruments are several times expansive than those on Earth, ships, or aircraft, a satellite, also requires little or no additional fuel after launch and some can last for decades.

The advantage of timeliness is most apparent when observing severe storms or other fast-changing phenomena. No other approach is feasible, particularly when the phenomena are in remote regions or very large. Transient events such as volcanoes, pollution episodes, and icebergs demand continuous monitoring if they are to be studied at all.

Looking back, the practice of earth sensing from the air long predates the advent of space technology, having begun in the second half of the nineteenth century with manned balloons equipped with cameras. Early in the twentieth century the advent of powered flight and improvements in photography brought about a tremendous change in the art of aerial surveying of the earth.[7]

During the course of World War 1, surveying techniques were implemented by the military to secure significant tactical advantages. Between the World Wars use of aerial photography diminished, though some attempts were made to apply the new techniques for cartography and geologic reconnaissance.

World War II affected remote sensing in two principle ways. First, the intensive use of aerial photography gave the practice a legitimacy and demonstrated its obvious potential. Second, rockets developed for military purposes were used after the war to obtain very high altitude photographs. Some imaginary revealed the significant advantages of high altitudes.

The advent of space technology triggered the beginning of a new era in earth-surveying techniques. Remote sensing of the earth has been defined by some as a methodology to assist in characterising the nature and conditions of natural resources, natural features and phenomena, and the environment of the earth by means of observation and measurements from space platforms. It is worthy of note that aircraft remain an important and indispensable instrument for remote sensing. However, since aircraft operate from fairly low altitudes and cannot remain in flight for prolonged periods of time, they can only cover a limited area and cannot easily offer a continuos view of the surface covered.

Technically speaking, remote sensing is the observation of a target by means of a devise known as a sensor which is separated from the target by a given distance. The concept is predicated on the collection of data from which the analysis of different radiation's of the electromagnetic spectrum may be made. The target, which is a portion of the earth's surface, emits radiation by reflection which is measured by the sensors of the remote sensing system. Remote sensing technology thus requires four elements : the radiation source, the transmission path of the radiation signals, the target to be monitored and the sensor.

In sum, the system involves the measurements of electromagnetic radiation in various spectral bands, identifying and quantifying objects or patterns of the earth's surface in the visible infra-red and microwave range.

It would be incorrect, however, to assume that the mere collection of the data itself constitutes the entire role of remote sensing from space. Rather, it is a synergistic system whereby data is collected by various sensors which sample the radiation flux in different portions of the electromagnetic spectrum. This data is then processed and analysed to produce information used as the basis for management decisions or scientific investigation.

The first earth observation satellite, the TIROS-I, was launched by the National Aeronautics and Space Administration (NASA) on 1 April 1960. Remote sensing by spacecraft of natural and human resources was initiated by the American Landsat system. In 1977, the United States launched its first earth resources technology satellite (ERTS). Renamed Landsat-1, it was followed in 1975 by Landsat-2 and Landsat-3 by 1978. A fourth remote sensing satellite, Lansat-D (renamed Landsat-4 after launch) was launched in the third quarter of 1982 as part of the space shuttle program.

The raw data collected by Lansat satellites is received by ground stations in the United Sates, Canada, Italy, Brazil, Sweden, Japan, and Argentina. The Landsat system is open to individuals, states and foreign institutions. Information is available at the predetermined cost from the various receiving stations.

Internationalization of Remote Sensing by Satellites

In view of the fact that it is mainly, the concept of State sovereignty that has prevented and still prevents the establishment of legal instrument relating to remote sensing by satellites, many endeavors have been undertaken to internationalize remote sensing by satellites. The idea is to create an international remote sensing centre whose task it would be to conduct remote sensing programmes on a regional, not necessary national, scale.

From the legal point of view such a centre would, when under UN auspices, be entirely in accordance with existing space legal rules. It would also increase the efficiency of the various functions of remote sensing by satellites system on a global scale. On the other hand, it is argued that centralization will increase the dependence of technologically developing countries on the technology of technologically developed countries, in particular in regard to scientific and intellectual attitudes.

Remote Sensing Satellites For Military Use

One important point that has to be pointed out is that it is widely recognised today that military use of outer space is fundamental to one national security. Numerous space systems, such as those for navigation, whether forecasting , communications, mapping, geodetic measurement, nuclear explosion detection and monitoring ballistic missile early warning, photo reconnaissance and surveillance, are considered "force multipliers" which support and enhance military operations. The military communications satellite usage generally falls into three categories : (1) command and control of strategic forces; (2) secure voice and wideband , high capacity communications supporting the intelligence community, major headquarters and the National Command Authority; and (3) beyond-the-horizon communications between mobile forces and their command structure.[8]

It is a general practice in all countries the world over that no details of military space missions are made public. The importance of remote sensing from space can be derived from the fact that the first military satellites launched by the US, USSR and China, were remote sensing missions.

In the United States for example, a total of 1036 satellites have been launched till the end of 1980.[9] Of these, 590 were primarily civilian in nature and 446 or 43 percent were primarily military in nature. Of the latter category, 363 had mission objectives in the general field of remote sensing, such as photographic and tv reconnaissance (231 satellites), electronic reconnaissance (ELINT, from Electronic INTelligence) or "ferret" (81 satellites), early warning systems (39 satellites) and ocean surveillance (12 satellites). The first military US satellite was launched in February 1959, less than one and a half year after Sputnik 1 and just over one year after the first US Satellite Explorer 1.

Economic

Today, next to the telecommunications market, remote sensing and Geographical Information System (GIS) may be amongst of the most significant commercial applications in the space industry.[10] With the launch of 20 new remote sensing satellites expected by the year 2002, capacity for data collection will increase dramatically. The new systems will include sensor technology that will provide users with the option of resolutions down to one meter. This will be combined with other factors driving the industry, including the increase in cost-effective computing power and data compression capability as well as related increase in sophistication of applications adapted to specific user needs and more user-friendly software.

The impact of remote sensing activities on various segments of the global space market may be estimated as follows[11] :

i. US$580-620 million a year for satellite manufacturing, including both meteorological and remote sensing spacecraft and payloads;
ii. US$230-250 million a year for satellite launches, funded by the space agencies;
iii. US$60 million a year for sales of raw data used ,costly for commercial purposes and priced in a number of ways, ranging from the marginal cost of reproduction to a price reflecting a steady transfer of the operating cost to users and, in the longer term, the cost of satellite system renewal;
iv. US$280-300 million a year for manufacturing ground equipment for receiving, storing and processing satellite data; and
v. US$830-850 million a year for remote sensing data distribution, processing and interpretation services, and the sale of value-added products and services, essentially by private companies to primarily public, semi-public and cooperative organisations concerned with pollution control, agricultural, utilities infrastructure, urban planning, zoning and water management.

Geographical Information System (GIS) is a tool for assessing, integrating and distribution large spatially – referenced sets of data. With its capability of combining data derived from multiple sources – satellite imagery, digitised maps, census bureau data, soil composition, vegetation, types of water supply, etc – in order to present an overall picture of the situation in the certain area. GIS became an extremely valuable instrument for numerous applications ranging from business and market analyses to disaster management planning and from environmental monitoring to urban development.

Originally, use of GIS was limited to governments, universities and large companies that could afford the infrastructure which included expensive and sophisticated software, hardware and researches and trained technicians. As the technology has advanced, off-the-shelf software for personal computers has opened access to the GIS market to a variety of new users, mostly small and medium sized companies all over the world. Fuelled by the growing demand for GIS services and software, this market could reach a level of US5 billion in sales by the year 2000.

Remote sensing offers a reliable method for assessing the economic resources of a sensed state and is of crucial interest to developing countries. The evolution of strategies for national development on the part of developing countries sheds light on the economic possibilities of remote sensing. After decades of international efforts, the economic development of the third world states is still in need of advancement. Over population, high unemployment and serious balance payment deficits remain. This has led the governments of many developing countries to shift their economic policies in favour of natural resource development. Crucial to the success of this strategy is the establishment of an accurate inventory of untapped resources. Remote sensing can assist in the pursuit of this goal by providing needed information inexpensively and rapidly.

At the same time, developing countries have expressed concern that information may be used to the detriment of their national economic interests. For example, information on mineral and fossil fuel deposits in the hands of foreign companies may give them superior bargaining power when negotiating contracts relating to resource exploitation. Private industry has long ago recognised the value of remote sensing information and uses this data extensively.

PART II : LEGAL ISSUES

General Survey of Legal Problems

a) State Jurisdiction

Can a country invoke exclusive State jurisdiction in order to prevent or limit remote sensing of its territory by a foreign satellite and can the information obtained be itself regarded as a natural resource over which it has sovereignty ?

There is first the notion of trespass in foreign territory by overflight or by surface surveying, in some sense more so than with the passage of a satellite. The ICAO Convention recognises, subject to certain conditions, a right of overflight by aircraft, which are not engaged in scheduled international air services (Article 5(, which is similar to innocent passage of vessels in the territorial sea. But the overflight of pilotless aircraft requires special authorization (Article 8). The Outer Space Treaty is silent on the overflight of spacecraft, though its broad language in Articles 2 and 3 suggests that the principle of innocent passage applies. A satellite in orbit is not of course covered by the ICAO Convention, which is concerned with aircraft operating airspace, but a space shuttle may be such an aircraft at certain stages of its flight.[12]

While the ICAO Convention allows the prohibition or regulation by a State of the use of photographic apparatus in aircraft over its territory (Article 36), that surface surveying by satellite is not itself a trespass is implied by Outer Space Treaty, Article 11, where it is sufficient "to inform the Secretary General of the United Nations as well as the public and international scientific community, to the

greatest extent feasible and practicable, of the nature, conduct, location and results" of space activities.

b) Value and Use of Information

But this does not effectively cover the value and use of the information obtained from remote sensing. The distinction between trespass and proprietary rights is vividly expressed in the finding of a United States court[13] that the aerial photography of a partly constructed plant, built for the production of methanol by a secret process, was a wrongful appropriation of trade secrets by competitors, but that the flight of the aircraft itself was not a tresspass since it was observing federal aviation rules.

The United Nations General Assembly set up a working Group in 1971 to consider these and other features of remote sensing and after making a Report in 1974, the Working Group embodied a number of principles, around which there was consensus, in a draft convention in 1976. But it was a range of opinions and attitudes. At one extreme it was said that remote sensing should be conducted only with the prior consent of the subjacent State (Argentina, Brazil). At the other end the United States maintained not only that remote sensing should be wholly free from control but that there should be no restrictions on the use of the information obtained, provided that it is made available to all. The draft convention in Article 5(b) took a middle position.

It may be stated that the principal concern of countries with respect to remote sensing is not so much the lawfulness of the activity itself but rather control over the dissemination of information gathered by satellite. Proponents of prior consent favour the creation of an equitable and non-discriminatory regime for the dissemination of information. This claim pertains to the ground and user segments of the system. The real issue is the extent to which guarantees or arrangements may be made to ensure that states have access to data about their resources.

As many developing countries are large commodity producers which rely heavily on the export of natural resources, concerns over access to information are easily understandable. Most customary international law, the U.N Charter and existing space treaties do not adequately guarantee their interests. For example, the "common interest" clause enunciated in Article 1 of the Outer Space Treaty is viewed as an imperfect or soft obligation which does not translate into equitable sharing and access to remote sensing data.

b) The United Nations Principles on Remote Sensing

Background

Because of the great benefits that could be derived from remote sensing and the opportunity for potential misuse of the acquired data, the international community

through the United Nations and its Committee on the Peaceful Uses of Outer Space (COPUOS) took a leading role aimed at establishing a set of legal principles that should govern states in their conduct or remote sensing activities. The drafted fifteen principles were the result of many years of arduous negotiations in COPUOS and were approved unanimously by the UN General Assembly on December 3, 1986 in resolution 41/65.[14]

The principles, in nutshell, provides:

i) that remote sensing activities should be carried out for the benefit and in the interest of all countries, taking into particular consideration the needs of the developing countries;
ii) that remote sensing activities should include international cooperation and technical assistance;
iii) that remote sensing should promote the protection of the environment and human kind from natural disasters;
iv) that when one country acquires data over another country the sensed country should have access to the data on a non-discriminatory basis and on a reasonable cost term.

Issues

In discussing the issues, I shall concentrate in those which in my view are of primary importance, keeping in mind the fact that all principles are interrelated and can not be considered in isolation from each other.

Some are of the view that even a cursory glance at the principles seems to indicate that most of them are not likely to become sources of possible conflict.[15] This may turn out to be inaccurate.

It should be pointed out in the first place that this instrument took the form of a General Assembly resolution and not, as was hoped by some states, a treaty, with the result that the Principles, instead of being intended to constitute rules legally binding upon those that subscribe to them, are merely guidelines.

These Principles, however, only concern : "remote sensing for the purposes of improving natural resources management, land use and the protection of the environment" (Principle 1(a)). This definition does not cover the controversial uses of remote sensing information concerning security nor data with respect to natural resources.

"Remote sensing activities" (Principle 1(e)), on the other hand, means :

- the operation of remote sensing space system;
- primary data collection and storage stations; and
- activities in processing, interpreting and disseminating the processed data, Principle 1 distinguishes between "primary data", "processed data" and "analysed information".

Turning to the contents of these principles, one finds that many of them are merely re-affirmations of existing rules of international laws or provision of existing treaties, such as Principle III on the need to respect international law, the

United Nations Charter, the 1967 Space Treaty and the relevant instruments of the International Telecommunication Union. Certain provisions of the 1967 Space Treaty have been emphasis, such as its Article I in Principle IV.

The Principles repeat principles of the Space Treaty and add " respect for the principle of full and permanent sovereignty" of all States and peoples over their own wealth and natural resources, with due regard to the rights and interests of other States and entities under their jurisdiction.

Who may get what kind of information and when ? According to US anybody can make an agreement on ground stations and can buy data and sell them. So there is no need for "Principles". Although Principle XIV refers to the international responsibility of States under Article VI of the Space Treaty, according to the US this responsibility cannot extend to all remote sensing activities, eg the selling of remote sensing data, as that activity is too removed from "national space activities". There is no "supervision and control" possible after the data have been sold.

But States wanted guaranteed access to remote sensing information and this as soon as possible. Principles XII gives the sensed State access to primary and processed data concerning its territory, as soon as produced, on a non-discriminatory basis and on reasonable cost terms. Also to "available analysed information" concerning the territory under its jurisdiction in the possession of any State participating in remote sensing activities. This Principle does not give such access to available information in the hands of private companies. Private enterprise must conform to the conditions of its national licence. Nor does Principle XII give the sensing State the obligation to disseminate data.

Principle X, however, stipulates that remote sensing shall promote the "protection of mankind" from natural disasters and Principle XI give States the obligation to "disclose" or "transmit" data as far as "useful" for the protection of mankind from natural disasters, to states concerned.

Promotion of international cooperation is a main objective of these principles also, and Principle XIII provides that States, upon request, shall enter into consultations with a sensed in order to make available opportunities for "articipation"" This participation is also already promoted by Principle V, and has to be based "on equitable and mutually acceptable terms".

The fundamental problem underlying the difficulties to arrive at a consensus with respect to unconditional freedom for remote sensing of another State is the question whether a State has a "right to privacy". In other words, should the strict observance by States of the obligation not to intervene in the (domestic) affairs of any other State apply to States wishing to take pictures of any other State, meaning the prior permission of the sensed State would be required in cases of such remote sensing of another State ?

Does "interference" include (unsolicited and unwanted) provision of information and ideas to, or the desire to seek information about, any other State ? It is my sincere view that both interference, actual and non-actual interference, such as intellectual, mental or cultural intervention, may count as "interference in

domestic affairs". A State and its people as a collectively can and should have "privacy" by virtue of its sovereignty. It is my strong belief that the time has come to expand international cooperation in space activities. On the other hand, a free but qualified international exchange of information and ideas is the best guarantee of the maintenance of international peace and security and the development of friendly relations and cooperation between nations. To require therefore the prior consent of the sensed State would not be counter-productive, given the pledge of States to promote the maintenance of peace and the strengthening of mutual understanding and the intensification of international cooperation.

Remote Sensing offers the additional problem of the use (dissemination to third parties) of "sensitive" information obtained about any other State, even though any other State in principle is free to seek that information and to receive it, while the sensing State is free to impart it. Sovereignty of a State, of course, cannot be said to extend to information about the State, its government, its population or the natural resources within its territory. The use of such information, however, may in practice infringe the status quo of a State's international position.

The Principles contained nothing specific at all on the subject of dissemination of data to third parties. Apart from rather guarded concessions on opportunities for participation and mutual benefits under Principle XIII and access to primary and processed data as well as to "available analysed information" under Principle XII, the sensed state has been given no special treatment at all, except perhaps that very vague safeguard found in principle IV. Principle IV provides that remote sensing activities shall be conducted among other things on the basis of respect for the principle of full and permanent sovereignty of states and peoples over their own wealth and natural resources, and "shall not be conducted in a manner detrimental to the legitimate rights and interests of the sensed State". But all this is subject to interpretation.

In sum those who are apprehensive that data gathering from outer space by others might work to their detriment or that the data gathered from outer space might be misused by either the sensing state or by third parties to their detriment can probably find only scant comfort from the United nations Principles.

For protection, it appears that their best safeguard is still to be found in Article VI of the 1967 Space Treaty whereby states parties are rendered internationally responsible for "national activities in outer space". This article is reaffirmed in Principle XIV. But arguably Principle XIV appears to have limited the application of Article VI of the Space Treaty to activities connected with "operating remote sensing satellites", while leaving the remaining activities to be regulated only by the ordinary "norms of international law on State responsibility".

At the end of the day then, in so far as inter-state relations are concerned, subject to specific treaty obligations, the law on data gathering from outer space remains largely as it was with its three qualifications, namely, extension of limit of national space, criminalization under domestic law of harmful acts committed outside the country and appeal to the principle of good neighbourliness. This being the

case, one wonders from this point of view whether the latest offering from COPUOS is really worth 15 years of labour.

CONCLUDING REMARKS

For more than forty years, space has proved to be of crucial strategic, political, socio-economic and scientific importance. Both the major economic powers and developing nations have established and implemented programmes to enable all parties involved, essentially the public authorities, industry and academic institutions, to demonstrate and exploit the potential space technologies.

Today the commercialisation of space activities, which remote sensing is part of it, has become irreversible and expanding process. The new political and economic environment has resulted in shifting space industry's resources towards commercial opportunities. The industry is continuing its evolution from a government-driven, project-defined industry to be in which governments play a lesser role and market forces predominantly dictate growth.

This process allows both industrialised and developing countries to benefit from these opportunities through strengthening economies, new market developments, qualified jobs creation, educational opportunities and higher standard of life. For developing countries, commercial use of space technologies especially remote sensing may also provide new opportunities for catching-up. To keep this momentum, it is extremely important that a collaborative environment between government and industry, as well as between science and marketplace and industrialised and developing is strengthened, and where necessary, established.

However, commercialisation of certain space technologies particularly remote sensing imaginary, has resulted in high costs which many developing countries cannot effort. Those high costs are limiting developing country access to vital information just when commercialisation suggests it will become available to them.

A less visible, but equally problematic, effect of commercialisation is the tendency of developing countries to invest scarce resources in space systems and technologies that are operated primarily by foreign consultants or contractor, rather than investing in the education and training that is necessary to develop local expertise and competence in the use of space systems and technologies.

The legal issues, on the other hand, are not so promising. Notwithstanding, the intimated uncertainties beclouding the future, the UN approved Principles on Remote Sensing carry with them both accomplishments and expectations of a positive nature. For instance, the return to the consensus procedure which was unfortunately abandoned during the drafting of principles on direct television broadcasting by satellites must be regarded as a definite plus for COPUOS. Insofar as the developed countries were concerned, they gained undisputed recognition of the right to conduct remote sensing activities over the territories of other states

without requesting prior consent either to the activities or the dissemination of data. As has been intimated beforehand, this recognition of right is tempered by the requirements that the activities must be conducted in a manner non detrimental to the interests of the sensed state and on the basis of respect for the principle of sovereignty of al states over their own natural resources, with due regard to the interests of other states and the needs of the developing nations. Additionally, the sensed states are entitled to consultation upon request, so as to make available opportunities for their participation in remote sensing activities on mutually agreeable terms.

It is hoped that the delicate balancing of the interests of both developed and developing nations in order to enable them to take advantage of the great benefits of remote sensing technology, coupled with mankind'' interest in environmental protection will serve to reduce possible future friction that could arise from provisions to divergent interpretation.

Finally, I do hope that one day the United Nations will has the strength and courage to come out with at least a similar principles "to govern" the use of remote sensing satellites for military purposes.

ENDNOTES

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[5]The Highways of Air and Outer Space Over Asia, pg 49

[6]Heaven and Earth : Civilian Uses of Near-Earth Space, pg 162

[7]Space Activities and Emerging International Law, pg 389

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[9]Space Law in the United States, 1985, pg 14

[10]UNISPACE III Conference – Commercial Aspects of Space Exploration Including Spin-Off Benefits, pg 9

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