The Legal Framework Related to the Privatization and Commercialization of Remote Sensing Satellites in the United States and in Canada

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À ma mère, mon père et ma sœur,
pour leur amour immense et
soutien de tous les jours

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ABSTRACT

This Thesis deals with the national legal aspects of a particular space application: remote sensing by satellites, also referred to as earth observation systems.

Governments have been the leading providers and users of satellite imagery data since the advent of earth observation satellites (i.e. almost 40 years ago). However, this has changed, particularly in the United States, with several private companies having acquired and launched their own imaging satellite systems. This new trend towards commercialization and privatization of the remote sensing industry, which appeared firstly in the United States and which is now being extended to Canada, required a change in policy. The role played by the government policies and regulations in shaping the prospects for the emerging commercial remote sensing satellite firms is of critical importance. In this context, these policies and regulations will determine the conditions that will enable commercial firms to realize their competitive potential in both the domestic and international marketplace.

In this Thesis, a brief overview of the technical and historical legal backgrounds of remote sensing is provided. Then, the international legal framework of remote sensing is briefly analyzed. Finally, a thorough analysis of the policies, laws and regulations applicable within the United States and Canada is presented.

RÉSUMÉ

Ce mémoire traite des aspects légaux internationaux et nationaux d'une application particulière de l'espace: la télédétection par satellites, également désignée sous le nom de système d'observation de la terre.

Depuis l'arrivée des satellites d'observation de la terre il y a presque 40 ans, les Gouvernements de différents pays ont été les principaux fournisseurs et utilisateurs des données et images produites par ces systèmes. Cependant, avec l'arrivée récente de plusieurs entreprises privées ayant acquis et lancé leurs propres systèmes de satellite de télédétection, cette situation change de plus en plus, en particulier aux États-Unis. Cette nouvelle tendance vers la commercialisation et la privatisation de l'industrie de la télédétection s'est aussi étendue au Canada. Dans les deux pays, elle a exigé un changement des politiques gouvernementales en place. Dans ce contexte, le rôle joué par les Gouvernements dans l'élaboration de politiques et règlements est d'importance critique. Ces règles ont et auront un impact direct sur les perspectives d'avenir pour les sociétés commerciales de télédétection dans cette industrie naissante qu'est la télédétection privée. En effet, les politiques et règlements mis en place détermineront les conditions qui permettront aux entreprises commerciales de réaliser leur potentiel concurrentiel dans les marchés domestiques et internationaux.

Dans ce mémoire, nous exposons tout d'abord une brève vue d'ensemble des contextes historiques et technologiques de la télédétection. Puis, nous présentons brièvement le cadre juridique international de la télédétection. Enfin, nous faisons une analyse complète des politiques, des lois et des règlements applicables aux États-Unis et au Canada.

TABLE OF CONTENTS

INTRODUCTION

This Thesis deals with the national legal aspects of a particular space application: remote sensing by satellites, also referred to as earth observation systems. Both at the international and national level, the legal regimes pertaining to remote sensing are mainly concerned with space based systems. Hence, we will limit our analysis to the legal regime of the space segments of remote sensing systems. The policies, laws and regulations governing segments such as ground segments and user segments, which includes, *inter alia*, national data policies, will not be addressed thoroughly in this thesis.

Chapter one will briefly introduce the technical developments of remote sensing and their related legal implications. In particular, we will see how the concept of sovereignty was defined by Nations and how it applies to airspace and outer space.

In Chapter two, we will review the legal principles of space law that apply to remote sensing satellites and activities, and which have been formulated at the international level in accordance with established law-making process. A brief overview of the actual and emerging international bodies involved in such process will also be done. We will finally discuss the international principles related to remote sensing activities, and how States are under the obligation to respect these principles through their domestic space law regimes.

With Chapter three, we will firstly provide an overview of what led to the present body of United States' remote sensing legal framework. In parallel, we will also highlight how the general aspects of the international legal regime set forth in the United Nations Remote Sensing Principles of 1986 apply to domestic remote sensing activities within the United States. We will further see the impact of national security issues and foreign affair concerns on their domestic legal framework. Finally, we will analyze the current licensing regime for commercial remote sensing systems as well as the current data & distribution

policies for remote sensing systems. We will present in more detail the legal obligations of American commercial firms that receive government's licenses to operate their imaging satellites. The extraterritorial nature of the United States legal regime will be emphasized.

In Chapter four, we will briefly examine the legal framework related to Radarsat-1 and -2 and identify the main policies and laws relevant to Canadian remote sensing activities. Emphasis will be given to the recently enacted legislation that will regulate the operation of remote sensing space systems in Canada, which also encompass commercial systems. As we will see, the development of the Canadian regulatory structure remains greatly influenced by the United States legal framework on remote sensing.

CHAPTER ONE: AN INTRODUCTION TO REMOTE SENSING

1.1 Historical Considerations Leading to the Development of Outer Space Law

The commercialization of space remote sensing systems refers to "a sequence of actions necessary to achieve market entry and general market competitiveness of new innovative technologies, process and products." [1] Strictly speaking, commercialization is the process of transforming something into a commercial activity. Privatization involves "some measure of transfer of operational responsibility or even ownership of government property and systems to private hands." [2]

Today's commercialization and privatization of remote sensing systems resulted from a long process of developing the basic technologies, testing them, and building knowledge bases.[3] The first methods to take pictures from the air, although regarded today as primitive and peculiar, eventually led to the new technologies that we know today. The next few sections will briefly introduce the technical developments of remote sensing and their related legal implications.

1.1.1 The History and Scope of the Technical Developments of Remote Sensing in a Snapshot

Remote sensing as a technology started with the first photographs being taken from the air. The cameras that were used to take those pictures served as prime remote

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[1] See "Glossary of Terms Used in Global Climate Change", online: California Climate Change Portal at: <http://www.climatechange.ca.gov/glossary/letter_c.html>.
[2] See Ray A. Williamson, "Remote Sensing Policy and the Development of Commercial Remote Sensing", in COMMERCIAL OBSERVATION SATELLITES: AT THE LEADING EDGE OF GLOBAL TRANSPARENCY, Washington, DC: RAND and American Society of Photogrammetry and Remote Sensing, April 2001, at 50. (JC Baker, K. O'Connell, RA Williamson, editors).
[3] *Ibid.*

sensors for more than 150 years. The idea of photographing the Earth's surface from above emerged in the 1860's with pictures taken from balloons for purposes of topographic mapping. Most photos were made from tethered balloons, but the platform was later provided by free-flying balloons.[4]

At the end of the 19th century, innovative methods consisting in mounting cameras on kites or pigeon fleet were introduced. Major improvements followed from these beginnings. By the First World War, cameras mounted on airplanes were the main provider of aerial views of fairly large surface areas. They proved to be invaluable for military reconnaissance. From that time on until the early 1960s, the aerial photography was routinely used. It remained the single standard tool for portraying the surface of the earth from either a vertical or oblique perspective.[5]

At the dawn of the space age, following World War II, technology developed and launch capabilities increased, thus leading to the first attempts to use sensors above the earth's atmosphere. With the aim of obtaining images of the surface of the earth, rockets were launched in the desert areas but failed to enter into orbit.[6] Eventually, as launch vehicles were further improved, remote sensors could be placed as part of their payload. During the 1960s, basic television cameras were incorporated in orbiting satellites. While they imaged crude, low resolution black and white pictures of clouds and the earth's surface, they nevertheless allowed the first meteorological satellite, TIROS-1, to be introduced by the United States (US).[7]

By the late 1960s, pictures of the earth were also taken from space by astronauts with hand-held cameras. At the beginning of the following decade, the US National Aeronautics and Space Administration (NASA) designed, constructed, and then launched the *Earth Resources Technology Satellite* (ERTS-1). ERTS-1, later renamed Landsat, was

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[4] Nicholas M. Short, Sr., "The Remote Sensing Tutorial", online: NASA Remote Sensing Tutorial <http://rst.gsfc.nasa.gov/Front/overview.html>.
[5] James B. Campbell, *Introduction to Remote Sensing*, 2nd ed. (New York: The Guilford Press, 1996) at 8.
[6] Space pictures were obtained from V-2 rockets launched at White Sands Proving Ground (New Mexico), in 1946.
[7] Short, *supra* note 4; Campbell, *supra*, note 5.

the first civilian earth-observing satellite in a series of seven satellites (to date) that have allowed continuous coverage of most of the earth's surface since its launch in 1972.[8]

As we can see, the modern field of remote sensing has only been around for approximately half a century. The first activities involving remote sensing, either from sources such as aerial platforms, manned orbiting platforms or imaging satellites,[9] triggered the need for States to agree on many basic legal concepts prior to further expanding these activities. The first major issue facing the world's Nations was to define the concept of sovereignty and to agree on how it would apply to airspace and outer space.

1.1.2 The Airspace Sovereignty Concept

Cujus est solum ejus est usque ad coelum
He who owns the land owns it even to the skies
Latin legal maxim[10]

1.1.2.1 Definition and Origins of Airspace Sovereignty

Sovereignty can be defined as the ability of a nation to protect its national interests and the exclusive right to exercise supreme authority over a geographic region or group of people.[11] Sovereignty is often tied to a State's territory, which includes its airspace and portions of ocean adjacent to coasts.[12]

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[8] "Launch dates are: Landsat **1**, July 23, 1972; **2**, January 22, 1975, **3**, March 5, 1978; **4**, July 16, 1982, **5**, March 1, 1984 (Landsat **6**, launched later, failed to operate); and **7**, April 15, 1999. (As of [July 2005], only Landsats 5 and 7 are operational, i.e., acquiring data; the older ones have been shut down.)." Short, *supra* note 4.

[9] See Kevin O'Connell & Beth E. Lachman, "From Space Imagery to Information: Commercial Remote Sensing Market Factors and Trends", in COMMERCIAL OBSERVATION SATELLITES: AT THE LEADING EDGE OF GLOBAL TRANSPARENCY, Washington, DC: RAND and American Society of Photogrammetry and Remote Sensing, April 2001, pp.53-78 at 75. (JC Baker, K. O'Connell, RA Williamson, editors).

[10] From the maxim "*Cujus est solum ejus est usque ad coelum et ad inferos*", a roman legal principle of property law which had been incorporated into the law of most States by 1919 but that is no longer observed in many instances today.

[11] See *1933 Montevideo Convention on the Rights and Duties of States*, Montevideo, 26 December 1933 (entered into force in 1934).

[12] See Laurie J. Schmidt, "New Tools for diplomacy, Remote Sensing Use in International Law", Socioeconomics Data and Applications Center DAAC, January 12, 2001, online: <http://earthobservatory.nasa.gov/Study/Diplomacy/>.

At the outset, it is interesting to note that air law as well as space law preceded the actual technology involved. Indeed, airspace law principles can be found as far back as 350 years ago in many Roman laws.[13] But the international air law regime governing State's operations in airspace today were only codified at a much later time.[14] It is only following the First Word War that it was considered necessary to incorporate into a convention the already existing air regulations and the general tendency in favor of the sovereignty of States in the space above their territories. A choice had to be made between a "freedom of the air" theory derived from the "freedom of the high sees" principle in Maritime Law, and sovereignty of each underlying States.

In 1919, during the adoption of the Convention Relating to the Regulation of Aerial Navigation in Paris,[15] the parties agreed that "every Power has complete and exclusive sovereignty over the airspace above its territory" and further specified that "(...) the territory of a State shall be understood as including the national territory ... and the territorial waters adjacent thereto."[16] Although the application of the Convention was restricted to its States Parties, no State questioned the right of sovereignty of a nation over its territory as defined thereof.[17] This general recognition of airspace sovereignty mainly resulted from the devastating impact of air bombardment during the First World War.[18]

By 1944, the Chicago Convention on International Civil Aviation,[19] which is said to be one of today's most successful international multilateral treaties in existence,[20] superseded the outdated Paris Convention and reinforced this principle. Article 1 of the Chicago Convention states that: "every State has complete and exclusive sovereignty over

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[13] See François Malo, "Canadian Aerospace Sovereignty: In Pursuit of a Comprehensive Capability", online: Department of National Defence (Canada) at: <http://www.fas.org/news/canada/0056.htm#t3>.
[14] *Ibid.*
[15] *Convention Relating to the Regulation of Aerial Navigation of 1919*, 11 League of Nations Treaty Series 174. [Hereafter the Paris Convention of 1919]
[16] *Ibid.* Article 1.
[17] See Malo, *supra*, note 13.
[18] See Michael Milde, "Status of Military Aircraft in International Law", (2000) Public International Air Law: Course Materials, IASL, 2002, p.221.
[19] *Chicago Convention on International Civil Aviation of 1944*, 61 Stat 1180, TIAS No.1591, 15UNTS 295. [Hereafter the Chicago Convention].
[20] See Nandasiri Jasentuliyana, "Celebrating fifty years of the Chicago Convention twenty-five years after the moon landing: lessons for space law", Annals of Air & Space Law, vol. XIX-II, (1994).

the airspace above its territory." This very broad principle also encompasses the right for a State to deny any passage through its airspace, which extends to the airspace above its national territory and its territorial waters.[21] With respect to the airspace above the territorial waters, this principle even denies the "right of innocent passage" as the one for the passage of ships within territorial seas.[22] This term is generally recognized to mean passage "not prejudicial to the peace, good order or security of the coastal State".[23] Above the high seas, since States have the freedom to traverse the high seas unimpeded, flights are free for the use of all.[24] As one can imagine, the tendencies for the States to defend their national interests was due to the aftermath of the Second World War, which again, greatly influenced the choice of territorial sovereignty over freedom of the skies.

Following the adoption of the Chicago Convention, a great expansion in world air traffic occurred. The concept of territorial sovereignty was still regulating international aviation. But the right to regulate at the domestic level over a State's territory was from then on tailored by the provisions of the Chicago Convention. As it reads from the preamble, this was an international agreement "on certain principles and arrangements in order that international civil aviation may be developed in a safe and orderly manner and that international air transport services may be established on the basis of quality of opportunity and operated soundly and economically."[25] The Chicago Convention clearly did not intend to change the basic existing international rules on airspace sovereignty. Rather, it attempted to agree as to the extent of privileges of flight that might be exchanged between contracting States. Indeed, mutual overflight rights of civil aircrafts

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[21] See John Cobb Cooper, "Legal Problems of Spacecraft in Airspace", Festchrift fur Otto Riese, (1964).
[22] *United Nations Convention on the Law of the Sea*, Dec. 10, 1982, 1833 U.N.T.S. 3 (entered into force Nov. 16, 1994), Part 2, Section 3 [Hereinafter 1982 UNCLOS] and *United Nations Geneva Convention on the High Seas* , 29 April 1958, United Nations, *Treaty Series*, vol. 450, p. 11, (entered into force: 30 September 1962) [Hereafter 1958 UNCLOHS].
[23] 1982 UNCLOS, *Ibid*, at Article 19.
[24] See John Cobb Cooper, "Backgrounds of International Public Air Law", Yearbook of Air and Space Law, (1967), McGill University Press, in Public International Air Law: Course Materials, IASL, 2002, pp.59-76. See also 1982 UNCLOS, *supra*, note 22, Article 87, which states that: "the high seas are open to all States, whether coastal or land-locked. Freedom of the high seas is exercised under the conditions laid down by this Convention and by other rules of international law. It comprises, *inter alia*, [...] (a) freedom of navigation; (b) freedom of over flight."
[25] See Chicago Convention, *supra*, note 19.

were exchanged under transit agreements negotiated during the Chicago Convention.[26] The possibility of allowing greater "freedoms of the air" was particularly made explicit in two Transit Agreements annexed to the Chicago Convention. [27]

A provision of particular interest in the development of remote sensing law is Article 36 of the Chicago Convention. Said Article states that: "each contracting State may prohibit or regulate the use of photographic apparatus in aircraft over its territory." Clearly, the use of cameras mounted on aircraft was being contingent upon each State's regulations and/or prohibitions. However, one should bear in mind that the Chicago Convention was primarily concerned with the regulation of civil aviation, its provisions applying exclusively to civil aircrafts. Pursuant to Article 3 of the Convention, "State aircrafts" are not subject to its provisions. And they do not enjoy its privileges or freedoms of the air. This clause also means that military aircrafts are not subject to the Chicago Convention, and that the standards, practices and procedures of ICAO are not applicable to them.[28] It follows that State and military aircrafts are not permitted to fly over foreign sovereign territory otherwise than with the express authorization of the State concerned. [29]

The possibility to develop the use of overhead imagery using airplanes was to be considerably reduced by the concept of airspace sovereignty within both the civilian and military regimes.

1.1.2.2 Military Reconnaissance during the Cold War Era

Many space law authors and legal scholars consider undeniable that military and security implications played an important role in the evolution of international remote

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[26] See Chief of Air Force, "AAP 1003.Operations Law for RAAF Commanders" online: ROYAL AUSTRALIAN AIR FORCE <http://www.raaf.gov.au/airpower/publications/doctrine/aap1003/highres/intro.pdf>.

[27] *International Air Services Transit Agreement*, Chicago, December 7, 1944, ICAO Doc. 7500, and the *International Air Transport Agreement*, Chicago, December 7, 1944, U.S. Dept. of State Publication 2282, were negotiated together with and annexed to the Chicago Convention for signature.

[28] See Chief of Air Force, *supra*, note 26.

[29] See Milde, *supra*, note 18 at 221.

sensing law.[30]

After the initial stages of adventure and commerce for the use of airspace, came the military involvement. This involvement was particularly increasing during the Cold War era and the development of military aviation. During that time, and during the confrontation between the US and the Union of Soviet Socialist Republics (USSR), surveillance coverage became critical to the two superpowers for global dominance. As the airspace sovereignty concept had become customary and codified law, the overflights of any unauthorized civilian or military airplane through the airspace of a foreign State was, irrespective of its altitude, a clear violation of international public law.[31] Nevertheless, intense aerial espionage activity started taking place. The necessity to obtain information about the enemy was crucial to the superpowers, especially the need to obtain imagery about their respective military installations. The risks involved in conducting illegal reconnaissance activities were overridden by such needs.

Indeed, one of the fundamentals of the Cold War era was the reciprocal fear of a surprise attack with weapons of mass destruction by either one of the superpowers and/or their allies. To reduce mutual suspicion and to give a measure of protection against surprise attack, the US offered an open-skies proposal during an international summit on arms control verification in 1955.[32] According to the proposed treaty, each signatory would have a right to make photographic overflights of specific military facilities of another signatory's territory, without being in violation of its airspace sovereignty. This proposal was rejected by the Soviet Union. The suspected reason is that they did not possess, at the time, the technology necessary to operate overflights of the US territory. In

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[30] See Louis Haeck, "Aspects juridiques de certaines utilisations militaires de l'espace", 1996 Annals of Air & Space Law 65, vol.XXI-I.

[31] Michel Bourbonnière, *Commercialisation of Remote Sensing U.S. and International Law Towards a Liberalization of Economic Regulations*, Thesis, Institute of Air and Space Law, McGill University, 1997 [unpublished] at 4.

[32] "U-2 Crisis of 1960" online: Wikipedia, the free encyclopedia <http://www.biography.ms/U-2_Crisis.html>

accordance with the National Security Act of 1947,[33] the American President Eisenhower then issued directives to "gather, in every feasible way, the information required to protect the United States and the free world against surprise attack and to enable them to make effective preparations for defense".[34] According to the US, such activities were necessary as measures for legitimate national defense due to the excessive secrecy practiced by the Soviet Union.

Under these directives, programs consisting in extensive aerial surveillance by unarmed civilian aircrafts were developed. One of them was the "CIA U-2 project" which was initiated by the Central Intelligence Agency (CIA) in the early 1950s. It was thought that a high altitude aircraft mounted with special photographic equipment could help conduct covert missions and gather information on the military installations of the Soviets. This belief led to the development of a Lockheed U-2 high altitude airplane which had the characteristics of being hard to detect and impossible to shoot down. The CIA officials, when introducing the unarmed civilian U-2 aircraft, decided to use "weather research" as a cover story, should the existence of the U-2 ever be made public. The practice involving the use of spy planes by the US Government to observe the Soviet territory begun with the first overflight of the Soviet Union in the spring of 1956.

Since neither the US nor USSR would openly tolerate reconnaissance flights over their territory, the U-2 overflights were normally of a peripheral character.[35] Given that military aircraft in the airspace over the high seas enjoyed immunity from foreign State jurisdiction, the information gathering was done from an oblique perspective. These so-called "side views" were in line with the international principle of State sovereignty.

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[33] See *The National Security Act*, July 26, 1947. (PL 235 - 61 Stat. 496; U.S.C. 402), amended by the *National Security Act Amendments of 1949* (63 Stat. 579; 50 U.S.C. 401 et seq.); See online: Wikipedia, the free encyclopedia at: <http://en.wikipedia.org/wiki/Main_Page>: "In 1947, the U.S. President Truman realigned and reorganized the United States' armed forces, foreign policy, and intelligence community apparatus in the aftermath of World War II by enacting the National Security Act. Aside from the military reorganization, the act established the National Security Council (NSC), a central place of coordination for national security policy in the Executive Branch, and the Central Intelligence Agency (CIA), the United States' first peacetime intelligence agency."

[34] President Dwight D. Eisenhower, "Our First Line of Defense: Presidential Reflections on US Intelligence", *Laying of cornerstone for CIA building, 3 November 1959*, online: Center for the Study of Intelligence at: <http://www.cia.gov/csi/monograph/firstln/eisenhower.html>.

[35] Wikipedia:U-2 Crisis of 1960, *supra*, note 32.

Hence, taking pictures of another State while flying within neutral areas or within its own territorial space would not violate international law. But the limitations of side views, due to the poor quality of the images obtained and the limited coverage they allowed, lead to the occasional penetrative overflight.

Espionage by aerial infiltration over the USSR territory was initially a successful practice by the US. In fact, the Soviets did not have the technical capabilities to prevent these otherwise illegal penetrative overflights. Their attempts to intercept the US planes had failed due to the U-2's extreme altitude.[36] But the evolution of soviet weaponry eventually prevented them to continue. One particular incident, involving the shooting down of an American U-2 spy plane over the Soviet territory, brought the practice to an end. In May 1960, one of the Soviet air missiles hit a U-2 airplane while it flew over its territory. The plane was essentially intact and the Soviets managed to recover the surveillance camera and even developed the photographs. The U-2 pilot, Gary Powers, was captured after making a parachute landing and was later convicted of espionage over the USSR territory. He was sentenced to 3 years' imprisonment and 7 years of hard labor.[37]

Some analysts stated that, "the importance of the U-2 incidents lies in the fact that the only illegal aspect of this activity, inasmuch as international law is concerned, was the flights themselves and not the espionage."[38] Indeed, international law had already established a clear difference between peripheral and penetrative reconnaissance as the first one was lawful and the second was not. Hence, it was rightly stated that "international law is concerned with the point of origin of reconnaissance and not with the act of reconnaissance in general". [39]

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[36] The U-2 could reach such extreme altitudes that the pilot must wear the equivalent of a space suit and carry his own oxygen supply. The U-2 was capable of simultaneously collecting signals and imagery intelligence.

[37] Gary Powers ended up serving only twenty-one months of his total sentence since he was later exchanged in a spy swap for a Soviet agent captured by the US.

[38] Michel Bourbonnière, *supra*, note 31 at 5.

[39] *Ibid.*

It has also been correctly put forth that the U-2 incident demonstrated that "the collecting of imagery was in itself not an illegal act".[40] However, there are two schools of thought concerning the legal basis on which this conclusion can rest. A minority of authors have attempted to support this conclusion by alleging that since there was no instrument of public international law prohibiting a State from obtaining images of another State, conducting espionage was allowed.[41] They put forth that "international law grants every nation the right to conduct espionage."[42] According to them, this position rests on the *Steamship Lotus*[43] case which stated that in public international law, unless prohibited, an action is allowed.[44] Although they rightly concluded to the legality of espionage activities, their assertions to support such a conclusion were strongly refuted by a growing majority.

An increasing number of space law experts have criticized this "obiter dictum"[45] of the *Lotus* case and further denied its application *mutatis mutandis*[46] to outer space.[47] They asserted that the freedom of action originating from the concept of territorial sovereignty as understood in non-space relations was not applicable to outer space. Furthermore, not only is the *Lotus* case irrelevant to space activities but both its "ratio

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[40] *Ibid.*

[41] See "The Law of War in Space", Air Force Law Review; March 2001, online: <http://www.space4peace.org/slaw/lawofwar.htm>. See also Bourbonnière, *ibid.*

[42] Bourbonnière, *supra*, note 31 at 6; H. Feder, "The Sky's the Limit? Evaluating the International Law of Remote Sensing", (1991) 23 Int.Law & Pol. 599 at 605-606.

[43] *Steamship Lotus* case (France v. Turkey) [1927] PCIJ 3 (7 September 1927). The main issue of this case was on the applicability of penal laws to a ship which were different than the penal laws of the State whose flag that ship carried. Aside, the Court also stated that restrictions upon independence of States cannot be presumed, or in other words, that in international law, whatever is not prohibited is allowed.

[44] See Air Force Law Review, *supra*, note 41.

[45] "Latin for "something said in passing." When judges put comments in opinions that are extraneous to the line of reasoning that leads to the decision in the case, the comments are said to be "obiter dictum" or "dicta". Comments such as this are not binding authority." Legal Information Institute, Cornell University, Law School, online: Cornell University at: <http://www.law.cornell.edu/lexicon/obiter_dictum.htm>

[46] Latin phrase meaning "when the relevant changes have been made."

[47] See e.g. Manfred Lachs, The Law of Outer Space: An Experience in Contemporary Law-Making, 1972, pp.196; See Ivan A. Vlasic, "The Growth of Space Law 1957-1965: Achievements and Issues", 1965, Yearbook of Air & Space Law, pp.379-380; See Carl Christol, "Article 2 of the 1967 Principles Treaty Revisited", IX Annals of Air & Space Law 217, 1984.

decidendi"[48] and its "obiter dictum" have been negated by subsequent ruling of the International Court of Justice and by international law conventions.[49] Instead, the majority asserted that the freedom of action of a State is determined by the possibility of infringing upon the rights of others and by the concept of reasonableness. They explained that all States are free to conduct outer space activities (such as remote sensing) as long the activity does not conflict with the common interests of other States. Nations may engage in reasonable conduct until inhibited by clearly established principles and rules of international law. This position still holds today and is evidenced by the provisions of the Outer Space Treaty.[50]

From that moment, since the technologies had developed and launch capabilities had increased, the use of outer space for the development of imaging capabilities using satellites started to be appealing to the superpowers. Of course, the idea that the legal problems surrounding aerial imagery by airplanes could disappear with the use of outer space for remote sensing had yet to be established. Nevertheless, it was already generally accepted that outer space was an international area analogous to the high seas and beyond the reach of national sovereignty. It logically resulted that since espionage from the high seas "was generally accepted as being a legal activity, it has been concluded that espionage from outer space is also legal."[51]

The race to space had begun.

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[48] Latin phrase meaning "the reason for the decision". Unlike obiter dicta, the principles of judgment for ratio decendi stand as potentially binding precedent, through the principle of stare decisis (i.e. the notion that prior court decisions must be recognized as precedents). See "Ratio Decidendi", online: Wikipedia, the free encyclopedia at: <http://en.wikipedia.org/wiki/Ratio_decidendi>.

[49] For example, the *1958 UNCLOHS, supra,* note 22 and the *1982 UNCLOS, supra,* note 22, contained principles contradicting the *Lotus Case*. The *Lotus* decision was also contradicted by the 1951 *Fisheries Case* [(UK v. Norway) Reported [1951] ICJ Rep. 116] and the 1955 *Nottebohm Case* [(Liechtenstein v. Guatemala) 1955 I.C.J. 4] of the International Court of Justice.

[50] See for example, Article IX of the Outer Space Treaty, *infra,* note 66.

[51] Bourbonnière, *supra,* note 31 at 6; Feder, *supra,* note 42.

1.1.2.3 Outer Space: A Limit to Sovereignty

Ex facto oritur jus
The law rises from fact
Roman maxim

Outer space differs in many legal aspects from airspace.[52] Air law has the exact opposite starting point when compared with space law: sovereignty is its very basis and international law applies only as far as that sovereignty allows.[53] In the legal regime for outer space, there are several restrictions on the concept of sovereignty. According to many, while "sovereignty does apply to airspace over a State's territory, it does not apply to outer space"[54] where States and private entities are conducting military, commercial and public activities. However, both have one thing in common: the absence of delimitation between them.[55] No past or present provision of aeronautical law fixes the upper boundary of national airspace. The Paris Convention of 1919 did not define the term "airspace" and did not limit the upward sovereignty of a State to the "airspace". The Chicago Conference in 1944 also did not adopt any definition or delimitation of the airspace.

In 1957, the Soviet launches of Sputniks I and II precipitated the need to resolve the issues of sovereignty and delimitation between air and outer space. No international law, practice, or custom had as yet established the issue of a nation's sovereignty in outer space. The Soviet launches were going to be the initial spark that set the events in motion leading to general international acceptance of the "freedom of space" principle. In that particular case, state practice was to be the basis of the law.

When Sputnik was placed in orbit, no country, including the US, objected to the satellites overflight of their territory. A few months later, no one objected either to the overflight of Sputnik II. And when countries failed to object to subsequent satellite

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[52] W.P. Heere, "Problems of Jurisdicition in Air and Outer Space", 23 Air & Space Law, Number 2, 1999.
[53] Frans G. Von der Dunk, "Jus cogens sive lex ferenda : jus cogendum?" (1992) Public International Air Law: Course Materials, IASL, 2002, p.123.
[54] Jonhathan F. Galloway , "Limits to sovereignty: Antarctica, Outer Space and the Seabed", IISL-98-IISL-1.10 in General Principles of Space Law: Course Materials, IASL, 2002, pp.351.
[55] See Heere, *supra*, note 52.

overflights,[56] the first custom in outer space law, that is the free flight of objects in outer space, became firmly established. Further, no country made a distinction between scientific and intelligence-gathering satellites. When the US initiated the Discoverer program in 1958, no State objected.[57] Both the US and the Soviet Union had established, through their practices, the customs that would in turn developed the law.

Meanwhile, in order to initiate discussion amongst nations on outer space issues, an international forum for debate had to be elected. Given that the predominant interest was not civil aviation and since the main issues regarding outer space involved national defense and military type questions, it was decided that the International Civil Aviation Organization (ICAO), created by the Chicago Convention in 1947,[58] was no longer the appropriate vehicle to undertake resolution of the sovereignty issue. Further, the Soviets were not members of ICAO. Instead, it was suggested that the issues surrounding the use of outer space be shifted from ICAO to the United Nations (UN), which in turn created the UN Committee on the Peaceful Uses of Outer Space (COPUOS).

The question of the definition of outer space was first considered and identified as a legal problem within the UN in 1959.[59] It was further considered in the early sixties (i.e. December 1961), when the United Nations General Assembly (UNGA) unanimously passed Resolution 1721. The Resolution was sponsored by both the United States and the

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[56] The first US satellite (Explorer 1) was orbited on January 31, 1958 after several failures of the Naval Research Laboratory's Vanguard rocket.

[57] The Discoverer program, then described as a satellite technology development effort, was a cover for the covert information gathering mission named CORONA, which was declassified in 1995. Its aim was to develop a film-return photo reconnaissance satellite. The first Corona surveillance satellite took more photographs of the Soviet Union territory than the total from all 24 of the U-2 earlier missions over the country. The images, although fuzzier than U-2 photographs, covered areas of the Soviet Union never reached by the spy planes. See Short, *supra*, note 4; See "History of the Lockheed U-2", online: The free Dictionary at <http://encyclopedia.thefreedictionary.com/Lockheed%20U-2>. See Alan Wasser, "LBJ's Space Race: What We Didn't Know Then (Part 1)", (2005), online: The Space Review at <http://www.thespacereview.com/article/396/1>.

[58] Michael Milde, "Dispute Settlement in the Framework of ICAO" (1980), Public International Air Law: Course Materials, IASL, 2002, p.279: "The Convention is first of all a comprehensive unification of public international air law and at the same time is a constitutional instrument whereby an international organization [...] was created and its functions, powers and constitutional procedures were defined."

[59] ICAO Observer (C-WP/8063, p.3).

USSR. This document, together with three previous UNGA Resolutions,[60] provided the general framework for what would eventually become the 1967 Outer Space Treaty.[61] Resolution 1721 stated the UN refusal to recognize any sovereignty in outer space. It concluded that outer space was to be free for exploration and use by any and all states, in conformity with international law, and that outer space was not subject to appropriation by any state.[62] During the same year, through a study for NASA on the situation prevailing at the time, it was concluded in a RAND report[63] that:

> "At least provisionally, space flight appears to be considered not inherently subject to exclusive sovereignty of an "under"-lying national state. The threat that air sovereignty would be extended automatically to space flight seems for the present to have receded. Both the US and the SU [Soviet Union] have behaved as though the national air sovereignty which they acknowledge all states to possess did not extend so as to require them to obtain prior consent for geocentric orbital "over"-flights or for deep-space-probe "over"-flights, though the programming of a few shots whose missions might have been considered "delicate" may have owed something to a desire to avoid "over"-flight of certain territories. Official US statements have gradually approached an explicit declaration that outer space is, in general, free. Legal opinion in the US and the SU has on the whole taken the same position, as has that in other countries." [64]

The US and Soviet satellites had been orbiting over other nations for approximately three years without objection before the UN suggested the "freedom of space" principle. Each side was well aware of the other's information-gathering

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[60] Namely, Resolution 1772, Jan.3, 1962: *International Co-operation in the Peaceful Uses of Outer Space*; Resolution 1962 (XVIII), Dec.13, 1963: *Declaration of Legal Principles Governing Activities of States in the Exploration and Use of Outer Space*; and Resolution 1963 (XVIII), Dec.13, 1963: *International Co-operation in the Peaceful Uses of Outer Space.*

[61] See Outer Space Treaty, *infra*, 66.

[62] See Heere, *supra*, note 52.

[63] RAND (the name of which was derived from a contraction of the term *research and development*) is a nonprofit research organization providing objective analysis on pressing problems. Initially, RAND focused on issues of national security. See Rand Corporation online at : <http://www.rand.org/about/history/>.

[64] B. Cheng, "The United Nations and Outer Space", 14 CLP 1961, at 259-62.

satellites.[65] It was therefore not surprising that later, most nations also agreed to this principle. The freedom principle was established in the UN Treaty on Principles Governing the Activities of Sates in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, signed on 27 January 1967.[66] The Outer Space Treaty clarified the issue of space sovereignty in its Article I (2) and Article II. It affirms that "outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." The so-called "principle of freedom" of passage for satellites in outer space had been created. As demonstrated, this particular aspect of international space law had evolved from the practice of nations rather than by formal statement of countries positions.

Yet, the legal debate about where airspace ends and outer space begins continued. In 1959, the UNCOPUOS concluded that a determination of precise limits for airspace and outer space was not a problem requiring priority attention.[67] The main reasons for not defining outer space were that it was premature and it limited military space operations. Furthermore, the two major space powers advocated for an *ad hoc* approach that would allow practice and technology to drive the evolution of the law on this issue. The approaches to delimitation of outer space were myriad.[68] Nonetheless, in the 1960s, during a meeting of the International Aeronautics Federation (IAF) attended by individuals from both the US and the URSS,[69] it was suggested that the limit of airspace and outer space shall be between the upper flight height of aircraft and the lower orbit of

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[65] Richard S. Leghorn & Gregg Herken, "The Origins and Evolution of Openness in Overhead Global Observations", published in COMMERCIAL OBSERVATION SATELLITES: AT THE LEADING EDGE OF GLOBAL TRANSPARENCY, by Rand and ASPRS (2001), at 29.

[66] *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 (entered into force Oct. 10, 1967) [hereinafter Outer Space Treaty].

[67] See Cheng, *supra*, note 64.

[68] The two most prevalent approaches for defining outer space have been the spatial and functional theories. For an interesting explanation of these approaches see B. Cheng, "The Legal Regime of Airspace and Outer Space: The Boundary Problem Funtionalism versus Spatialism: The Majors premises", 1980 *Annals of Air & Space Law* 323.

[69] It is to be noted that the individuals attending IAF meetings are acting in their personal capacity and not as representatives of their States.

spacecraft, arbitrarily established at 62 miles (or 100 km).[70] Since then, and following many debates and theories as to the upward extent of national territory, it is safe to assert that national airspace extends somewhere up to approximately 100-110 km. But no agreement has been reached yet.

To date, defining outer space still remains on the agenda of the Legal Subcommittee of the UNCOPUOS. According to many, "it is highly unlikely that any delimitation or demarcation between airspace and outer space will be internationally recognized until a particular practice or technological device makes such a definition imperative." [71]

1.1.3 The Creation of Civil and Military Programs

The Sputnik crisis was also the catalyst for a whole chain of US initiatives. In August 1958, President Eisenhower signed NSC 5814/1 entitled "Preliminary US Policy on Space", which "described in detail the purpose and principles for US civilian and military space programs".[72] The NSC 5814/1 policy essentially downplayed the role of the military and emphasized NASA's role in outer space.[73] President Eisenhower wanted to stress that the US was interested in the peaceful uses of space, but recognized that space had military applications as well. [74]

He and his advisers agreed that a new federal agency was needed to conduct all nonmilitary activities in space. Their desire to separate military and civilian space activities led to creation of NASA under the new National Aeronautics and Space Act of

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[70] Everett C. Dolman, *Astropolitick: Classical Geopolitics in the Space Age*, Frank Cass Publishers, Cass series, 2002, Strategy and history; no 4, p.208 at 115.
[71] Delbert R. Terrill, Jr. Colonel, USAFR, "The Air Force Role in Developing International Outer Space Law", Air University Press, Maxwell Air Force Base, Alabama, May 1999 online at: <http://www.au.af.mil/au/awc/awcgate/space/terrill.pdf>.
[72] *Ibid.*
[73] *Ibid.*
[74] Marcia S. Smith, "U.S. Space Programs: Civilian, Military, and Commercial" (2004) CRS Issue Brief for Congress, online at: <http://italy.usembassy.gov/pdf/other/IB92011.pdf>.

1958.[75] NASA was established as a "civilian agency charged with defending American prestige in the eyes of the world".[76] Under the NASA Act, it was specified that the Department of Defense (DOD) [77] would retain control over military space programs.[78] Further, the Act maintained that "activities in space should be devoted to peaceful purposes for the benefit of all mankind." [79]

Civilian remote sensing from space began in April 1960 with the launch of the Television and Infrared Observational Satellite (TIROS-1) as an experimental weather satellite. The first satellite remote sensing for the civilian sector designed specifically to collect data of the Earth's surface and resources was launched in July of 1972, when NASA launched the ERTS system, later renamed and now known as the Landsat system.[80] For the purpose of this thesis, we will only be focusing on the civilian/commercial remote sensing satellites systems.

1.2 Technical Background and Context

1.2.1 Definition of Remote Sensing

The term "remote sensing" is said to have been used for the first time during the 1950s by a female geographer/oceanographer called Evelyn Pruitt of the US Navy's Office of Naval Research (ONR).[81] She is said to have introduced the term "sensing" to differentiate the collection of earth's images from the air (aerial photography), to the collection of the earth's *imagery* from space (using broader forms of imagery and requiring other forms of sensors than cameras) and which she considered far more

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[75] P.L. 85-568: *National Aeronautics and Space Act of 1958*, 42 U.S.C. [Hereafter the "NASA Act"].
[76] Barton Beebe, "Law's Empire and the Final Frontier: Legalizing the Future in the Early Corpus Juris Spatialis" (1999), online at: <http://www.bartonbeebe.com/documents/n-beebe.pdf>.
[77] The US Department of Defense is a Cabinet organization of the US Government which controls the US military.
[78] See the "US Department of Defense", online: Wikipedia, the free encyclopedia at: <http://en.wikipedia.org/wiki/United_States_Department_of_Defense>.
[79] *NASA Act*, *supra*, note 75.
[80] Hugh Bloemer and Dale Quattrochi, "Remote Sensing from Satellites" online: Online Journal of Space Communication <http://satjournal.tcom.ohiou.edu/issue03/editor.html>.
[81] Campbell, *supra*, note 5.

"remote". [82]

Nowadays, the term is commonly used to describe "the science of identifying, observing, and measuring an object without coming into direct contact with it." [83] This activity of looking at a target from a distance is a familiar and simple process that every human beings use, consciously or not, in their day-to-day life. In its most simplistic form, our eyes serve us as remote sensors. Further, many of us make use of remote sensing systems, such as, *inter alia,* cameras, scanners, telescopes, radiometers and radars.

However, the more advanced remote sensing systems are mainly used for acquiring information about earth, the planets, the stars, and ultimately the whole cosmos.[84] Therefore, a formal and technical definition should encompass these notions. According to the UN definition, it would consist in "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 the environment".[85] A simpler definition of space remote sensing would therefore be the collection of data that can be processed into imagery of surface features of the earth from a satellite.

In a more global context, remote sensing activities consist of the operation of remote sensing space systems, primary data collection, and inputs of data and knowledge from other sources. One can see here that the earth observation activity has many considerations to it and that one should be mindful in drafting regulations of the issues related to each and every one of these aspects.

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[82] Short, *supra*, note 4.
[83] "Remote Sensing" online: Earth Observatory <http://earthobservatory.nasa.gov/Library/RemoteSensing/>.
[84] See Short, *supra* note 4.
[85] See *1986 Remote Sensing Principles, infra*, note 155, Principle 1 "remote sensing".

1.2.2 Key Concepts and Technical Considerations

One basic technical consideration to bear in mind when looking at remote sensing regulatory frameworks is that these systems are usually comprised of four basic segments:

(1) Space segment (Sensors);

(2) Launch segment (Test & Integration, Launch Vehicles & Services, Orbit Insertion);

(3) Ground segment (Ground Receiving Stations, Operation & Maintenance); and

(4) User segment (Data Management/ Archiving, Application Software).

Each of these segments is regulated by the country in which it is used, often on the basis of international principles. So far, both at the international and national level, the legal regimes pertaining to remote sensing are mainly concerned with space based systems in terms of their purposes and the technology involved in the remote sensing process.

1.2.3 Overview of the Remote Sensing Process

Another essential thing to note is the functioning of the remote sensing satellites (or space segment) and the impact on the regulatory framework of using certain technology.

1.2.3.1 The Production of the Data by Satellites Sensors or Radars

As one may know, all objects on the ground absorb and re-transmit energy in some form of another. Remote sensing satellites detect the emission of electromagnetic waves through optical sensors. Optical sensors have been used since the beginning of the Landsat series. Now the radar technique, which consists of transmitting electromagnetic waves towards the observed target, tends to be used more frequently. In fact, an improvement in the techniques lead to the use of Radar satellites technology or Synthetic Aperture Radar (SAR) which enable sensors to penetrate clouds and to sense in the dark,

obstacles that optical sensors cannot avoid. Canada's Radarsat-1 and -2 are among the instruments that use such technology.

Radar is an "active" microwave system. "It has been flown on both military and civilian spacecraft because of its ability (for certain wavelengths) to penetrate clouds".[86] The optical system is considered a "passive" system. The difference is that active remote sensors emit electromagnetic waves that travel to an object and are reflected back toward the sensor.[87] A familiar example of active remote sensors includes X-rays that use electromagnetic waves to produce images of the human body. Passive remote sensors observe electromagnetic waves emitted by objects.[88] One example of this is the camera. Hence the technology involving an active system like a radar system has a much higher observation capability than any passive systems, including the optical system. Furthermore, radar systems can lead to very high spatial resolution capabilities that are crucial technical elements when operating commercial remote sensing satellites. Indeed, legislative limitations and conditions are often imposed based on the level of such resolution. In particular, commercial data of a pre-determined resolution is considered sensitive for national security reasons and cannot be distributed to all comers.

The "spatial resolution" is defined as "the level of detail, or smallest size of an object, which can be identified" [89] and is commonly expressed in meters. Higher-resolution images (1m to 5m) enable the detection of smaller objects such as vehicles, whereas lower-resolution images (10m or larger) are mainly limited to distinguishing objects of large features such as airports. Present civil systems have spatial resolutions in the range of 5 to 30 meters. Commercial systems are now offering data under 10 meters and as fine as 1-3 meter resolution. Some commercial firms are planning resolutions even

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[86] Short, *supra* note 4.
[87] See Remote sensing using satellites, online: University Corporation for Atmospheric Research at : <http://www.comet.ucar.edu/nsflab/web/remote/113.htm>.
[88] *Ibid.*
[89] Bourbonnière, *supra,* note 31 at 14 (footnote 25).

better than one meter. [90]

1.2.3.2 The Transmission of the Data to the Ground

The data produced by the remote sensing satellites consist of four types of remote sensing data or information:

(1) Raw data,

(2) Primary (or unenhanced) data,

(3) Processed data, and

(4) Analyzed information.

Raw data is data collected by a satellite that has not been processed at all. *Primary data* (or unenhanced data) consists of remote sensing signals or imagery that is unprocessed or subject only to data preprocessing.[91] This is the data usually selected by Governments for storage. *Processed data* means the products resulting from the processing of the primary data, needed to make such data usable. *Analyzed information* is information gleaned from the interpretation of the processed data, including inputs of data and knowledge from other sources. Once processed and analyzed, remote sensing data can be utilized in a variety of applications.[92]

1.2.3.3 The Collection and Processing of the Data on the Ground

Data is collected from the satellite platform by the ground segment (ground receiving stations) and sent to the user segment. The user segment encompasses value-added firms or organizations in charges of distributing and/or archiving the data. Value-added firms are the providers that apply their particular expertise to transforming imagery

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[90] Molly K. Macauley & Timothy J. Brennan, "Enforcing Environmental Regulation: Implications of Remote Sensing Technology", Discussion Paper 98-33, (1998) at 4, online: Resource for the Future at <http://www.rff.org/Documents/RFF-DP-98-33.pdf>.

[91] Preprocessed data is data beyond raw data but that have not yet been processed into a usable image or other product.

[92] See Michael R. Hoversten, "U.S. national security and government regulation of commercial remote sensing from outer space", Air Force Law Review, Winter 2001, online at: <http://www.findarticles.com/p/articles/mi_m6007/is_2001_Wntr/ai_75622168>.

and geospatial data into the distinctive types of information products and services desired by various market segments. Some consider that this is the real market value of the commercial remote sensing industry.

1.2.4 Applications and Purposes

As a few examples of remote sensing applications, one can mention the following main fields: land use planning, civil aviation, environmental control, agriculture, fishing, oil and meteorology. Observation satellites also provide a regular coverage of events like conflicts, crises and catastrophes, and help in verifying arms control agreements. At the end, current and potential applications of space-based remote sensing data are seemingly endless.

All of these remote sensing applications serve a wide range of purposes. The most important ones are: scientific, civilian, commercial, and military purposes. The very first declared purpose in the early beginnings of remote sensing was the scientific one. Those satellites were (and are still today) solely used for research and discovery and often benefited non-profit organizations or educational institutions. Not long after, civilian activities, considered to be of public domain and mainly conducted by national space agencies or organizations, started to appear. The civilian systems and the data they produced are public good services, deemed vital public knowledge.[93] By their nature, they are not subject to commercialization. One example is the meteorological satellites (such as TIROS) which are sometimes discriminated from the other remote sensing satellites (such as Landsat) since their main purpose is meteorological observations while the purpose of the other earth observation satellites is mainly land area observation.[94] Plus, meteorological satellites are often of dual purposes, being shared with the military sector.

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[93] Bourbonnière, *supra,* note 31 at 11.

[94] Japan Association of Remote Sensing, "Chapter 5.8:Remote sensing satellites" (1996) online: Laboratorio de Procesos Oceanograficos y Clima - PROFC (Universidad de Concepcion) at: <http://www.profc.udec.cl/~gabriel/tutoriales/rsnote/cp5/cp5-8.htm>.

Recently, applications started to be of a much more commercial tendency. Commercial purpose of remote sensing is defined as "the exploitation of remote sensing data to gain profit, either through the procurement and sale of data as an intermediate good or through value added analysis that uses sensing as a production input"[95] Commercial data is used for similar applications and purposes than the ones already mentioned and they have the advantage to be supplied to the customers on an on-demand basis and at a maximum quality level. These customers range from private companies or individuals to Governments and military departments. Given the diversity of the actors involved in the commercialization of remote sensing satellites, especially in terms of their motivations and intended purposes, the commercial aspect of remote sensing had to be framed and structured and now functions within its own policy and regulatory system.

Finally, remote sensing application does not depart from its dominant military dimension that prevailed since the beginning and still remains today. Hence one of the purposes of remote sensing, if not the main one, is military or national security purpose. "Visible, Near-Infrared; Thermal Infrared, and Radar sensors are applied to gathering information about ground targets and activities of national security significance. Many of the military or intelligence satellites, up until recently, have had superior resolutions when compared with Space Agency systems." [96] Although organizationally separated and having different purposes, the military space program is not easily divided from civilian or commercial programs. Both military and civil sectors use communications, navigation, weather, and remote sensing/reconnaissance satellites, which may operate at different frequencies or have different capabilities, but have similar technology. The same launch vehicles can be used to launch any type of military, civilian, or commercial satellite. They even share the use of satellites sometimes.[97] It follows that when analyzing the legal regime of one sector, it is essential to highlight the relationship in terms of differences and similarities with the other sectors.

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[95] Bourbonnière, *supra,* note 31 at 12, cited in D.J. Johnson, M. Nelson & Robert J. Lempert, "U.S. Space-Based Remote Sensing: Challenges and Prospects" (Santa Monica, CA: Rand, 1993) at 2-3.
[96] Short, *supra*, note 4.
[97] See Smith, *supra*, note 74.

Therefore, this thesis will mainly focus on the commercial purposes of remote sensing satellites but will include, given the military origins of the technology and the undeniable influence of such systems on the current commercial legal regimes, the concept of national security. At last, only the American and Canadian commercial remote sensing legal regimes will be analyzed for reasons of scope and brevity.

CHAPTER TWO: THE INTERNATIONAL LEGAL FRAMEWORK OF REMOTE SENSING

2.1 Introduction

Remote sensing is essentially an international activity. [98] Hence, in order to better comprehend the national regulations applied by various States, one must strive to understand the international context for commercial remote sensing. At the outset, it is imperative to specify that "space law", which is based on five international treaties,[99] is an already codified field of international law. In fact, many principles of these five ratified instruments became *de facto* as well as *de jure* conventional and customary law, binding on all States.[100] Another particularity of international space law *per se* is that it is a specific field of international law to which the maxim *"lex speciales derogate generale"* [101] applies.

In the following sections, we will review the main legal principles of space law, formulated at the international level in accordance with established law-making process. A brief overview of the actual and emerging international bodies involved in such process will also be done. We will finally discuss how international principles relate to remote sensing activities and how States are under the obligation to respect these principles through their domestic space law regimes.

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[98] See Ram Jakhu, "International Policy and Law-Making Process for Remote Sensing by Satellites", 1997 Annals of Air & Space Law Vol. 22-I, at 452.

[99] Between 1967 and 1979, five space treaties have come into force, commonly referred to as: The Outer Space Treaty of 1967, The Agreement on Rescue of 1968, The Liability Convention of 1972, The Registration Convention of 1975 and the Moon Agreement of 1979. See "United Nations Treaties and Principles on Space Law" online: Office for Outer Space Affairs at <http://www.oosa.unvienna.org/SpaceLaw/treaties.html>.

[100] De facto means "in fact" or "as a matter of fact". De jure means "based on law" or "as a matter of law."

[101] Special law has priority over general law.

2.2 The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS)

The UN COPUOS has been and is still a major and recognized forum for the formulation of international space law since its formation in 1958.[102] Starting as an *ad hoc* Committee, COPUOS became a permanent body of the UN system in 1959.[103] COPUOS comprises two sub-committees, each aiming at considering either the legal or scientific & technical aspects of the peaceful uses of outer space. [104] In particular, the legal sub-committee is responsible for the drafting of treaties and agreements regarding outer space issues. The process of drafting is necessary detailed and lengthy since it involves formal general discussions and negotiations between delegations, as well as numerous informal consultations during which much of the progress is made.[105]

Once finalized, the drafts treaties are adopted by the COPUOS Members[106] and by consensus.[107] They are further approved by the UN First Committee[108] and finally presented to the UN General Assembly. The recommended texts are adopted, through its

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[102] See Ram Jakhu, "Developing Countries and the Fundamental Principles of International Space Law (1991) in General Principles of Space Law: Course Materials, IASL, 2002, pp.165 at 167. Each body meets annually to discuss the current items on their respective agendas. See Office of Outer Space Affairs online: <http://www.oosa.unvienna.org>.

[103] The General Assembly established the Committee as a permanent body and reaffirmed its mandate in Resolution 1472 (XIV). See "United Nations Committee on the Peaceful Uses of Outer Space: History and Overview of Activities" online: Office for Outer Space Affairs at <http://www.oosa.unvienna.org/COPUOS/cop_overview.html>.

[104] See Jakhu, *supra*, note 102 at 167.

[105] See Nandasiri Jasentuliyana, "The Lawmaking Process in the UN" (1992) in General Principles of Space Law: Course Materials, IASL, 2002, pp.153 at 153.

[106] Since 1959, COPUOS has grown from 24 to 67 Members which makes it one of the largest Committees in the United Nations today. For a complete list of State Members see "History and Overview of Activities", OOSA, *supra*, note 103.

[107] In consensus processes, formal decisions or actions cannot be made or taken unless it is agreed to by all parties. In a majority rule process, decisions are made by voting with a majority determining the position of the entire group. The main drawback of the consensus process is that it can be extremely difficult especially when opposing parties have absolutely irreconcilable and contradictory interests. Further, it can be very slow. But it has been considered appropriate within COPUOS and the UNGA since "the consensus rule has ensured that the treaties drafted in the United Nations were acceptable to both space powers and non-space powers." See Jasentuliyana, *supra,* note 105 at 154.

[108] The UN First Committee is a subsidiary organ of the UN General Assembly which deals with all disarmament and nonproliferation questions.

Members States[109] and again by consensus, in the form of resolutions to which the draft treaties are annexed. These resolutions and their appendices (i.e. draft treaties) are submitted again to all UN States Members for adherence and ratification. Only after the required number of ratifications is reached do the resolutions' appendices become legally binding treaties and agreements internationally recognized. As one can see, the process of formulating and adopting space treaties and agreements can be laborious and time consuming. Yet, there is no time frame or time limitation for this process to take place. [110]

Thus far, within this process, the UN COPUOS legal sub-committee has produced five major multilateral space treaties,[111] all of which have been ratified and became part of the "*Corpus juris spatialis internationalis*" or the body of international space law.[112] Furthermore, another contribution of the UN COPUOS is the adoption of five sets of legal Principles by the General Assembly. The UNGA Principles[113] aimed at regulating human activities in outer space. The legal difference between the five international treaties and the five sets of principles elaborated through the UN reside in the following statement by the UN Office for Outer Space Affairs[114]:

> "Following their adoption by the General Assembly, the five international treaties governing outer space were opened for signature and ratification by Member States. Under international law, their provisions are binding upon those States who have ratified them. In addition, they articulate agreed upon principles relating

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[109] As of 2005, there are 191 United Nations Member States. See "List of Member States", UN Press Release ORG/1360/Rev.1 (Updated 24 February 2005), online: United Nations at <http://www.un.org/Overview/unmember.html>.

[110] See Jasentuliyana, *supra*, note 105 at 153.

[111] See *supra*, note 99 and accompanying text.

[112] The *Corpus juris spatialis internationalis* is the whole of the five UN space treaties but also includes the UNGA five set of legal principles, international agreements, treaties, conventions, rules and regulations of international organizations (eg. the International Telecommunications Union), national laws, rules and regulations, executive and administrative orders, and judicial decisions. See OOSA online, *supra*, note 102.

[113] The UNGA Principles are commonly referred to as: The 1963 Legal Principles on Outer Space, The 1982 Principles on Direct Broadcasting, The 1986 Principles on Remote Sensing, The 1992 Principles on Space Nuclear Power and The 1996 Declaration on Space Benefits. See United Nations Treaties and Principles on Space Law online: Office for Outer Space Affairs at <http://www.oosa.unvienna.org/SpaceLaw/treaties.html>

[114] The Office for Outer Space Affairs [hereinafter OOSA] mainly serves as the secretariat for COPUOS and implements its recommendations and those of the UNGA. See OOSA online, *supra*, note 102.

to the exploration and use of outer space which may guide even those States which have not legally bound themselves to the provisions. The five sets of principles have the legal status of General Assembly resolutions. They provide generally accepted principles, rules and standards by which States may, and very often do, govern their space related activities." [115]

As will be elaborated later in this chapter, the UN OOSA statement with respect to the non-binding nature of the UNGA Resolutions, although generally accepted at the beginning, is starting to be contradicted by many scholars.[116]

2.3 The United Nations International Treaties Applicable to Remote Sensing

Amongst the five Space Treaties existing today, we will only consider the Outer Space Treaty and certain provisions of the Registration Convention[117] and the Liability Convention.[118] Their contents are considered relevant for the issues of remote sensing activities, particularly commercial remote sensing.

2.3.1 The Outer Space Treaty

Qui tacet consentire videtur
He who is silent appears to consent
Roman Maxim

At the outset, it should be remembered that the Outer Space Treaty is the *magna carta* of international space law. However, it only provides for broad and general

[115] OOSA online, *supra*, note 102.
[116] See e.g. Sergio Marchisio, "The Evolutionary Stages of the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS)", Journal of Space Law, vol.31, 2005, at 229. See Joanne Irene Gabrynowicz, *"Defining data availability for commercial remote sensing systems: under United Nations States Federal Law"*, Annals of Air and Space Law, vol.XXIII, 1998, pp.93-108.
[117] *Convention on Registration of Objects Launched into Outer Space*, 14 January 1975, 1023 U.N.T.S. 15, 28 U.S.T. 695, T.I.A.S. No. 8480 (entered into force 15 September 1979).[Hereafter Registation Convention].
[118] *Convention on International Liability for Damage Caused by Space Objects*, 29 March 1972, 961 U.N.T.S. 187, 24 U.S.T. 2389, T.I.A.S. No. 7762 (entered into force 1 September 1972). [Hereafter Liability Convention].

principles on the substantive aspects. In the Outer Space Treaty,[119] there is no specific section on remote sensing. This is easily explained by the fact that this international instrument is what one can call a "futuristic" one. In fact, it was not created to concretize what was known at the time of its adoption (i.e. in 1967) but to cover also new and future applications of human activity in outer space. As a result, there is no direct reference to remote sensing activity, neither in the Outer Space Treaty nor in any of the four other major space law treaties, since commercial remote sensing applications only fully emerged several years after their ratification. However, even if the Outer Space Treaty does not specifically address remote sensing, certain provisions can however be interpreted to apply to this activity.

The first issue to clarify is the legality of remote sensing, including military reconnaissance, in outer space. The first four Articles of the Outer Space Treaty confirmed the consistency of this activity with international norms. Firstly, according to Articles I (2) and II of the Outer Space Treaty, outer space and celestial bodies are not subject to national appropriation by claim of sovereignty, by means of use or by any other means. This principle obviously denies the application of State sovereignty to the orbiting of any type of satellites in outer space, which includes the orbiting of remote sensing satellites.[120] Hence, Articles I (2) and II established the outer space as a *res communis*[121] under international law. Therefore, as previously mentioned, the data gathering by remote sensing satellites operating in "international space", much like aircraft operating in international airspace over the high seas, is consistent with international norms.[122]

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[119] See *Outer Space Treaty*, *supra* note 66.
[120] See *Outer Space Treaty*, *supra* note 66, Article II.
[121] Territory free for equal use by all States.
[122] See B.Cheng "Studies in International Space Law" (1997), p.572 at pp.578-81; See Major Robert A. Ramey", The Air Force Law Review 2000, 48 A.F.L. Rev. 1, (2001) online at: <http://www.space4peace.org/slaw/lawofwar.htm#n468>, construed from C.Q. CHRISTOL, THE MODERN INTERNATIONAL LAW OF OUTER SPACE 22 (1982) at 41 and 45: "Indeed the principal Outer Space Treaty negotiator for the U.S. stated that the analogy of the high seas was a guiding theme during the drafting of Article 1 of the Outer Space Treaty establishing the freedom of outer space. From this, Christol concludes that the negotiators of the Outer Space Treaty were "aware of the res communis concepts applying to the ocean and were employing this analogy as they contemplated the legal rules to be applied in the exploration and use, including exploitation, of the space environment."

Secondly, Article III and IV affirm the legality of collecting data from space as long as it is in accordance with international law and for peaceful purposes. Article III makes general principles of international law applicable to outer space, which includes customary law and the UN Charter.[123] Article 2 (4) of the UN Charter prohibits "the threat or use of force"[124] and makes it "unlawful for a State to interfere in a hostile manner with the space assets of another State, to include reconnaissance satellites".[125] Hence, States should not interfere with intelligence-related activities in outer space. In the event of hostile actions from a State, the legality to defend itself against such actions could be premised on the self-defense provisions of Article 51 of the UN Charter.[126]

Finally, Article IV (2) provides that "the moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes."[127] To that effect, the US has proposed within the UN and at the international level, that "peaceful purposes" means non-aggressive use.[128] This interpretation would allow defense and intelligence-related activities in pursuit of national security and other military goals. Naturally, this view was not universal. The USSR and other States considered the term "peaceful purposes" to mean non-military use.[129] Under that second interpretation, reconnaissance for military purposes would be illegal.

Today, the US position is *de facto* the one that has been prevailing. As evidenced by customary practices (incidentally that of both superpowers), it can be fairly said, concerning civilian and military reconnaissance, that "international law affords States a

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[123] See Christopher M. Petras, "Eyes of Freedom-A view of the law governing military use of satellite reconnaissance in U.S. homeland defense", 31 *Journal of Space Law* 2005, p.81 at pp.86-94.
[124] *Charter of the United Nations*, 26 June 1945, Can. T.S. 1945 No.7, Article 2 (4) [Hereafter the UN Charter]
[125] See Petras, *supra*, note 123.
[126] *UN Charter*, *supra*, note 124, Article 51.
[127] *Outer Space Treaty*, *supra* note 66, Article IV.
[128] "The White House National Space and Technology Council Fact Sheet: National Space Policy" (Sept. 19, 1996) online: CDI Center For Defense Information at: <http://www.cdi.org/program/document.cfm?documentid=343&programID=68&from_page=../friendlyversion/printveron.cfm>.
[129] See Ram Jakhu, "Weaponization of Space and the Outer Space Treaty", Presentation to the Delegations to the First Committee of the United Nations General Assembly, 14 October 2002, UN Headquarters, New York, NY, USA.

fundamental right to acquire data from space".[130] Plus, the reconnaissance activity using satellites has also been recognized as "a stabilizing factor in world affairs through the monitoring of arms controls agreements" and as a "positive contribution [...] to the security of all nations". [131] This has led to "the assimilation of the lawfulness of space-based "intelligence, surveillance, and reconnaissance" into the *Corpus Juris Spatialis*",[132] or body of space law.

The second issue is the legality of remote sensing activities by commercial entities. Again, Article 1 (2) provides for the free "exploration" and "use" of outer space "by all States".[133] According to many, the absence of definition of these terms within the Outer Space Treaty does not mean that commercial explorations and uses are forbidden.[134] Nor does it mean that exploitation of outer space by private entities should be excluded.[135] The freedom of exploration of outer space "extends to States, their private natural or legal persons under their authority and supervision, and to the international organizations of which they are member."[136] In fact, the letter of Article VI of the Outer Space Treaty clearly allows private companies to explore outer space.[137] When looking at said provision, one can also easily conclude that private remote sensing activities are not forbidden, although authorization and continuous supervision by the States is required.

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[130] See Petras, *supra,* note 123.
[131] Ivan A. Vlasic, "The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer-Space, in Peaceful and Non-Peaceful Uses of Space 37, at 38, 45 (B.Jasani ed. 1991). Cited in Petras, *supra,* note 123 at 94.
[132] *Ibid.*
[133] [...] "Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies." [...] See *Outer Space Treaty, supra* note 66, Article I (2).
[134] See Ram Jakhu, "International Law Governing the Acquisition and Dissemination of Satellite Imagery", Journal of Space Law, vol.29, 2003, pp.65-91 at 74.
[135] *Ibid.*
[136] *Ibid.* Construed from the *Outer Space Treaty, supra*, note 66, Article VI.
[137] "States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization." *Outer Space Treaty, supra*, note 66, Article VI.

Indeed, Article VI also defines the conditions in which activities in outer space by non-governmental entities ought to be conducted. According to the provision, the activities of non-governmental entities require authorization and continuing supervision by the "appropriate State". They must also make sure that any activities carried out by private entities are done so in conformity with the Treaty.[138] Furthermore, State parties bear international responsibility for national activities in outer space, including any activities by non-governmental entities.[139] Hence, Article VI essentially requires that States regulate the space activities of non-governmental or private entities.[140]

Based on the above, it is safe to assert that there are no legal obstacles to using remote sensing satellites in outer space, and that the use of private earth observation systems are not an issue in international space law. In fact, the terminology used in the Outer Space Treaty is general enough to allow an interpretation permitting commercial activities in space.[141] Further, the legal principle of freedom of exploration and use of outer space has been generally accepted as part of customary international law, binding on all States.[142]

2.3.2 The Liability Convention

Article VII of the Outer Space Treaty, as further elaborated by the Liability Convention, holds States liable for damage caused by their private entities in their space endeavors.[143] It prescribes that each State that launches or procures the launching of an object into outer space, and each State whose territory or facility an object is launched from, is internationally liable for damages caused by that object to another State or to its natural or juridical persons.[144] As seen, Article VI of the Outer Space Treaty also

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[138] See Hoversten, *supra,* note 92.
[139] See *Outer Space Treaty, supra,* note 66, Article VII.
[140] See Hoversten, *supra,* note 92.
[141] Bourbonnière, *supra,* note 31 at 28.
[142] See Jakhu, *supra,* note 134 at 76.
[143] See Hoversten, *supra,* note 92.
[144] See Julian Hermida, *Legal Basis for a National Space Legislation,* Space Regulations Library, volume 3, Kluwer Academic Publishers, Dordrecht/Boston/London, 2004, p.273 at 11. Construed from the *Outer Space Treaty, supra,* note 66, Article VII.

encompasses accountability for private entities. It therefore follows that "international liability relating to commercial remote sensing satellite directly belongs to the launching State." [145]

The Liability Convention was adopted in 1972 for the overriding purpose of establishing an elaborate and conclusive international system of liability.[146] Under its Article II, States are absolutely liable for damage caused by the space objects of private entities on the surface of the earth or to an aircraft in flight. The Convention depicts a victim-oriented approach of responsibility and strict liability of States for internationally wrongful actions.

Another interesting aspect is that the Convention allows for the possibility of arrangements between the so-called launching States to distribute the risks arising from a joint launch.[147] In fact, more than one State could be held liable in a situation where a private remote sensing system would be owned by several companies in numerous States. In turn, most of the so-called launching States have concluded liability arrangements with their private entities for the transfer and allocation of such liability. For instance, the current US licensing regime requires commercial providers to obtain commercial insurance for the launch of their remote sensing satellites.

Finally, it is worth observing that the "launching state" could also be the "appropriate state" (referred to in Article VI of the Outer Space Treaty) or vice versa. Moreover, there could be multiple launching States and appropriates States with respect to a particular satellite. Again, the appropriate state is obliged to authorize and continuously supervise the space activities of non-governmental entities while the launching state is internationally liable for such activities. These types of private and commercial endeavors would inevitably require coordination between the concerned

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[145] See Patrick Salin, *Selected legal aspects of commercial remote-sensing-bilateral regulations and proprietary provisions relative to LANDSAT, SPOT, MOS-1, ERS-1 and RADARSAT*, Thesis, Institute of Air and Space Law, McGill University, 1992 [unpublished] at 27.

[146] See F. Von der Dunk, "Public Space Law and Private Enterprise" (2001) in General Principles of Space Law: Course Materials, IASL, 2002, pp.375.

[147] See *Liability Convention, supra*, note 118. Article V (2).

States. Once more, the direct consequence of international liability and accountability of State is that recourses must be taken at the national level in order to answer for private space activities.[148]

2.3.3 The Registration Convention

The Registration Convention expands and clarifies Article VIII of the Outer Space Treaty, requiring that launching States maintain a national registry and that the Secretary General of the UN maintain an international registry.[149] Article IV of the Registration Convention further established the obligation for launching States to register objects launched into outer space with the UN. The clause also requires launching States to provide the Secretary General with detailed information on such space objects. Some authors have seen Articles IV of the Registration Convention as a general and secondary aspect of remote sensing.[150] However, as registration is mandatory under international law, it directly applies to the launch of any remote sensing system, including commercial systems.

All of the parameters highlighted above have a direct impact upon the issue of remote sensing activities by private entities. The most efficient and comprehensive mean for a State to take care of international liability and other issues on the domestic level, is through the establishment of national space laws including most prominently licensing regimes.[151] Through their regulatory scheme, national governments and policymakers must be sure to address all of their above-mentioned international obligations. Consequently, they end up having a direct influence on the development and direction taken by their commercial and private remote sensing industry.

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[148] See Marchisio, *supra*, note 116. See UNGA Resolution A/RES/59/115, *Application of the concept of the "launching State"*, 10 December 2004.
[149] See Hoversten, *supra,* note 92.
[150] See R. Loosh, "Acceptability of the use of satellite imagery for agency safeguards purposes", *Commercial Satellite Imagery: A tactic in nuclear weapon deterrence*, Springer; Chichester, UK: Praxis Publishing Ltd, 2002, pp.299 at 275.
[151] See Von der Dunk, *supra*, note 146.

At the moment, only a few States[152] (the major ones being the US, Russia, the United Kingdom, Sweden, South Africa, and Australia) have adopted specific legislations relating to outer space activities. Of those, only a few have specific legislations on remote sensing systems. One of them is the US, which was the pioneer in instituting national space legislation for commercial remote sensing. Since the US acted as instigator in this domain, Nations engaging in regulating their remote sensing industry will most probably be influenced by the American commercial remote sensing regulatory framework. They are likely to shape their earth observation legal regimes according to this US based model that is now being followed by many countries including Canada.

2.4 The 1986 United Nations Principles on Remote Sensing

As already stated, there are no legal obstacles to using remote sensing satellites in outer space. The use of private earth observation systems is not an issue in international space law. However, the collection and distribution of data has been the object of an international debate. These activities were falling outside of the immediate scope of the Outer Space Treaty, being primarily earth-based activities. The questions initially raised were: does a sensing State need prior consent of the sensed State before remotely sensing it from outer space and how are the data collected going to be disseminated? At the beginning, one should bear in mind that there were very few players in the remote sensing industry, namely the US and the USSR. Following the concerns raised by the States on these topics, remote sensing was put on the UN legal Agenda of 1968.[153]

There were two main views that were presented during the discussions. The first one, lead by the US, maintained that based on the freedom of use of outer space, there was no need of any prior consent of the sensed State and that there should be open

[152] According to the UN OOSA website: States which have national law and legislation governing space-related activities include, *inter alia*, Argentina, Australia, Brazil, Canada, Chile, China, Finland, France, Germany, Hungary, Indonesia, Japan, New Zealand, Norway, Philippines, Republic of Korea, Russian Federation, Slovakia, South Africa, Spain, Sweden, Tunisia, Ukraine, the United Kingdom of Great Britain and Northern Ireland, and the United States of America. See OOSA online, *supra*, note 102.
[153] First UN Conference on Peaceful Uses of Outer Space in Vienna in 1968.

dissemination of data.[154] The second view was put forth by the "non-alliance" countries (i.e. Brazil, India, France) lead by the USSR. They argued, based on State sovereignty, that prior consent was required before sensing a State and that there should also be prior consent to dissemination of data. However, for about two decades, this debate continued under the auspices of COPUOS until UN Resolution 41/65 was finally adopted in 3 December 1986.[155]

The United Nations Principles relating to Remote Sensing of the Earth from Space[156] aimed at answering the aforementioned political and legal issues raised during years by the various States. Considered by most as a compromise between the two different lines of thoughts, these principles are nevertheless being considered by others as insufficient and vague. The content of each of the UN Principles on Remote Sensing is summarized in a table reproduced at the end of the present chapter.[157]

At the outset, this resolution is not a UN treaty but a resolution. As seen, resolutions are not binding as they only give a snapshot of the will of States at a given time. Joanne Irene Gabrynowicz, Director at The National Remote Sensing and Space Law Center in Mississippi,[158] argues to the contrary. She states that the Remote Sensing Principles are binding because all the involved States have observed them through State practices since 1986. She furthermore expresses that in countries where regulations or legislation exist, one will always find a reference to the UN Remote Sensing Principles. By having continuously and uninterruptedly applied these principles, these States have "nationalized" the principle obligations. Therefore, she concluded that they now have the duty to abide by them. Nevertheless, this position remains that of the minority and the non-binding status of the UN Remote Sensing Principles still prevailed.

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[154] Based on "*International Co-Operation in the Peaceful Uses of Outer Space*", 1961 UNGA Resolution 1721 (XVI); and Article 1and II of the *Outer Space Treaty, supra*, note 66.
[155] *United Nations Principles Relating to Remote Sensing of the Earth from Space*, U.N.G.A. Resolution 41/65 (XLII), UN GAOR, 29 Sess., 95th Plen. Mtg., UN Doc. A/41/65, ann. at 2. [Hereafter the 1986 Remote Sensing Principles].
[156] *Ibid.*
[157] The table is copied from: Lawrence W. Fritz, "High Resolution Commercial Remote Sensing Satellites and Spatial Information Systems", (1999), online: International Society for Photogrammetry and Remote Sensing (ISPRS) at <http://www.isprs.org/publications/highlights/highlights0402/fritz.html>.
[158] Gabrynowicz, *supra*. note 116.

From this Resolution emerged 15 Principles among which the scope of application was defined as dealing only with matters of the land and environmental issues. The Resolution does not apply to meteorological and military domains.[159] Firstly, it has been reaffirmed within these principles that the use of satellite for remote sensing *per se* is not prohibited, based on the freedom principle.[160] The Resolution also set down the objective that "remote sensing shall promote the protection of the Earths natural environment" therefore imposing a certain obligation on States to promote the protection of the Earth's environment and of the mankind from natural disasters.[161] The UN Principles also affirms that no prior consent is legally required to carry out remote sensing activities.

As regards the dissemination of the data, the principles provide for three types of data: primary data, processed data and analyzed information.[162] Principle XII describes how the data is disseminated.[163] In brief, the data is made available on a non-discriminatory basis to any Sensed State, as soon as it is produced, and at a reasonable cost term. Any primary, processed data or analyzed information has to be made available to the sensed state. Third Party States should only have access to primary and processed data. It is interesting to note that there are no definitions on the exact meaning of the terms "nondiscriminatory basis" and "reasonable cost term" used within the Resolution. However, the first one has been said to refer to "dissemination of the data on the same basis and terms for all countries" and the second one is usually interpreted as meaning "market value".[164]

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[159] See *Remote Sensing Principles, supra,* note 155.
[160] See *Ibid,* Principle IV.
[161] See *Ibid,* Principle X.
[162] See *Ibid,* Principle I.
[163] "As soon as the primary data and the processed data concerning the territory under its jurisdiction are produced, the sensed State *shall have access* to them on a *non-discriminatory basis* and on *reasonable cost terms*. The sensed State *shall also have access* to the available analyzed information concerning the territory under its jurisdiction in the possession of any State participating in remote sensing activities on the same basis and terms, taking particularly into account the needs and interests of the developing countries." [emphasis added]. See *Remote Sensing Principles, supra,* note 155, Principle XII.
[164] See Gabrynowicz, *supra,* note 116.

In the situation where a sensed State is refused access to the data about its territory, the enforcement of the provisions would depend upon the binding nature of the UN Principles, as it has been discussed previously. In the event that the Resolution would be regarded as binding, thus enforceable upon Nations, the letter of its Principle XII "clearly recognize the legal right of the sensed State to seek from the sensing State satellite imagery of its own territory."[165] In fact, with the use of the word "shall have access" instead of "should have access" the clause has a mandatory nature, thus allowing such interpretation.[166]

It is clear from the above that the 1986 UN principles have reconfirmed the two following rules: 1) the freedom of collection of data by all States, about all States, and without the prior consent of the sensed States and 2) the free distribution by the sensing State of collected data, and information derived from such data, without the consent of the sensed state. As we will see later, the most relevant principle to commercial remote sensing is the obligation to provide sensed countries nondiscriminatory access to the sensed and analyzed data of their territory.[167] These rules will be found in the national regulations of countries such as the US and Canada, as an integrated part of them.

2.5 The Committee on Earth Observation Satellites (CEOS)

The Committee on Earth Observation Satellites (CEOS) is the result of an international will to coordinate the policies of the different States, in particular their data policies.[168] It was first created at the G7 summit in 1984 and serves the purposes of:

(1) "optimizing the benefits derived from the space-based remote sensing through cooperation of its members to provide services, policies and products;

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[165] See Jakhu, *supra,* note 134 at 87.
[166] *Ibid.*
[167] See *Remote Sensing Principles, supra,* note 155, Principle XII.
[168] See CEOS Terms of Reference [adopted in 25 September 1984 in Washington, DC, USA], online: CEOS at <http://www.ceos.org/pages/ceos_terms.html>

(2) providing assistance to members and users by acting as a focal point for the coordination of space based remote sensing; and
(3) promoting exchange of technical information in order to encourage the compatibility of space-based remote sensing satellites."[169]

The current members of CEOS comprise not only of the major operators, users, space agencies, and interested groups but also international organization such as the Food and Agriculture Organization of the United Nations (FAO).[170] Discussions annually evolve within this open forum for all the international members. CEOS' work is mainly done through working groups in charge of investigating specific areas of interest, cooperation and coordination, and to report at subsequent annual meetings.[171]

The working groups are formed of all or any of its current 20 Charter Members and 18 Associate Members.[172] For example, the CEOS Ad hoc Disaster Management Support Group supports natural and technological disaster management worldwide. It does so by fostering improved use of existing and planned Earth observation satellite data in selected hazard areas: drought, earthquake, fire, flood, ice, landslide, oil spill, and volcanic hazards.[173] Another example is the recent strategy of the Working Group on Training and Education. Its 3-year action plan is to make CEOS agencies' educational and training materials more accessible and visible to the international earth observation world.[174] These actions suggested by CEOS working groups, are then voluntarily and nationally integrated by member States such as the US and Canada.

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[169] *Ibid.*
[170] Charter members of the CEOS include Canada, through the Canadian Space Agency, along with France, India, Brazil, the United States (NASA/NOAA), ESA and Japan (JAXA). The Canada Centre for Remote Sensing is an Associate member. See "Earth & Environment Significant Events and Achievements Report", 2003, pp.36 at 5, online: CSA at www.space.gc.ca. [CSA Earth Report].
[171] See CEOS Terms of Reference, *supra*, note 168.
[172] See CSA Earth Report, *supra*, note 170.
[173] *Ibid.*
[174] *Ibid.*

CEOS is to data policies what COPUOS is to outer space legal principles: "the main forum of discussion for the coordination of remote sensing data policies."[175] Today, CEOS is actively pursuing its activities on remote sensing while COPUOS has been silent since 1986. Hence, some authors have rightly put forth that CEOS might have replaced COPUOS "in the policy and law-making process of remote sensing by satellite".[176] The concerted efforts of the space faring nations in coordinating their data distribution policy, is likely to continue to evolve under the auspice of CEOS. Its smaller size and user-friendly working methods have made it the primary forum of international discussion and cooperation in both the near and longer term.

2.6 Conclusion

In Conclusion, the entire body of international space law does not prevent private actors to enter space activity. The contrary is however true: international space law never clearly allowed commercial activities in space. But as demonstrated above, a number of Articles from the different Space Treaties seem to at least accommodate the commercial use of outer space, hence preventing legal barriers from being established against the commercialization of space.[177]

Further, the international space law regime has established positive requirements that must be complied with by States. Whether it be by imposing State responsibility for private entities in outer space, or by instituting a corresponding obligation to authorize and continuously supervise their private actors, or by assuring that the activities of their private industry are carried out in conformity with the provisions of the Outer Space Treaties, the international space law regime essentially requires that States regulate space activities of non-governmental or private entities.

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[175] See Jakhu, *supra*, note 98 at 454.
[176] *Ibid.* at 452.
[177] Bourbonnière, *supra*, note 31 at 32.

2.7 Summarized Content of the 15 United Nations Principles Relating to Remote Sensing of the Earth from Outer Space.

Table 1 [178]

Remote Sensing activities of a State shall:

I. (definitions)

II. be for the benefit and in the interest of all nations

III. be conducted in accord with international law

IV. be conducted with respect for sovereignties and rights of sensed States

V. promote international cooperation in an equitable manner

VI. encourage establishment of regional agreements for data collection and processing where feasible

VII. make available technical assistance to interested States on mutually agreed terms

VIII. the UN shall promote international cooperation, including technical assistance and coordination*

IX. inform UN Secretary General of and about its space programs

X. promote protection of Earth environment and inform States affected

XI. promote protection from natural disasters and inform States likely to be affected

XII. make data accessible to sensed States on non-discriminatory basis and on reasonable cost terms

XIII. consult with sensed States for mutual opportunities

XIV. be responsible and adhere to international law

XV. resolve disputes from application of these principles through established procedures

**Principle VIII relates to UN activities and not a State activity.*

[178] Table copied from Fritz, *supra,* note 157.

CHAPTER THREE: THE UNITED STATES NATIONAL LEGAL FRAMEWORK ON REMOTE SENSING SATELLITES

3.1 Introduction

Since the Landsat remote-sensing program of 1972, there has been a steady trend towards commercialization of the remote sensing industry in the US. As a result, the US has more regulations on remote sensing activities than any other country in the world. The main drivers behind the growth of commercial interest in imaging satellites are the technological improvements in space systems, in ground equipment and in data processing techniques. In fact, advances in spacecrafts and sensor technologies,[179] reduction of cost and the use of less complex equipment for working with satellite imagery lead to this growth in the commercial imaging satellite industry.

3.2 Synthesis of the United States Regulatory Framework Evolution

The American legislative evolution defines the manner in which commercial remote sensing operators function.[180] The purpose of this section is not to delve deeply into each of the legislation that was in place over the time but to provide an overview of what led to the present body of US remote sensing laws.

In parallel, we will also highlight how the general aspects of the international legal regime set forth in the UN Remote Sensing Principles of 1986 apply to domestic remote sensing activities. For example, the US legislation has confirmed the non-discriminatory access principle by,[181] *inter alia*, incorporating provisions in the main US Acts[182]

[179] The ability to build imaging satellites that are smaller, cheaper and more agile compared with large and expensive Landsat.
[180] Bourbonnière, *supra*, note 31 at 48.
[181] *Remote Sensing Principles*, *supra*, note 155, Principle XII.
[182] The principle of non-discriminatory access can be found in both the *1984 Commercialization*, *infra*, note 186, and the *1992 Policy Act*, *infra*, note 196.

governing remote sensing commercialization.[183] However, we will see that the contextual changes in the original international remote sensing environment, with the advent of growing commercial activities, might have rendered the UN Remote Sensing Principles obsolete. And as a result, National legislation is gradually departing from these principles and instead adapting to current needs. We will see how national security reasons and foreign affairs concerns have been the main drivers for this departure.

3.2.1 The United States Regulatory Framework in the 1970's and 1980's

In the 1970's, with Landsat being originally intended to serve the scientific community and the researchers, the program was naturally under the responsibility of NASA.[184] In the 1980's, with the transfer of the commercial responsibilities to the private industry, the Agency's leadership was later handed over to its fellow agency, the National Oceanic and Atmospheric Administration (NOAA),[185] with the Land-Remote Sensing Commercialization Act of 1984.[186] The purpose of this Act was "to ensure the smooth transition of the control of the commercial aspects of the Landsat system from the public to the private hands, while maintaining the control of the US Government [...] over the destiny of the system for national security reasons and information needs."[187]

The main elements observed during the process of commercialization of the land remote sensing satellites were found within Public Law (P.L.) 98-365.[188] Namely, the commercialization of Landsat was to be done through a contract with NOAA, and the Department of Commerce (DoC) was allowed to license private remote sensing space systems that comply with the Act.[189] A private company was to operate the Landsat system while the ownership of the system was to remain with the Government. Further,

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[183] See Marchisio, *supra,* note 116. Construed from Gabrynowicz, *supra*, note 116.
[184] *NASA Act, supra*, note 75.
[185] National Oceanic and Atmospheric Administration, 15 CFR Ch.IX (1-1-91 Edition) Part 960, 52 FR 25970, July 10 1987.
[186] *Land Remote Sensing Commercialization Act of 1984*, 15 U.S.C. 4201 et *seq.* [Hereinafter the 1984 Commercialization Act].
[187] See Salin, *supra,* note 145.
[188] PL 98-365: *Land Remote-Sensing Commercialization Act of 1984* (July 17, 1984).
[189] See Landsat Program Chronology, online: NASA Ames Research Center at: <http://geo.arc.nasa.gov/sge/landsat/lpchron.html>.

DoC was required to maintain an archive of land remote sensing data and it was specified that Landsat data had to be made available on a non-discriminatory basis.[190]

In 1985, the Landsat system was contractually purchased, through the US DoC, by a private consortium called Earth-Orbiting Satellite Company (EOSAT).[191] With the sale, the consortium was to operate the system for a period of ten years. Under the terms of the contract, EOSAT undertook to, *inter alia*, operate Landsats 4 and 5 and build Landsats 6 and 7. The consortium was also given exclusive rights to market the Landsat data collected during the contractual period and to do so for about 10 years from the date of acquisition of each data.[192] The meteorological satellites were to remain public and under the control of NOAA, hence they were excluded from privatization under P.L. 98-166.[193] Unfortunately, the commercialization of Landsat turned out to be a failure. This was mainly due to restrictive provisions on the dissemination of data contained in the 1984 Commercialization Act, which prevented the remote sensing data market to grow and become competitive with foreign systems.[194] In particular, the requirement to make unenhanced imagery data available to all potential users on a non discriminatory basis inhibited EOSAT from competing with value-added firms.[195] A deeper analysis on this aspect will be done within the subsequent sections of this chapter related to data collection and distribution policies.

However, the new national interests for commercial remote sensing continued to be nurtured by the will of maintaining technological leadership of the US industry (skills and know-how). For the US Government, another incentive to develop the commercialization of remote sensing systems was the access to additional imaging capabilities to deal with domestic and foreign policies emergencies (i.e. national

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[190] *Ibid.*
[191] EOSAT was a company formed by RCA and Hughes Aircraft Company.
[192] See Landsat Program Chronology, *supra*, note 189.
[193] PL 98-166: *Land Remote-Sensing Commercialization Act of 1984.*
[194] See *Commercialization Act of 1984, supra,* note 186. s.402 b (2) and s.402 b (9).
[195] See Kevin M. O'Connell, John C. Baker, Beth E. Lachman, Steven Berner, David R. Frelinger and Kim E. Gavin, *US Commercial Remote Sensing Satellite Industry: An Analysis of Risks*, RAND Report, MR-1469, October 2001, p. 68. See 15 U.S.C. 4242, S.402 b (2) and S.402 b (9). See also 15 U.S.C. 4242, S.402 b (2).

disasters). Finally, the broader public benefits from a wide range of civilian and commercial applications of remote sensing data (economic development, environment monitoring, etc.) was also a strong motivator to pursue commercialization.

3.2.2 The United States Regulatory Framework in the 1990's

Consequently, in the 1990's, the US Government policies replaced the 1984 legislation and permitted full commercialization (i.e. private ownership and operation) of remote sensing satellites. The superseding Land Remote Sensing Policy Act of 1992,[196] adopted during Bush Administration, created conditions that encouraged private firms to start new businesses based on commercial earth observation systems. The Act authorized the Secretary of Commerce to license said private systems and set forth the legal conditions for US private firms seeking to own and operate remote sensing satellite systems. In January 1993, the Bush administration was issuing the first high-resolution commercial remote sensing license under the 1992 Policy Act. It was issued to a US company called WorldView Imaging Corporation,[197] for a commercial imaging satellite able to obtain 3 to 15 meters resolution imagery.[198]

Beside public laws and policies, the corpus of the US legal framework is also composed of general documents that articulate the President's views on national affairs. They are called Presidential Directives (PD) or Reviews (PR) and are general policy documents which "tend to set or redirect an established state of affairs".[199] There have been several Presidential Directives regarding space affairs during the administration of

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[196] *Land Remote Sensing Policy Act of 1992*, 15 U.S.C. s.5601 (1992) [hereinafter 1992 Policy Act].

[197] In January 1995, WorldView Imaging Corporation merged with the commercial remote sensing activities of Ball Aerospace and Communications Group to form EarthWatch Corporation. In September of 2001, EarthWatch became DigitalGlobe, one of the three current company operating commercial satellite systems. DigitalGlobe successfully launched its first operational commercial satellite (Quickbird 2) on October 18 of 2001, after the failed launch of Quickbird 1 in November 2000. To date, Quickbird 2 is still in operation. *See* Bob Tripp, "EarlyBird Satellite Expected to Sharpen Focus of Commercial Remote Sensing Industry", (October 1995), online: Earth Observation Magazine at: <http://www.eomonline.com/Common/Archives/1995oct/95oct_tripp.html> and "History of DigitalGlobe", online: Digital Globe at: <http://www.digitalglobe.com/about/history.shtml>.

[198] O'Connell *et al.*, *supra*, note 194 at 67.

[199] Patrick A. Salin, "An overview of US Commercial Space Legislation and Policies-Present and Future", 2002 Annals of Air & Space Law, vol.XXVII/3, p.209 at 213.

each of the US Presidents. An important one for remote sensing is the Presidential Decision Directive 23 (PDD-23) of 1994,[200] adopted during the Clinton Administration. PDD 23 "liberalized the commercialization of high resolution remote sensing (one meter and higher)"[201] and further specified the US Government's conditions/guidelines for granting operating licenses to American firms interested in commercial remote sensing satellites. Today's well-know private companies such as "Digital Globe (QuickBird) and Space Imaging (Ikonos) developed themselves within this new regulatory framework."[202] The right to "shutter control", which will be discuss at length in the next section, was also reaffirmed within this Directive. Finally, PDD-23 also "included a provision that the data would conform to the UN Principles on Remote Sensing."[203]

This update of the legal regime on remote sensing also brought the US Government back into the Landsat program, as they were to play again (through NASA, NOAA and the Department of the Interior (DOI)) an active role in operating and managing its many segments.[204] As a result, the commercial development of remote sensing started to depart from the Landsat program.[205] The newly emerged commercial sector now had its own operating legal regime and could be clearly distinguished from the traditional remote sensing sectors (i.e. civilian and military). In 1994, with the amendment of the 1992 Policy Act through Presidential Decision Directive/NSTC-3,[206] the Landsat program had a distinctive mission of producing imagery data to satisfy US

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[200] Fact Sheet, *Policy on Foreign Access To Remote Sensing Space Capabilities, Capabilities,* (known as Presidential Decision Directive-23, or PDD-23) , The White House Office of the Press Secretary , 10 March 1994, online: <http://www.fas.org/irp/offdocs/pdd23-2.htm>. [PDD-23]

[201] See Salin, *supra,* note 199.

[202] Patrick A Salin, "US Space-Related Rules Adopted in 2003–2004", 2004 Annals of Air & Space Law, vol. XXIX/6, p. 373 at 376.

[203] Ray A. Williamson and John C. Bakerb, "Current US remote sensing policies: opportunities and challenges", Space Policy 20 (2004), 109–116 at 111.

[204] "Under this plan, NASA would procure the satellite, NOAA would manage and operate the spacecraft and ground system, and DOI would archive and distribute the data at the marginal cost of reproduction. By 1998, NOAA's role in Landsat had disappeared, and the US Geological Survey (USGS) was given the entire operational role". Williamson, *supra,* note 2.Construed from PDD-23, *supra,* note 200.

[205] See Williamson, *supra,*note 2 at 37.

[206] *Presidential Decision Directive/NSTC-3* on Landsat Remote Sensing Strategy dated May 5, 1994 (Revised on October 16, 2000).

civilian remote sensing needs. Landsat 7 Data Policy of 1997[207] later established a pricing mechanism that would allow imagery data to be acquired at very low-cost. Hence, following all of these policy changes, it is fair to say that the Landsat system became a direct competitor to the private operators. Indeed, they both shared the different US Agencies as their main customers. Hence, there have been some concerns that these policies could undermine the nascent commercial remote sensing industry.[208]

With the subsequent Commercial Space Act of 1998,[209] analysts said that the will of Congress "to develop the commercial dimension of Outer Space business" was actualized.[210] Of particular interest for the development of remote sensing were the stated objectives of disseminating the data obtained from space on a commercial and private basis.

3.2.2.1 National Security Concerns

In military terms, remote sensing is "reconnaissance". As we previously saw, while "reconnaissance" over the territory of a foreign State with the use of an aircraft is prohibited under international law, the same activity from a spacecraft is allowed. With the advent of new and advanced space-based earth-imaging commercial systems, for example radar systems, national security issues were raised worldwide. Indeed, the systems to be operated by US commercial operators could potentially be of high-resolution capabilities, being very precise in obtaining imagery. National leaders and defense officers were apprehensive about the dual-use nature of the satellite imagery from these systems. They were fearful that high-resolution imagery would reveal state secrets and undermine their national security or embarrass national authorities.[211] Hence, letting

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[207] *Landsat 7 Data Policy*, October 31, 1994, (Revised: September 19, 1997), as required by Section 105 of Public Law (P.L.)102-555, the Land Remote Sensing Policy Act of 1992. See "Landsat 7 Data Policy" online: NASA Goddard Space Flight Center at <http://landsat.gsfc.nasa.gov/project/l7policy_updated.html>
[208] O'Connell *et al.*, *supra*, note 195 at 75.
[209] *Commercial Space Act* of 1998, 105th Congress, (HR 1702, S.1473), Public Law Nos. 105-303, 28 October 1998.
[210] See Salin, *supra,* note 199 at 216.
[211] See O'Connell & Lachman, *supra*, note 9 at 59.

private operators sell and distribute data without restrictions was considered by the US to be a threat to its national security.

Therefore, the US started to impose national limitations in the license to commercial satellites operators with regard to their right to use data of a certain threshold. Later, "shutter control" clauses were introduced to limit potential harm to the US national security. To date, there have also been many agreements between countries as it pertains to the use of such data. For instance, Canada and the US have an agreement concerning the use of Radarsat imagery.[212]

3.2.2.1.1 Licensing Restrictions and Shutter Control

In June 1978, President Carter issued PD/NSC-37,[213] which restricted commercial imaging systems to 10 meters.[214] Under the 1984 Commercialization Act, the Secretaries of State and Defense were given the power to decide whether any satellite system should be approved for launch and operation. These restrictions began to erode in the mid 1980s but the process of imposing limitations accelerated in 1992 and in 1994, when PDD-23 was formulated.[215] While this last policy allowed unlimited resolution for commercial systems, it imposed numerous limitations, restrictions and rights of intervention by the US Government. One of them was called "shutter control".

Shutter control refers to the right for a Government to impose for reasons of national security, international relations and obligations, any licensee not to operate its system. Shutter clauses exist in US, France and now in Canada. When introduced by President Clinton in PDD-23, it was perceived as a negative impediment to the growth of commercial remote sensing industry because of the ambiguity and vagueness surrounding

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[212] US Fact Sheet , The Department of State *"US-Canada sign Agreement on Providing US-origin Remote Sensing Capabilities for Canada's development of the Radarsat-2 system"*, 16 June 2000, online: NOAA at: <http://www.licensing.noaa.gov/rsat2factsheet.htm>.
[213] Presidential Directive/NSC-37, *National Space Policy*, May 11, 1978.
[214] See Gerald Steinberg, *Dual Use Aspects of Commercial High-Resolution Imaging Satellites*, Mideast Security and Policy Studies, No. 37, February 1998, New BESA Publications, online: Bar-Ilan University at <http://www.biu.ac.il/SOC/besa/books/37pub.html>.
[215] *Ibid.*

the shutter control clause. In general, it was not clear to the industry when such a prerogative would be invoked and what would be considered as "national emergency". The "shutter control" clause was strongly criticized for being unclear and for using terminology that was creating insecurity. It reads:

> "During periods when national security or international obligations and/or foreign policies may be compromised, as defined by the Secretary of Defense or the Secretary of State, respectively, the Secretary of Commerce may, after consultation with the appropriate agency(ies), require the licensee to limit data collection and/or distribution by the system to the extent necessitated by the given situation. Decisions to impose such limits only will be made by the Secretary of Commerce in consultation with the Secretary of Defense or the Secretary of State, as appropriate.[...]" [216]

From that provision alone, the level of market risk for any private company wanting to engage in remote sensing activities considerably increased.[217] The industry, although understanding the motivations behind these measures, was concerned that this discretionary power to shut down their system was not to be understood by their customers, partner or investors.[218] In addition, they advocated that having more accurate data would benefit and allow international stability. Indeed, nobody would be able to "hide" any activity from other States. Commercial remote sensing operators were pushing such approach of "openness" since they were not only subject to licensing limitations but also to operating limitations of their systems.

In order to reassure private operators, the Departments of Commerce, State, Defense, Interior and the Intelligence community signed a Memorandum of Understanding (MOU) agreeing that "shutter clause" would be invoked for the shortest

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[216] See PDD-23, *supra,* note 200.
[217] See O'Connell & Lachman, *supra,* note 9 at 58.
[218] See Williamson & Bakerb, *supra,* note 203 at 111.

amount of time and for a limited geographical zone.[219] However, this was not necessarily balancing the interest of the States and of the commercial remote sensing operator's competitiveness at the international level.

Indeed, attempts to deny imagery to potential enemies through unilateral action were just likely to leave the field to international competitors.[220] It is interesting to note that the shutter clause could be imposed on operator licensed in the US, while foreign competitors falling outside the US jurisdiction would not be subject to such restriction during the same period. In such case, there would be no reason for the US to invoke the shutter-clause, and shut down its companies, when identical data could be obtained from foreign commercial remote sensing systems with high-resolution capabilities.

On the other hand, the international community may conclude that due to both national and world security interests, it would be appropriate to have guidelines or uniform standards concerning shutter clause at the international level. In other words, to have an "international shutter clause" in the form of both bilateral and multilateral treaties. The current trend is that foreign national policies have been imitating the US by including shutter clause provision in their regulatory framework. For example, Canada's Bill C-25 includes such clause. But there are no coordination agreements for an international application of national shutter-clauses at this point. Hence, the concerns of the private industry remain valid.

Finally, national security concerns also show through the US national regulations as an integrated part of the terms and conditions of the license delivered to private

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[219] See *NOAA 2000 Interim Regulations, infra,* note 221, p.46823: regarding the memorandum of understanding concerning the licensing of private remote sensing satellite systems.
[220] *See also* Ann M. Florini & Yahya A. Dehqanzada, "The Global Politics of Commercial Observation Satellites", in JC Baker, K. O'Conner, RA Williamson, editors. COMMERCIAL OBSERVATION SATELLITES: AT THE LEADING EDGE OF GLOBAL TRANSPARENCY. Washington, DC: RAND and American Society of Photogrammetry and Remote Sensing, April 2001, pp.433-448 at 439.

firms.[221] The license requires the licensee to operate its system in a manner which preserves the national security and observes the international obligations of the US, to limit imaging during periods when national security or international obligations and/or foreign policies may be compromised, and to provide US Government access to and use of data when required for national security or foreign policy purposes.[222] Hence, the more technologically-advanced a system is, the more conditions there could be to the license, thus increasing the regulatory burden on private remote sensing operators.

3.2.3 The United States Regulatory Framework in the 2000's

During the present decade, DoC issued (through NOAA) a set of regulatory rules and procedures under the 1992 Policy Act, which are still applicable as of this date.[223] NOAA 2000 Interim Regulations for Private Remote Sensing Space Systems[224] specified the legal obligations of US commercial firms that receive government's licenses to operate their own imaging satellites. A detailed presentation of these obligations will be done in the final sections of this thesis.[225]

In 2002, the US Government re-attempted to commercialize the Landsat program with the Landsat Data Continuity Mission (LDCM). This time, they asked the private sector to develop the next mid-resolution remote sensing system. They wanted to ensure continuity for the Lansat data's archive plan, which had started 30 years ago.[226] This new attempt was triggered by the "apparently successful commercialization of high-resolution

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[221] PDD 23 includes 8 specific requirements for the licensing of commercial imaging systems that are related to national security. Those were integrated within *NOAA 2000 Interim Regulations on the Licensing of Private Land Remote-Sensing Space Systems*, 15 CFR Part 960, 31 July 2000. [Hereafter NOAA 2000 Interim Regulations].

[222] See *NOAA 2000 Interim Regulations, supra*, note 221.

[223] At the time of writing, an updated set of rules was under examination by NOAA and the DoC but has yet to be approved and published. For an updated status see the NOAA ACCRES internet site, *infra*, note 282 at: <http://www.accres.noaa.gov/index.html>.

[224] *NOAA 2000 Interim Regulations, supra*, note 221.

[225] See Sections 3.4 and 3.5 of the present thesis.

[226] See Shaida Johnstona and Joseph Cordes, "Public good or commercial opportunity? Case studies in remote sensing commercialization", Space Policy 19 (2003), pp.23–31.

remote sensing activities coupled with the belief that conditions had changed since the failed attempt to commercialize Landsat in the 1980s."[227]

With the LDCM, the Landsat system was placed under the dual responsibility of NASA and the US Geological Survey (USGS).[228] They were tasked to guarantee a replacement for Landsat 7,[229] "which started producing degraded data in May 2003."[230] One of the declared objectives of the LDCM was "to ensure the continued acquisition and availability of Landsat-quality data".[231] Further, the 1992 Policy Act "expressed a preference for transition to private-sector funding and management".[232] NASA and USGS contemplated a myriad of options in order to respect these guidelines.

The first considered response by the Agencies was to rely on degrading but still-operating Landsat 5.[233] But this option could only be considered as a temporary solution since the system "has a very limited lifetime and does not have the collection and delivery capability of its newer sibling."[234] The option of placing sensors aboard foreign systems such as French SPOT[235] was also rejected, mainly because of their more limited coverage compared to Landsat.[236]

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[227] *Ibid.*
[228] See Salin, *supra,* note 202 at 376.
[229] Landsat 7 was placed in orbit on 15 April 1999.
[230] See Salin, *supra,* note 202 at 376.
[231] "History of Landsat Data Continuity Mission (LDCM)", online: US Geological Survey at <http://ldcm.usgs.gov/history.php>.
[232] *Ibid.*
[233] Landsat 5 was launched in March 1984 and has been in orbit for over 20 years. On November 26, 2005, Landsat 5 has started experiencing technical difficulties with its back-up solar array, which began exhibiting unusual behavior. See "Landsat 5 Experiencing Technical Difficulties", Room News, (November 30, 2005), US Department of the Interior and US Geological Survey, Office of Communication, online: USGS at: <http://www.usgs.gov/newsroom/article.asp?ID=1419> ; See Landsat Program Chronology, *supra*, note 189.
[234] Williamson & Bakerb, *supra*, note 203 at 114.
[235] Système pour l'Observation de la Terre.
[236] Williamson & Bakerb, *supra*, note 203 at 114.

As there were no replacement systems on the horizon, the DoC and other Agencies appraised the following summarized scenarios:

(1) "private sector funding and management of a successor land remote sensing system;
(2) establishing an international consortium for the funding and management of a successor land remote sensing system;
(3) funding and management of a successor land remote sensing system by the United States Government; and
(4) a cooperative effort between the United States Government and the private sector for the funding and management."[237]

From these scenarios, one can see that the primary intention of the US Government with the LCDM was to eventually integrate the private sector in the funding and management of Landsat. They attempted to follow the selected options through various Requests for Proposals (RFPs), which turned out to be unsuccessful.[238] Afterwards, it was decided via a memorandum issued by the White House Office of Science and Technology Policy (OSTP) in 2004[239] that the transition of the Landsat Program will be done "from a series of independently planned missions to a sustained operational environment".[240] The document announced the incorporation of Landsat-type sensors, scheduled for launch in late 2009, on an already existing polar platform run

[237] Williamson & Bakerb, *supra*, note 203 at 114.
[238] "Efforts to begin implementing a successor mission to Landsat 7 [...] suffered a set back in 2003. Landsat Program Management (NASA and USGS) had planned to purchase data meeting LDCM specifications from a privately owned and commercially operated satellite system beginning in March 2007. However, after an evaluation of proposals received from private industry, NASA cancelled a Request-for-Proposals (RFP) for providing the required data." The RFP was cancelled in September 2003. "Landsat Program Update: Winter/Spring 2005", online: NASA Goddard Space Flight Center at <http://landsat.gsfc.nasa.gov/announcements/program_update.html>. See also Brian Berger, 'Resource21 Lobbies for NASA to Reconsider Landsat Bid', *SpaceNews*, 27 October 2003, p. 9. Also: Jason Bates, 'Failure to Capture Landsat Contract Dooms Resource21', *SpaceNews*, 1 March 2004, p. 26.
[239] For access to the memorandum see LCDM, *supra*, note 231 at: <http://ldcm.usgs.gov/documents/Marburger_memo_16Aug04.pdf>.
[240] See LCDM, *supra*, note 231.

under the US Government auspices.[241] That is to say that the Landsat Program will continue to be run by the US Government as the private sector has not been in a position, again, to take over.

Finally, US President George W. Bush introduced in 2003, a new policy entitled "US Commercial Remote Sensing Policy" which will be analyzed in greater detail in the following section of this Chapter.

3.3 The United States Commercial Remote Sensing Space Policy of 2003

Since the advent of the PDD-23 policy, government officials had yet to gain experience with the provisions of the policy. In fact, they had been developed prior to any operating commercial systems.[242] As new players were entering the commercial market, certain concerns started to appear. According to some policy authors, PDD-23 turned out to be restrictive on commercial endeavors in placing limits on certain technical characteristics such as the spatial resolution and the data availability during time of conflict.[243] Hence, PDD-23 policy, which intended "to encourage the development of a robust US commercial remote sensing satellite sector",[244] did not sufficiently support the industry's development of new commercial systems. The need to give new guidance to commercial firms came with the 2003 Policy.

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[241] The National Polar-orbiting Operational Environmental Satellite System (NPOESS), a satellite system used to monitor global environmental conditions, will be the selected platform. As of August 2004, the USGS and NASA were directed by the White House OSTP memorandum to establish a partnership with NPOESS Integrated Program Office (IPO)) for the joint implementation of a LDCM Operational Land Imager. NPOESS was established for implementing the convergence of civil and military US-Polar-Orbiting Operation Environmental Satellite Systems, under Presidential Decision Directive/Nstc-2, The White House, Washington, May 5, 1994, online: NOAA at: <http://www.ipo.noaa.gov/About/NSTC-2.html>. See LCDM, *supra*, note 231.

[242] See Williamson & Bakerb, *supra*, note 203 at 111.

[243] *Ibid.*

[244] *Ibid.*

On 25 April 2003, President Bush signed National Security Presidential Directive 27 (NSPD 27) entitled "US Commercial Remote Sensing Space Policy"[245], prepared by the White House OSTP. The document superseded the PDD-23 Policy of 1994[246] from the Clinton Administration. Yet, it was the first major policy directive following a recent comprehensive National Security Council review of space policy matters. This program had been announced by President Bush earlier during his mandate (i.e. in 2002) and called for the review of all national space policies.[247]

The Bush Administration policy introduced major changes in four areas: the US Government use of commercial remote sensing space capabilities, the licensing and operation of the commercial remote sensing systems, the foreign access to US capabilities and the Government-to-Government intelligence, defense, and foreign policy relationships that involve US commercial remote sensing.[248] The main objective stated in the directive reads as follows:

> "The fundamental goal of this policy is to advance and protect US national security and foreign policy interests by maintaining the nation's leadership in remote sensing space activities, and by sustaining and enhancing the US remote sensing industry. Doing so will also foster economic growth, contribute to environmental stewardship, and enable scientific and technological excellence."[249]

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[245] See *US Commercial Remote Sensing Policy*, Fact Sheet, April 25, 2003, online through: USGS at: <http://crsp.usgs.gov> or at: <http://www.whitehouse.gov/news/releases/2003/05/20030513-8.html>. [Fact Sheet 2003].

[246] *Ibid.* at 1.

[247] See National Security Presidential Directive/NSPD-15, *National Space Policy Review*, Fact Sheet, June 28, 2002, online through: Federation of American Scientists at: <http://www.fas.org/irp/offdocs/nspd/nspd-15.htm>.See also Dennis Jones, "Commercial Remote Sensing and National Security", The Aerospace Corporation, Summer 2004, online: The Aerospace Corporation at: <http://www.aero.org/publications/crosslink/summer2004/09.html>.

[248] See "Matters relating to remote sensing of the Earth by satellites, including applications for developing countries and monitoring of the Earth's environment", Statement by the United States of America on agenda Item 7 at the 41st Session of the Scientific and Technical Subcommittee of the UN COPUOS, February 18, 2004, online: Speeches and Related Documents, The United States Mission to International Organizations in Vienna (UNVIE) at: <http://vienna.usmission.gov/_index.php?cmd=cmdFrontendSpeechesAndRelatedDocumentsDetail&speechid=84>.See also Fact Sheet 2003, *supra,* note 245.

[249] See Fact Sheet 2003, *supra,* note 245.

The policy *rationale* is to develop a strong government-industry partnership hence a more robust commercial industry. According to observers, the policy also "significantly relaxes restrictions on what capabilities US commercial remote sensing companies can provide, both domestically and internationally, with the goal to maintain this country's leadership in remote sensing space activities."[250]

3.3.1 Government-Industry Partnership

At first, the civil Agencies[251] were given certain responsibilities under the policy provisions. They were asked, together with national security agencies, to determine and communicate to the commercial companies which of their current and future needs the commercial remote sensing capabilities could meet.[252] These specific actions had to be completed by the relevant government agencies within 120 days from issue of the policy.[253]

Then, the policy exhorts all US Government Agencies to maximize their use of commercial remote sensing space capabilities. They ought to fulfill their imagery needs for military, intelligence, foreign policy, homeland security and civil uses by acquiring data from commercial systems. They were further instructed to develop a long-term, sustainable relationship with the US commercial remote sensing space industry.[254] The new White House policy intends to aid federal civil and national security agencies in acquiring data and imagery from space and to improve the level of cooperation between the different agencies.[255] Additionally, the policy places the National Geospatial-

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[250] "OrbView-3 Imaging Satellite Commercial Remote Sensing Policy", Space Daily, Dulles (May 29, 2003) online: Space Daily at: <http://www.spacedaily.com/news/eo-03zk.html>.
[251] Including the DoC, the DoI and NASA.
[252] See Fact Sheet 2003, *supra,* note 245.
[253] *Ibid.*
[254] See Space Daily: OrbView, *supra*, note 250 at 2.
[255] See Paul Dykewicz, "Remote Sensing Policy Stirs Debate," Satellite News (Sept. 8, 2003).

Intelligence Agency (NGA) (formally known as NIMA)[256] in charge of acquiring all commercial imagery for the US national security community. It also instructs the CIA and other agencies to rely on "commercial remote sensing space capabilities"[257] to the "maximum practical extent".[258]

As seen, NSPD 27 aligns both the US national security community and the private industry's needs and opportunities. Thus, NGA continued a strategy it had developed in 1999 to integrate commercial imagery into its current and future architectures. Two commercial imagery acquisition programs called the ClearView contract (January 2003) and the NextView contract (September 2003) were put in place. Under the ClearView contract, NGA agreed to purchase from commercial capabilities a minimum level of imagery data over a five-year period.[259] NextView moves beyond the basic commercial imagery acquisition and "seeks to ensure access, priority tasking rights, area coverage, and broad licensing for sharing imagery with all potential mission partners."[260] Several contracts have been awarded to the main commercial satellite imagery companies under the two programs.[261]

From its side, with the Commercial Remote Sensing Space Policy (CRSSP) Implementation Plan Working Group (IPWG), the civil agencies have initiated an interagency process leading to the execution of the tasks contained in the guiding policy. In December 2003, they have produced the Civil Agency Implementation Plan which dictates the way the stated goals of the policy are intended to be fulfilled in the future.[262]

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[256] On November 2003, the President signed the 2004 Defense Authorization Bill which contained a provision authorizing NIMA to change its name to the National Geospatial-Intelligence Agency (NGA). NGA is a national intelligence and combat support agency whose mission is to provide timely, relevant and accurate geospatial intelligence in support of national security. See "NGA History", online: NGA at <http://www.nga.mil/StaticFiles/OCR/nga_history.pdf>

[257] See Fact Sheet 2003, *supra,* note 245, p.4.

[258] *Ibid.*

[259] See Jones, *supra*, note 247.

[260] *Ibid.*

[261] More information on the different awarded contracts is available on the NGA website at: <http://www.nga.mil>.

[262] For more details on the Plan see *Civil Agency Implementation Plan*, November 14, 2003, online: CRSP at: USGS <http://crsp.usgs.gov/pdfs/CRSSPplan121203.pdf>.

The new policy "reflects a significant shift in the relationship between the US Government and the US commercial remote sensing industry as illustrated in the first stated goal of the new policy."[263] This increased emphasis on the use of commercial remote sensing by US agencies can only be beneficial to the commercial remote sensing companies. It will provide the industry with a steady market for the sale of their commercial data while providing at the same time a capital for their satellite development. Such access to government buyers is surely to be welcomed in a market where the current industry, still in an infantile stage of its development, could otherwise take years to develop. Indeed, the current commercial remote sensing market is formed of only three US firms (Space Imaging, Digital Globe and Orbimage) and they have only been active since 1999.

3.3.2 Licensing and Operation of Commercial Remote Sensing Systems

The new commercial remote sensing policy addresses many of the ambiguities resulting from the PDD-23 legacy. The policy encourages the implementation of new incentives in licensing and operation for improving commercial imaging capabilities.[264] Mainly, the policy lifts former licensing restrictions on the development of more-advanced commercial remote sensing satellites.[265] At the same time, for national and homeland security reasons, the Government reserves itself the right to restrict their usage to US or US-approved customers.[266] The current two-tier licensing system[267] will not change and the existing 1992 Policy Act will remain applicable.[268]

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[263] See Gil Klinger, Director, Space Policy, National Security Council," Commercial Satellite Remote Sensing Symposium", Proceedings, May 13-15, 2003, Washington DC, p.22 online: NOAA at: <http://www.licensing.noaa.gov/SymposProceed-Mar9.pdf0>.
[264] See Williamson & Bakerb, *supra*, note 203 at 112.
[265] See "Commercial Satellite Remote Sensing Symposium", Proceedings, May 13-15, 2003, Washington DC, online: NOAA at: <http://www.licensing.noaa.gov/SymposProceed-Mar9.pdf0>.
[266] See Klinger, *supra,* note 263.
[267] "The two-tiered system differentiates between "upper-tier" for US Government and Government-approved users and "lower tier" data for general commercial availability. Criteria for which data are placed in each tier will be determined on a case-by-case basis according to evolving national security concerns regarding technology, resolution, etc." See CAIP, *supra*, note 262 at 16.
[268] See Klinger, *supra,* note 263.

According to some policy analysts, the most notable departure from the earlier PDD-23 policy is that the updated US policy does not emphasize the Government's right to impose ''shutter controls'' on the operations of US commercial observations satellites.[269] They assert that given recent war experience such as the US-Iraq conflict, "the Executive branch has demonstrated an aversion to imposing formal shutter controls on US commercial imaging satellite operations".[270] They further added that, "in neither instance did the US Government feel compelled to impose formal shutter controls on US companies to limit broad international access to potentially sensitive commercial satellite imagery during a period of US combat operations."[271]

However, from a regulatory standpoint, the differences between the two policies are in nuances, the depth of which will depend on the implementation phase. As asserted by many reputed experts when discussing the new policy provisions during a Symposium: "there is no change from pre-existing policy on shutter control. Existing interagency agreements remain in place."[272] They also specify that the US Government retain a range of capabilities and options to protect the US and its allies.

3.3.3 Foreign Access to United States Capabilities and Government-to-Government Agreements

The policy finally gives clearer guidelines for foreign access to US commercial remote sensing capabilities.[273] The encouraging language contained in the Policy pertaining to the oversea sales of US satellite imaging technology, is to the effect that requests to export capabilities comparable to goods and services that are already available (or likely to be available soon) on the open market will be "favorably considered."[274] Some analyst have said that the policy approach consisting in assisting the industry in providing its services to foreign Governments and commercial users, while satisfying US

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[269] See Williamson & Bakerb, *supra*, note 203 at 113.
[270] *Ibid.*
[271] *Ibid.*
[272] See Symposium, *supra,* note 265.
[273] See Williamson & Bakerb, *supra*, note 203 at 112.
[274] See Fact Sheet 2003, *supra,* note 245, p.6, Article VI.

security requirements, will enable the industry to compete aggressively in the global marketplace.[275] However, some observers are of the opinion that this remains to be seen given the fact that a variety of satellites and components today are treated by US export authorities as dangerous munitions.[276]

Furthermore, sensitive or advanced remote sensing exports as identified on the Sensitive Technology List[277] will be subject to Government-to-Government agreements. Experts say that this new requirement is to facilitate and accelerate international commercial remote sensing trade.[278] Although they acknowledge that the process could take a rather long time, they assert that once established, such agreements "could be very positive for licensing of services." [279] For the rest and as a general rule, exports will continue to be evaluated on a case-by-case basis.

In conclusion, the new commercial remote sensing policy of 2003 is still a work in progress. Agencies have been directed to complete a series of specific implementation actions following its announcement but much remains to be done. And if we were to judge the future by the past, one could reasonably say that in fact, its success largely depends on the way this new policy is to be implemented.

3.4 Licensing and Contracts

Generally, the US national legislation regarding commercial activities involves licensing regimes and under special circumstances, contractual arrangements (e.g. NextView and ClearView contracts). To date, unless they have been replaced or

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[275] See Salin, *supra,* note 201 at 376.
[276] See Space News Business Report, 27 May 2003, online:
<http://www.space.com/spacenews/archive03/editarch_052703.html>
[277] "Exports of sensitive or advanced information, systems, technologies, and components, however, will be approved only rarely, on a case-by-case basis. These items include systems engineering and systems integration capabilities and techniques, or enabling components or technologies, i.e., items with capabilities significantly better than those achievable by current or near-term foreign systems. The Secretary of State, in consultation with the Secretary of Defense and the Director of Central Intelligence, shall maintain a Sensitive Technology List that includes these items. This list shall be made available to U.S. industry, consistent with national security and foreign policy." See Fact Sheet 2003, *supra*, note 245.
[278] See Symposium, *supra,* note 265.
[279] *Ibid.*

invalidated, the spectrum of remote sensing policy is covered by either one of the policies, laws or regulations mentioned above.

At the outset, it is important to mention that the licensing process that will be presented within this thesis mainly derived from the PDD-23 of 1994 and can be found in NOAA 2000 Interim Regulations.[280] Since the replacement of PDD-23 by NCPD-27 in 2003, NOAA was advised to "develop, publish, and periodically review the licensing regulations"[281] of the commercial systems in coordination with other affected agencies. The Agency is expecting to release a new set of regulations in early 2006.[282] But until NOAA finalizes and publishes its new final regulations, the process constructed under the former regime will continue to be applied. Because of these imminent changes in the current regime, we will limit our presentation to the principle features of the licensing rules. Interestingly, the Agency has indicated that the proposed changes to the regulations will "further clarify reporting requirements, revise interagency review timelines for greater efficiency, revise timelines for companies to demonstrate satellite development, and add civil penalties for certain procedures."[283]

The DoC is the lead agency (through NOAA) for licensing and regulating US commercial remote sensing satellite firms.[284] Other departments or organizations are also involved in the review of licensing applications. Some government's agencies are given specific regulatory responsibilities. Amongst them are:

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[280] See *NOAA 2000 Interim Regulations, supra*, note 221.
[281] See Fact Sheet 2003, *supra,* note 245, p.3, Article IV.
[282] As of September 13, 2005, NOAA was reviewing comments received during the public comment period following an interagency process. The Agency was expecting the final regulations to be published in early 2006. See "Open Session Meeting Summary", NOAA Advisory Committee for Commercial Remote Sensing (ACCRES), September 13, 2005, p. 3, online: NOAA ACCRES at: <http://www.accres.noaa.gov/7thMeeting09-13-05.pdf>. For an updated status see the NOAA ACCRES internet site at: <http://www.accres.noaa.gov/index.html>.
[283] See NOAA ACCRES. *Ibid.*
[284] "The Secretary of Commerce, through the National Oceanic and Atmospheric Administration (NOAA), licenses and regulates the U.S. commercial remote sensing space industry, pursuant to the Land Remote Sensing Policy Act of 1992, as amended, and other applicable legal authorities. [...]" See Fact Sheet 2003, *supra,* note 245, p.3, Article IV.

- The Departments of State and Defense (respectively in charge of reviewing licensing applications for determining the conditions necessary to protect national security and foreign policy concerns);

- The Department of Interior (for national land remote sensing data archive matters);

- The National Environmental Satellite, Data, and Information Service (NESDIS), in collaboration with the National Land Remote Sensing Data Archive (EROS data Center, USGS) (also for data archiving matters); and

- NASA which supervises the safe disposal of the satellites.

In 2002, an Advisory Committee on Commercial Remote Sensing (ACCRES) was formed in order to engage expert advice to help NOAA move forward in dealing with new licensing applications.[285] The improvement of the licensing process for advanced technologies, and the consequent review of the decision-making process, was already a topic under consideration by ACCRES[286] when the 2003 policy was announced. In 2002, these agencies have concluded an interagency Memorandum of Understanding (MOU) in order to provide more clarity and facilitate the coordination of the licensing process.[287]

3.4.1 The Process at a Glance

Firstly, the regulatory framework to obtain a license states that any person subject to the jurisdiction or control of the US who wishes to operate a private remote-sensing space system must obtain a license.[288] This last notion of person subject to the US

[285] See NOAA ACCRES, *supra*, note 282.
[286] See Donald Evans, Secretary, US Department of Commerce, Keynote Address, Symposium, *supra,* note 265.
[287] See "*US Interagency Agreement on the Licensing of Private Remote Sensing Satellite Systems*", The White House, Office of Science and Technology Policy and National Security Council, Fact Sheet, February 2, 2000, online: NOAA at <http://www.licensing.noaa.gov/reference.html>.
[288] See *NOAA 2000 Interim Regulations, supra,* note 221, s.960.4.

jurisdiction and control is so broadly defined that it encompasses almost any individual or legal entity having any connections with the US.[289] The extent of this connection is illustrated by the application of the US rules on "foreign entities that, for example, use a US launch vehicle and/or platform; operate a spacecraft command and/or data acquisition or ground remote station in the United States." [290] The consequence of such broadness is that these provisions can become the basis for an extra-territorial application of the US national Rules. This situation has been denounced by many scholars as another attempt to impose US limitations on the global space industry.[291] But they also have concluded that unilateral action from the US to impose its rules, even on its closest allies, will not work.[292] On the contrary, it will generally be ineffective or counterproductive. A good example was Canada's decision to forbid its remote sensing industry from contracting with American companies following US attempts to subject Canadian firms to US restrictions.[293]

The license is obtained through a written application to the Assistant Administrator of NESDIS/NOAA.[294] There are no particular forms required and there are

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[289] See *NOAA 2000 Interim Regulations*, *supra*, note 221, s.960.3: "*Person* means any individual (whether or not a citizen of the United States) subject to U.S. jurisdiction; a corporation, partnership, association, or other entity organized or existing under the laws of the United States; a subsidiary (foreign or domestic) of a U.S. parent company; an affiliate (foreign or domestic) of a U.S. company; or any other private remote sensing space system operator having substantial connections with the United States or deriving substantial benefits from the United States that support its international remote sensing operations sufficient to assert U.S. jurisdiction as a matter of common law." See also the definitions of the terms "*Subsidiary*", "*Affiliate*", "*Administrative control*", *and* "*Beneficial owner*".

[290] See Jakhu, *supra,* note 134 at 82.

[291] See Bob Preston, "Emerging Technologies: Emerging Issues for Space Remote Sensing", in JC Baker, K. O'Conner, RA Williamson, editors. COMMERCIAL OBSERVATION SATELLITES: AT THE LEADING EDGE OF GLOBAL TRANSPARENCY. Washington, DC: RAND and American Society of Photogrammetry and Remote Sensing, April 2001, pp.79-100 at 96. See Florini & Dehqanzada, *supra,* note 220 at 442.

[292] *Ibid.*

[293] See "Chapter four: Section 4.2.2.3: The United States Connection" of the present thesis.

[294] The licensing responsibilities have been delegated from the Secretary of Commerce to the Assistant Administrator for NOAA Satellite and Information Services (NOAA/NESDIS). NESDIS is responsible for coordinating licensing of the operations of U.S. commercial remote sensing satellite firms. Further, NESDIS consists of several organizational components that collectively manage the operational environmental satellites of the US, provide data and information services, and conduct related research. This civilian operational environmental satellite organization is America's primary source of space-based oceanographic, meteorological and climate data. NESDIS provides long-term archive and access services for environmental observations and information. See "NESDIS Strategic Plan FY2005-2010", p.13, online: NOAA at: <http://www.spo.noaa.gov/pdfs/NESDIS_strategic_plan_2005-2010.pdf>.

no filing fees or filling charges. The information required consist of details on the corporate structure, the system operational/technical characteristics, the expected dates of system operation, the launch information, the data acquisition/distribution plans, the data reproduction and pricing policy, the planned agreements with foreign entities and the plan for safe disposition of system at the end of the operations.[295]

Following the complete application, it is forwarded for review by different Departments: DoC for matters relating to the licensing process, DoD for national security matters, DoS for international obligations matters, DoI for national land remote sensing data archive matters.[296]

Once complete, NOAA issues its determination within 120 days, consistent with its statutory authority.[297] An administrative appeal is possible, in writing, within 21 days of the decision.[298]

3.4.2 The Scope of the License

Requests by US firms seeking to get a license to operate a private remote sensing satellite system are reviewed and granted on a case-by-case basis. When approved by the US Government, the licensee must adhere to a range of conditions, including the acceptance of the Government's right to impose "shutter clause" if necessary. The license covers only operations of a private remote-sensing space system by a US entity or a non-US entity, and any changes in the operational aspects would require an amendment to the license.[299]

The terms and conditions of the license also set forth the obligations of the licensee. At a glance, the latter must maintain positive control of its spacecraft operations

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[295] See *NOAA 2000 Interim Regulations*, *supra*, note 221, Appendix 1 to Part 960.
[296] *Ibid.* s.960.6.
[297] *Ibid.*
[298] *Ibid.* s.960.10.
[299] *Ibid.* s.960.7.

and maintain a tasking record in conjunction with other record-keeping requirements. Additionally, commercial operators are prohibited from changing the operational characteristics of the approved satellite system. They are required to provide notification when they enter into significant or substantial agreements with new foreign customers. Licensees must obtain US Government approval for any encryption devices used. Plus, they must also obtain *a priori* US Government approval of all plans and procedures to deal with safe disposition of the satellite. Another aspect of the licensing restrictions is that foreign ownership is currently limited to a specified threshold that is fixed by Presidential Directive. Experts said that according to the new policy of 2003, the licensing policy about foreign ownership limits and foreign board representation on US remote sensing companies has not changed.[300] They added that the process would still be looking at effective controls and ownership limits but with the goal of encouraging foreign investment in advanced commercial remote sensing systems.[301] Also, the licensing regime includes requirements regarding national security and data distribution that were detailed in other parts of this thesis.[302]

Finally, the license is valid for a finite period (i.e. until the system stops operating) and is non transferable.[303] Any failure by the licensee to comply with the Act, Regulations or any terms and conditions of the license may entail penalties and sanctions. These goes in the order of civil penalties (fine to a maximum of US $10,000) to a criminal penalty as prescribed under other applicable laws.[304]

3.4.3 Other Requirements

It is also worth mentioning here that the operating license does not preclude requirements for the licensee to obtain related permits and licenses for export, use of

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[300] See Symposium, *supra,* note 265.
[301] *Ibid.*
[302] *Ibid.* s.960.11. See Chapter three: Section 3.2.2.1.1: 'Licensing Restrictions and Shutter Control" above.
[303] *Ibid* , s.960.9
[304] *Ibid* , s.960.15

radio frequencies, and launch.[305] Therefore, the granting of the license is done in consultation with other US Government agencies.

If its satellite is to be launched from a US territory, the licensee is required to obtain a launch license from the Department of Transportation's Federal Aviation Administration (FAA). Furthermore, the approval of the US Federal Communications Commission for the use of radio frequency spectrum is necessary. Finally, if there is export of equipment of technology to support the system, the operator may require the appropriate export licenses from the Department of Commerce's Bureau of Export Administration or the Department of State's Office of Defense Trade Controls. [306] When deciding whether or not to issue an export license, the Government will take into consideration the foreign customer's "willingness and ability to accept commitments to the US Government concerning sharing, protections, and denial of products and data." [307]

3.5 Data Policy for Remote Sensing Space Systems.

As discussed previously, the US has for many years internationally advocated for an "open skies policy", that is the free collection and distribution of data. Although its national regulations seem to reflect this philosophy, a close look at the US policies shows a slight departure from this "open" guiding principle.

3.5.1 The Evolution of the United States Market for Remotely Sensed Data

As already mentioned, the first Government and operator of an earth observation system was the US with the Landsat program. At this point, all raw data were fully distributed. The open policies of giving these data for free aimed at familiarizing and help flourishing the infantile industry of remote sensing. In the mid 1980's, the Reagan administration was in favor of commercializing and privatizing government's remote

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[305] *Ibid* , s.960.2 (e).
[306] See "Licensing of Commercial Remote Sensing Satellite Systems:Other Licensing Related Agencies", online: NOAA/NESDIS at: <http://www.licensing.noaa.gov/agency.html>.
[307] See PDD-23, *supra,* note 200.

sensing system. It followed that Landsat 4 to 6 were privately operated although being partially subsidized by governmental funds.[308] The 1984 Commercialization Act compelled the single private operator of Landsat (i.e. EOSAT) to distribute raw data to all potential purchasers on a non-discriminatory basis.[309] Hence, there were no discretionary pricing mechanisms left for the selling of raw data. They could not charge different prices to different customers. However, the pricing of the data was to be established by EOSAT on a profit-oriented basis.[310]

These legal obligations of providing all raw data in the same manner (i.e. at the same price),[311] turned out to be detrimental to the private market. Mainly, it prevented healthy competition with foreign system (i.e. the SPOT system) which was selling higher resolution raw data at a better cost. Further, the market pricing of Landsat data, including raw data, significantly inhibited users from using them and expanding their potential applications.

Beyond scientific and military uses, there were not at the time any real needs for remote sensing data. And each user had different and specific needs which turned out to be conflicting with those of the providers. For example, researchers involved in public research wanted a minimal cost and minimal barriers for sharing the data with one another when they had a common objective. On the other hand, a private company having copyrights on the data would want the maximum fee to be charged for the sale and any subsequent transferring of the data to others.[312] This situation had not been taken into consideration when the regulations were created in 1984. The resulting non user-friendly policy led to a drop in the use of the data, mainly by researchers who were unable to sustain the newly requested fees.

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[308] Gabrynowicz, *supra*, note 116 at 100.
[309] See *1984 Commercialization Act, supra,* note 186, s. 205 (a).
[310] See *1984 Commercialization Act, supra,* note 186, art.202 (a) (1). See also Bourbonnière, *supra,* note 31 at 58.
[311] See Bourbonnière, *supra,* note 31 at 56.
[312] In fact, even with market pricing, the best that could be expected for EOSAT was that revenues of data sales would cover the fixed costs of operations. Indeed, major costs were involved for the data collection by the private operator of Landsat. They had to support high development costs, long build times of satellite systems, coupled with the high risks involved in launching and operating such technology. See Johnstona & Cordes, *supra*, note 226.

Under Clinton administration, there was another shift, another change of policy. Mainly, Landsat 7 was placed back in the hands of the Government while Landsat 4 to 6 remained in the hand of EOSAT. The US policy governing Landsat 7 imagery sales was based on the data policy guidelines of the 1992 Policy Act (still valid today). The Act provided that only data obtained through government funded or government owned systems should be made available and liberally distributed. But the data would not to be free as it had been in the 1970's, before the failed commercialization attempt of Landsat in 1984. In respect of the "open skies" spirit of the US and as a compromise, only a minimal cost would be paid for Landsat 7 data. Through the Cost of Fulfilling User Requests (COFUR) Program,[313] the US Government specified that a user would only be requested to pay for the cost of the reproduction and shipping.

The reasoning behind this was that the taxpayers had already contributed to pay for the Landsat system with their taxes. It would therefore be incorrect or unfair to charge them again for the resulting data. It is interesting to note that the new philosophy or approach of the United States regarding distribution of data was quite different from that of other countries. Most countries were indeed requesting at least a minimum recovery cost for the distribution of similar data from their national systems.

For the privately funded satellite systems, although the 1992 Policy Act required private companies to make data available to sensed states "as soon as [they] are available and on reasonable terms and conditions",[314] they had fully regained their right to institute discretionary pricing mechanisms. And with the growing needs and multiple applications of the remote sensing imagery data, the users were more willing to disburse fees. The private operators were now in a real position to sell their data at the market value. As one can see, remote sensing policies needed to be user-friendly first so that a fee could be added without any impact on the remote sensing market.

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[313] Cost of Fulfilling User Requests (COFUR): the Landsat 7 imagery data can be purchased at the EROS Data Center.

[314] See *1992 Policy Act, supra,* note 196, sec 5622 (b) (2).

3.5.2 The "Non-Discriminatory Access Principle" of Remote Sensing Data in the United States National Legislation

Since the beginning, the US had taken affirmative measures, through its national legislation, to ensure its compliance with the international obligations contracted under the 1967 Outer Space Treaty and the guidelines of the 1986 UN Remote Sensing Principles. To ensure US compliance with its international obligation, the principle that unenhanced data acquired from space (either by itself or by its private sector operators) could be accessed by sensed States and their territories, was incorporated twice into its domestic legislation.[315]

So far, both 1984 and 1992 statutes have required the private sector companies to abide by the standard of non-discriminatory aspects.[316] However, the scope of the non-discriminatory principle applicable to private systems has been reduced, as stated by some legal academia:

> "Under the 1984 statute, the threshold requirement for licensees was to "make unenhanced data available to all potential users." Under the 1992 statute, this threshold was revised to making "available to the Government of any country (including the United States) unenhanced data collected by the system concerning the territory under the jurisdiction of such Government as soon as such data are available and on reasonable terms and conditions." [317]

Some have seen in this changes from one Act to the other, the evidence that would suggest a departure from the US, ever if so slightly, from its open skies policy.[318]

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[315] See Gabrynowicz, *supra*, note 116 at 94. See *1984 Commercialization Act, supra,* note 186, s.4201*et. seq.*; and the See *1992 Policy Act, supra,* note 196, s.5651 *et.seq.*

[316] See *1984 Commercialization Act, supra,* note 186, s.4242 (b) (2); and *1992 Policy Act, supra,* note 196, s.5622 (b) (2).

[317] *See* Gabrynowicz, *supra*, note 116 at 101. Construed from the *1984 Commercialization Act, ibid.* and the *1992 Policy Act, ibid.*

[318] See Hoversten, *supra,* note 92.

Nowadays, with NOAA 2000 Interim Regulations,[319] the terms and conditions for obtaining a license also request that the licensee make available unenhanced data to a sensed state as soon as such data is available and on "reasonable cost terms and conditions".[320] This means that the US is still complying with its international commitments of freely distributing the data and on reasonable terms. It has been positively asserted that the data availability requirement does not equal to cost-free distribution and do not extend to uniform pricing.[321] Indeed, the fact that licensees are allowed to seek market rates for their data is not considered a violation of the non-discriminatory principle.[322] However, one cannot help noticing here the withdrawal from the total advocated "open skies" principle, which provided for the open distribution of not only unhenanced data but also of analyzed information.

3.5.2.1 The Israel Case or the Kyl-Bingaman Amendment

Another event worth mentioning when presenting the US data policy for remote sensing space systems is the 1996 restriction on the collection and distribution of data with respect to Israel territory. Following Israel's insistence on the US not to distribute the data collected about it's territory to any third State, the US Government introduced the national restriction that no private operator can sell and process data from Israel that have less than two meters resolution.[323] In fact, the US Congress passed a law, through an amendment embedded in the National Defense Authorization Act for Fiscal Year 1997,[324] which placed such limitations on US private companies. The implication of such policy on the collection and distribution of remote sensing data is that although private companies can produce less than two-meter imagery, they are forbidden to sell them if

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[319] See *NOAA 2000 Interim Regulations, supra*, note 221.
[320] *Ibid.* s.960.12.
[321] See Gabrynowicz, *supra*, note 116 at 104.
[322] *Ibid.*
[323] The Kyl-Bingaman Amendment, on 23 September 1996, as Section 1064 of Public Law 104-201 (the *Fiscal Year 1997 National Defense Authorization Act)*
[324] *National Defense Authorization Act for Fiscal Year 1997*, S.Rep.No.104-278, 104th Congress, 2d Sess., s.1745 (1996), s. 1044 [Hereinafter the 1997 Defense Authorization Act or "The KyI-Bingaman Amendment"]

they depict coverage of the Israeli territory or any prescribed country or geographic area.[325]

The "KyI-Bingaman Amendment" raised many debates amongst politicians, policy leaders, scholars and the industry.[326] The many critics of this restriction pointed out its discriminatory aspect and lobbied in favor of its abolishment.[327] Joanne Irene Gabrynowicz, Director at The National Remote Sensing and Space Law Center in Mississippi, expressed that when there are regulations adopted to limit the right of operators to distribute data on a specific geographic zone, it could be considered as contrary to the UN principles.[328] She points out that from going to a position of "open" dissemination 30 years ago,[329] and by now placing restrictions on certain geographical part of the world, the US were *de facto* being discriminating.

Industry officials and other opponents further argued that the amendment was contrary to the 1992 Policy Act and the Presidential Directive of 1994. In Congressional testimony, it was declared that the Senate amendment, "amounts to the creation of a new multilateral regime to decide what images Governments will allow private firms to release."[330] It was further added that this illegal exception made to the non-discriminatory principle by the US Government would create a precedent for other nations to request similar blackouts over their territoties. It was this logic of thinking that if Israel were to have a blackout option, other countries would eventually demand the same. In such case, satellite companies could be faced with blackout areas around the world "to accommodate

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[325] See *NOAA 2000 Interim Regulations*, *supra*, note 221.
[326] *See* Annie Moreno, "La Commercialisation des Images Spatiales: Approche Juridique", Editions Litec-CREMEDI, 1999, pp.383 at 53; *See* Ray A. Williamson, "Legal and Policy Issues in Satellite Remote Sensing" in "Project 2001-Legal Framework for the Commercial Use of Outer Space", Recommendations and conclusions to develop the present stage of laws; Proceedings of an International Colloquium, Cologne, May 29-31, 2001, to present conclusions of "Project 2001-a joint international research project by the Institute of Air & Space Law, University of Cologne and Deutshes Zentrum für Luft-und Raumfahrt e.V., DLR/Ed. By Karl-Heinz Böckstiegel, Köln; Berlin; Bonn; München: Heymanns, 2002, p.724 at 165-178. See Gabrynowicz, *supra*, note 116.
[327] *Ibid.*
[328] See Gabrynowicz, *supra*, note 116.
[329] During the discussions preceding the adoption of the 1986 UN Resolution, the US was strongly advocating an open-policy dissemination of sensed data.
[330] See Steinberg, *supra*, note 214. *Construed from* the Congressional testimony of Mark Brender, Head of the Radio-Television News Directors Association.

the arbitrary requirements or political whims of individual countries."[331] Hence, the blackouts would eventually deprive the private sector from a considerable portion of the global imagery market, thus undermining investor confidence. Finally, others represented that the Kyl-Bingaman Amendment should be maintained to the condition that it be extended to any other states requiring similar restrictions for their territory, on the basis of equal treatments.[332]

The 1997 Defense Authorization Act required that "no department or agency of the Federal Government may license the collection or dissemination by any non-Federal entity of satellite imagery with respect to Israel, *or to any other country or geographic area designated by the President for this purpose*, unless such imagery is no more detailed or precise than satellite imagery of the country or geographic area concerned that is routinely available from commercial sources.[emphasis added]"[333] Consequently, the original Israel exception has been made general under the NOAA 2000 Interim Regulations, whose provisions implemented the Kyl-Bingaman Amendment.[334]

In practice, the NOAA 2000 Interim Regulations indicates as a condition for operation, that the licensee has the obligation to operate its system in a manner that preserves the national security and observes the foreign policy and international obligations of the United States.[335] In furtherance of this assertion, the clause indicates that specific limitations on operational performance, including limitations on data collection and dissemination, will be specified within each license. So far, each license contains the restrictions as regard the Israel territory. In line with the 1997 Defense Authorization Act, the DoC will monitor the level of imagery resolution readily and

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[331] *Ibid.*
[332] See e.g. Bourbonnière, *supra,* note 31; Gerald M. Steinberg, "Commercial Observation Satellites in the Middle East and the Persian Gulf", in JC Baker, K. O'Conner, RA Williamson, editors. COMMERCIAL OBSERVATION SATELLITES: AT THE LEADING EDGE OF GLOBAL TRANSPARENCY. Washington, DC: RAND and American Society of Photogrammetry and Remote Sensing, April 2001, pp.225-246.
[333] See the *1997 Defense Authorization Act*, Section 1064, Pub. L. No. 104–201.
[334] See *NOAA 2000 Interim Regulations, supra*, note 221, at 46827.
[335] *Ibid.*s.960.11 (b) (1).

consistently available from non-US sources and will determine what imaging or data dissemination restrictions, if any, shall apply to licensees.[336]

The NOAA 2000 Interim Regulations also contain provisions requiring that any private operators wanting to obtain an operating license submit a plan explaining how its proposed system will comply with the restrictions as established by the DoC.[337] Even after termination of the license, the provisions on the term of the license specified that the restrictions remain valid on "the acquisition and dissemination of imagery as imposed by the license or by the Secretary of Commerce"[338]

The provisions created a lot of concerns amongst the space community, especially the private operators. From the letter of the 1997 Defense Authorization Act, there were no specific guidelines as to whether a geographic zone should or should not be subject to the same policy. Under the law, the President of the US had the complete prerogative to designate, beside Israel, any other country or geographic areas as restricted. Moreover, there were no specifications regarding the time and the circumstances in which he would make such decision. Private operators find themselves in a situation where restrictions can be randomly imposed, not only during the licensing process but also during any subsequent commercial operation.

According to some authors, it can be presumed that the President would exercise his prerogative only for national security or foreign policy reasons, although they admit that the law does not provide for such restrictions.[339] Hence, the law permits the President to disregard the open-skies policy as he deems appropriate "although to do so without strong justification would certainly be politically damaging."[340] We can see that the US has opened the door for the dislodging of the non-discriminatory principle. However, it is unlikely that they will significantly depart from their own advocated open skies policy. In

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[336] *Ibid.* at 46827.
[337] See *NOAA 2000 Interim Regulations, supra,* note 221, at 46827.
[338] *Ibid.,* s.960.9 (b) (4).
[339] See Hoversten, *supra,* note 92.
[340] *Ibid.*

any case, this nebulous policy will eventually have to answer both to the industry players and the other States.

3.5.3 Ownership, Copyrights and Pricing of the Data

At the international level, there are no specific regimes dealing with the intellectual property rights or ownership of remotely sensed data. As seen, the Nations of the world initially agreed to the concept of open skies and allowed overflights of their territory for the purpose of collecting imagery. However, no specifications were made as to the ownership of the data other than establishing that the concept of open skies implied equal access on equal terms. In furtherance of this concept, the States introduced 15 UN Remote Sensing Principles, which makes data accessible to sensed States, on non-discriminatory basis and on reasonable cost terms, for the purpose of natural resource mapping or exploitation. In addition, no prior consent is required from a sensed States to conduct remote sensing activities. As a result, it can be safely assumed that a sensing State owns the data it has produced, although this right is hinged on conditions related to the protection of the Earth's environment. The States also determine the distribution or denial of the imagery acquired by its satellites, though this has to be done in accordance with international law.[341]

At the national level, property rights (or ownership) and copyrights must be distinguished. Property right or ownership is the right of an individual to own property and keep the income earned from it. A copyright is "a set of exclusive rights granted by a Government for a limited time to protect the particular form, way or manner in which an idea or information is expressed. Copyright may subsist in a wide range of creative or artistic forms or "works", including [...], photographs, software, and industrial designs. Copyright is a type of intellectual property."[342]

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[341] See Jakhu, *supra,* note 134 at 79, 80 and 88.

[342] See "Copyright", online: Wikipedia, A Free Encyclopedia at: <http://en.wikipedia.org/wiki/Copyrights>

As regards remote sensing data acquired by a private operator satellite, ownership rights belong to the operator. Through licensing provisions, the non-discriminatory access principle also applies to the US commercial industry, but it has been reduced in scope for national security concerns. However, under current US copyright law, whether produced by the public or private sector, the data themselves are not copyrightable, although the original selection, coordination, and arrangement of the data in databases may be copyrightable.[343] Currently, databases can also be protected by contract, trade secret law, state unfair competition law, as well as by various other technological safeguards and a variety of business practices.[344]

At the basis, if a company owns a piece of data or a database, it is entitled to charge and limit whether one can use it or distribute it. Commercial operators have developed new approaches to contractually managing and safeguarding all their proprietary rights. Rather than selling commercially produced databases, there has been a growing trend toward licensing, wherein the terms for use of the data are governed by the terms of the license. The licensing agreement generally limits the use of data to the purchaser and its ability to send the purchased data to others.[345]

As regard pricing issues, as said, they are fixed by the companies on a discretionary basis. Since 1999, data providers have started issuing fairly restrictive licenses for purchasers of data. In particular, they started to put cost on any transferring of sharing of the data by the original purchasers. These licensing restrictions on data sharing and cost has turned out to be a barrier for commercial satellite data providers, mainly to the widespread Federal Government use of commercial space-based remote sensing. In fact, this was a hindrance to many civil government users who typically operated in a data-sharing mode. Besides the difficulties related to the sharing of the data between

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[343] See Steering Committee on Space Applications and Commercialization, *Transforming Remote Sensing Data into Information and Applications: Intellectual Property Issues*, National Academy of Sciences, NATIONAL ACADEMY PRESS, Washington, D.C., 2001, at 44.

[344] *Ibid.*

[345] See Robert Pearson, "Commercial Remote Sensing Satellite Programmes in the United States", Chapter 6, Section 6.7, in *Commercial Satellite Imagery: A tactic in nuclear weapon deterrence*, Springer; Chichester, UK: Praxis Publishing Ltd, 2002, at 179.

agencies, another downside was that the release of the data for public use was also restricted and created frustration amongst the users. According to the ACCRES Civil Agency Implementation Plan, commercial data providers "are currently looking into such concepts as delayed release to the public or lower-cost public-use licenses"[346] to mitigate this problem. Further, they are assessing the possibility of reducing the cost of multiple-use licenses which, although already exist, have been unaffordable to numerous agencies.

In the case of Landsat 7, Landsat imagery has the status of a public good.[347] The Government retained the ownership of the unhenhanced data. It dictates its price and its use. According to the Landsat 7 Data Policy, only limited data processing will be provided by the US Agencies, leaving further data enhancement to users and value-added providers.[348] For this last aspect, a distinction between the different types of data also needs to be made. Contrary to "unenhanced" data for which the Government retains the ownership, if the user wants to have "value-added" type of data, then the principle is that the company producing the service can appropriate this category of data. The reason behind this is that the required activity grants the value-adder proprietary rights on the enhanced information that has become personalized through the value-adding process, except for reasons of national security. Hence private companies involved in the value-added process market are reputed to own the data they produce and as a result can dictate the cost and how a user can utilize the data through a restrictive license.

3.5.4 Archiving and Data Distribution

Archiving was introduced with the use of Landsat as a government measure to store and preserve the collected data for the future. PDD-23 of 1994 assigned the data archive responsibilities to the Earth Resources Observation System (EROS) Data Center

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[346] See CAIP, *supra,* note 262 at 32.
[347] See Kevin O'Connel & Greg Hilgenberg, "US Remote Sensing Programs and Policies" in JC Baker, K. O'Conner, RA Williamson, editors. COMMERCIAL OBSERVATION SATELLITES: AT THE LEADING EDGE OF GLOBAL TRANSPARENCY. Washington, DC: RAND and American Society of Photogrammetry and Remote Sensing, April 2001, pp.139-163 at 146.
[348] See National Aeronautics and Space Administration, *Landsat Data Policy*, 1997, online: NASA at < http://geo.arc.nasa.gov/sge/landsat/l7policyn.html>

of the US Geological Survey. Landsat 7's mission was to acquire and refresh a global archive of daytime, generally cloud-free images of all land and coastal areas.

Today, private companies also have to provide their data for archiving. The licensing process requires that the applications of private firms be sent to the Department of Interior for national land remote sensing data archiving matters. Under the terms of its license, the licensee must make available unhenanced data as requested by the US Government Archive for the basic data set.[349] Archiving requirements also demands that the licensee notify those responsible and make available the data when they contemplate its destruction.[350] The tremendous value for researchers to be able to compare data in different period of time for application such as global warming or environmental issues necessitated such measure. The data are stored and retrievable for a monetary cost (i.e. the COFUR program).

Products of commercial remote sensing firms not only include raw imagery sales but also secondary information products such as value-added services. Other components of remote sensing include the development and sale of ground stations, infrastructures and software.[351] The imagery data provider is an enterprise that collects and distributes the satellite imagery data to the users.[352] Satellite imagery providers or resellers are subject to the national authorities of the country in which they are located. Many satellite imaging firms are entering into business partnerships with data provider enterprises, an arrangement that offers a potentially profitable way for both sides to take advantage of their complementary remote sensing capabilities.

When a private company envisages developing an international database and distribution network, a request must be send to the Department of State who is in charge

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[349] See *NOAA 2000 Interim Regulations*, *supra*, note 221, s.960.11.
[350] *Ibid*
[351] See O'Connell & Hilgenberg, *supra*, note 9 at 54.
[352] See John C. Baker, "New Users and Established Experts: Bridging the Knowledge Gap in Interpreting Commercial Satellite Imagery", in JC Baker, K. O'Conner, RA Williamson, editors. COMMERCIAL OBSERVATION SATELLITES: AT THE LEADING EDGE OF GLOBAL TRANSPARENCY. Washington, DC: RAND and American Society of Photogrammetry and Remote Sensing, April 2001, pp.533-557 at 541.

of reviewing and applying strict rules on the export of sensitive technologies or even turnkey imaging systems to other countries.[353] Furthermore, as seen, the US regulates the access to data flows within its territory and to foreign customers through its licensing regime. Because of the already-mentioned extraterritorial nature of some of these regulations, some foreign data providers and distributors may also be subject to these US rules.

3.6 Conclusion

In conclusion, the process for obtaining a license in the US is viewed by private entities as much too slow and uncertain for effective competition in the commercial marketplace. The effect of the US policy and regulatory factors on the commercial remote sensing industry is obviously complicated by the multiple roles that the US Government plays as owner, regulator, customer, patron and potential competitor. With this in mind the US Government will constantly need to re-assess its licensing process in order to better improve its remote sensing industry.

Also, the level and number of challenges to be faced by the commercial private market will mainly be determined by the implementation of all the legislative and regulatory measures that we have commented upon. The current commercial remote sensing industry is still floating on uncertainty as to whether or not the domestic market is already saturated with the three commercial entities marketing high-resolution satellite imagery. According to some, unless more commercial users emerge or more government support is forthcoming, consolidations should be expected.[354] The increased interest noticed within the defense and intelligence agencies in taking advantage of the availability of high quality data from commercial sources[355] might be the solution to secure a successful future and a growing industry. However, it has been ironically said

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[353] See O'Connell & Hilgenberg, *supra*, note 347 at 148.
[354] See Symposium, *supra,* note 265 at.22; See Williamson & Bakerb, *supra*, note 203 at 116.
[355] See Patrick E. Clarke, "Commercial Satellite Imagery Matures as an Asset", Military Geospatial Intelligence, Vol. 2, Issue 1, 2004, pp. 20-23, online: Space imaging at: <http://spaceimaging.com/newsroom/select_2004.htm>.

that the US Government, while having such ambitions, might be in the unusual position of picking, through the NextView and ClearView contracts, which American-based remote-sensing company will become a long-term industry survivor.[356] In furtherance of their constant search for a bigger market and for ensuring their economic survival, domestic companies are likely to expedite their entering into the international market, through international alliances and partnerships. In any case, the pending success of the current commercial remote sensing industry will continue to necessitate a protective yet alert and adaptive regulatory framework.

Finally, the particularity of the US legal framework is that it encompasses broad legal provisions that are political in nature. Whether it is through shutter clauses, operation restrictions or system limitations, the US Government has unilaterally taken the right to give its legal regime an extraterritorial application on behalf of national security and foreign policy concerns. One of the driving forces behind the US policy is that by acting unilaterally, the US can determine the framework for the policies of other nations. Slowly, other international players have started to accept, albeit perhaps reluctantly, the US rules and limitations. A prime example is Canada's political decision to follow the American approach to control its commercial earth observation systems. In fact, in coordination with the US, Canada has recently established a similar legal framework for its remote sensing satellites industry. So far, Canada has been using the US regulations as a blueprint for it own regulations regarding national security and that of its allies.

[356] See Paul Dykewicz, "Feds May Decide Remote Sensing Survivor," Satellite News, May 31, 2004, online: SpaceImaging at: <http://spaceimaging.com/newsroom/select_2004.htm>.

CHAPTER FOUR: CANADA'S NATIONAL LEGAL FRAMEWORK ON REMOTE SENSING SATELLITES

4.1 Introduction

The continuing trends towards commercialization in the US and in the international marketplace lead the Canadian Government to change direction in space policy by leaving to a certain extent commercial objectives to private industry. Starting with its two Radarsat projects, Canada has been taking steps to ensure a strong position for its remote sensing sector. However, in a still emerging area such as the satellite remote sensing sector, the Canadian Government's importance is greater. Comparable to the US Government, it plays the roles of investor, anchor tenant, and partner with the private sector.

Moreover, Canada's space activities have always been undertaken as cooperative projects with foreign partners. As stated by some members of the Canadian Space Agency, international cooperation remains a cornerstone of Canadian space policy and has allowed Canada to undertake projects at considerably lower cost, has provided access to foreign technology and permitted Canadian industry to enter into teaming arrangements with firms in other countries. [357]

In the following sections, we will briefly examine the legal framework related to Radarsat-1 and -2 and identify the main policies and laws relevant to Canadian remote sensing activities. Emphasis will be on the recently enacted legislation that will regulate the operation of remote sensing space systems in Canada, including commercial systems. As we will see, the development of the Canadian regulatory structure remains greatly influenced by the US legal framework on remote sensing.

[357] See Dr Jocelyn Ghent Mallett, "Canada's Space Programme", Space Policy, February 1990, p.55.

4.2 Synthesis of the Canadian Regulatory Framework Evolution

Despite its active participation in the space sector, Canada did not have, until recently,[358] a specific and comprehensive regulatory framework to implement its international obligations and to govern all aspects of its private industry endeavors in outer space.[359] The only policy instrument available was the Long-Term Space Plan (LTSP),[360] firstly adopted in 1986, and renewed three times since.[361] This plan provides general directions to the space sector by indicating the major political objectives of the Canadian Government. However, this instrument does not give any indications as to what the space norms are and is silent on any regulatory matter. Although an interesting document for keeping track of the political commitments and directions taken by the Government of Canada (GOC) for a given time, "it does not provide the foundations for future regulations."[362] Hence, the first Canadian remote sensing activities were not governed by any specific legal framework but instead, the regulatory aspect of remote sensing activities was dispersed in a series of international and national documents containing the applicable norms and policies.

From 1972 until the Canadian Space Agency's creation in 1989, the Canada Center for Remote Sensing (CCRS), under the responsibility of the Department of Energy, Mines and Resources Canada (EMR), was developing the Canadian remote sensing industry by acquiring data from foreign orbiting satellites: the US's Landsat and France's SPOT. It was operating with two ground stations: one in the province of Saskatchewan and the other one in the province of Quebec. CCRS was a key player in the development of remote sensing in Canada and remains one of today's main actors in the Radarsat programs. CCRS is in charge of the ground segment activities of remote sensing

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[358] On 25 November 2005, the Government of Canada has enacted a new regulatory framework on remote sensing activities which has yet to enter into force.
[359] See Hermida, *supra,* note 144 at 166.
[360] *Ibid.* The LTSP is a periodic long-term space plan approved by Cabinet.
[361] The Canadian Space Agency is currently engaged in the Long Term Space Plan III, covering the period 1998 -2007. On November 12, 2003, the Canadian Space Agency approved the Canadian Space Strategy. It replaces the Long Term Space Plans as the framework that guides the Canadian Space Agency in leading Canada's national Space Program. See "The Canadian Space Strategy", online: CSA at <http://www.space.gc.ca/asc/pdf/strategy.pdf>
[362] See Hermida, *supra,* note 144 at 166.

in Canada, particularly the reception, processing, archiving and dissemination of remotely sensed data.[363] It also works with the private industry to develop remote sensing technology and applications.

The Canadian Space Agency (CSA) was created in March 1989 and officially established in December 1990 by the Canadian Space Agency Act.[364] CSA is a central agency created to bring together the existing space activities of the Canadian Federal Government. It was initially in charge of the Canadian space program's major fields: communication, earth observation and robotics. CSA chairs the Interdepartmental Committee on Space (ICS), which is composed of federal departments and agencies with an interest in space.[365] Mainly, CSA managed the space segment of projects such as Radarsat. According to the CSA Act, its legislated mandate is to promote the peaceful use and development of space for the social and economic benefit of Canadians.[366] In 1994, CSA announced its Canadian Space Program under the second LTSP for continuing the Canadian space activities through the 21st century.[367] One of the main objectives was to give focus to earth observation programs, mainly the Radarsat-1 project.[368] From then on, this satellite has been at the top of the priority list for the Canadian Space Agency.

4.2.1 The Radarsat-1 Era

Canada's long experience in data processing coupled with the need for regular surveillance of its territory lead to the conception of the Radarsat Program. In 1979, it was submitted to the Federal Cabinet that Canada should make its own radar satellite.[369]

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[363] See Canada Center for Remote Sensing, online: CCRS at <http://ccrs.nrcan.gc.ca/org/index_e.php>
[364] *Canadian Space Agency Act*, Chapter C-23.2 (1990, c.13) [hereafter CSA Act].
[365] See "Canada's Churchill Spaceport", 2003, online: Space Today Online at <http://www.spacetoday.org/Rockets/Spaceports/Canada.html>.
[366] See CSA Act, *supra,* note 364.
[367] See Stéphane Lessard, "An Update on Canadian Space Activities", Canadian Space Agency, 1996, online: CSA at: <http://esapub.esrin.esa.it/ecsl/ecsl16/less16.htm>.
[368] See Michel Bourbonnière & Louis Haeck, *Canada's Remote Sensing Program and Policies*, in JC Baker, K. O'Conner, RA Williamson, editors. COMMERCIAL OBSERVATION SATELLITES: AT THE LEADING EDGE OF GLOBAL TRANSPARENCY. Washington, DC: RAND and American Society of Photogrammetry and Remote Sensing, April 2001, pp.263-294 at 264.
[369] See Lawrence W. Morley, "Remote sensing then and now: RADARSAT", 1993, online, Canada Center for Remote Sensing at: <http://ccrs.nrcan.gc.ca/org/history/history21_e.php>.

A Radarsat Project Office was set up in 1980 with support from the Department of Communication, Environment Canada and several other agencies. At the time, private companies were appointed as prime contractors for the development of a SAR sensor and several others were involved as sub-contractors.[370] It is only fifteen years later, in November 1995, that Radarsat-1 was successfully launched. The enormous delay between the beginning of the project and the launch of the satellite was mainly due to political and financial set-backs, rather than technical one.[371]

4.2.1.1 Technical Considerations

In 1995, Canada was the third nation with its own civilian remote sensing satellite. The others were France and the United States. However, Radarsat-1 was the first *radar* remote-sensing satellite to be launched. It was also the first radar imaging satellite intended to meet the operational needs of remote sensing data users worldwide.[372] It became operational in February 1996, providing Canada and the world with a radar satellite system for the timely delivery of large amounts of data.[373] Radarsat-1 had an estimated lifetime of 5 years. Surprisingly, the system is still presently operating, having now entered its 10th year of operation.

To provide detailed photos of earth, this Canadian-constructed surveillance satellite uses synthetic aperture radar (SAR) to see through clouds, dust, fog and nighttime. Radarsat's SAR radar combined with its polar orbit allows it to scan the Arctic every 24 hours, most of Canada every 72 hours, and every other country in the world less frequently.[374] It provides useful information to both commercial and scientific users in the fields of agriculture, cartography, hydrology, forestry, oceanography, ice studies and

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[370] SPAR Aerospace was selected as prime contractor supported by MDA and COM DEV. See Morley. *Ibid.*

[371] For an historical analysis of the Radarsat project, see Morley. *Ibid.*

[372] See Ritchie Wayne Smendziuk, "The United Nations Principle of Non-Discriminatory Data Access - Does Radarsat Make the Grade?", Research Paper submitted to the Department of Space Studies University of North Dakota Grand Forks, Space Treaties & Legislation, December 1996, online: <http://www.space.edu/LibraryResearch/remote.html>.

[373] See "Satellites: Radarsat-1: What is Radarsat 1", online: Canadian Space Agency at: <http://www.space.gc.ca/asc/eng/satellites/radarsat1/background.asp>

[374] See John Kirton, « Canadian Space Policy », Space Policy, February 1990, p. 66.

coastal monitoring.[375] It has a resolution varying from 8 m to 50 m depending on swath width (i.e. the track of the satellite on earth which is adjustable according to the combination of resolution, span and periodic parameters of the satellite). The Canadian Space Agency is responsible for the space segment and CCRS is responsible for the ground segment of Radarsat-1.

4.2.1.2 A Joint Venture

At the beginning, Canada did not have sufficient funds available to invest in Radarsat-1 and so turned to the Canadian provinces and private companies for funding. Canadian provinces participated in the Radarsat-1 Program through two types of Memoranda of Understanding (MOU).[376] Provinces with companies capable of building a portion of the space or ground segment (i.e. Quebec, Ontario, Saskatchewan and British Columbia) signed an MOU as "Contributing Provinces".[377] They would contribute financially to the program in return for industrial work and access to data.[378] All the other provinces were invited to sign an MOU as "Participating Provinces".[379] They would commit to pre-pay certain funds to the CSA for the right to purchase Radarsat-1 data at favorable government rates.[380]

Within this national joint venture, private investors[381] were invited to get involved. They created RadarSat International (RSI), a private Canadian firm

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[375] See "What is Radarsat -1", *supra*, note 373.
[376] See Canadian Space Agency Press Release, "The Canadian Space Agency and RADARSAT International providing RADARSAT-1 Data to the Province of Newfoundland and Labrador", March 2002, online: Space Reference at: <http://www.spaceref.com:16080/news/viewpr.html?pid=7652>
[377] See *Memorandum of Understanding between the Canadian Space Agency and the Department of Energy, Mines and Resources, Government of Canada and the Contributing Provinces (Quebec, Ontario, Saskatchewan and British Columbia)*, 13 September 1989. [MOU Contributing Provinces]
[378] See Ahmed Mahmood, Ken Lord, Surendra Parashar and Ed Lagham, "Radarsat-1 Data Management", Annals of Air & Space Law, 1997, vol. 22-1, pp 485-493 at 487.
[379] See *Memorandum of Understanding between the Canadian Space Agency and the Department of Energy, Mines and Resources, Government of Canada and the Participating Provinces (Alberta, Manitoba, New-Brunswick, Nova Scotia and Prince Edward Island)*, 13 September 1989. [MOU Participating Provinces].
[380] See Mallett, *supra*, note 357.
[381] RADARSAT International was a consortium of SPAR Aerospace (Montreal, QC) MacDonald, Dettwiler and Associates Ltd (Richmond, BC) and COM DEV (Cambridge, ONT). SPAR Aerospace, now called EMS Technologies, acted as Radarsat's Prime Contractor.

conglomerate which would be responsible for the market and for selling the data from Radarsat-1.[382] To that effect, an MOU was first concluded between RSI and the Canadian Government (through both CSA and EMR).[383] RSI would be responsible, *inter alia*, to develop a market of non-government users for Radarsat products (internationally and nationally), to find a US private sector financial partner,[384] to collect all revenues generated by the use of Radarsat SAR data products & services, and to pay royalties to CSA. Roughly speaking, this agreement primarily aimed at ensuring the distribution of the satellite images by RSI, the sharing of incomes as drawn between the three parts, the technical management of the satellite by CSA, and the recognition of the total responsibility for the project by EMR. Later, a Master License Agreement (MLA) established the relationship among these parties as it pertained to the commercial distribution of the data.[385] In fact, RSI became the exclusive distributor of all Radarsat-1 data worldwide. However, they had to pay a royalty to CSA for all data and derivative products sold.[386]

At the national level, the whole framework of the Program was set in the MOUs mentioned above. But the Radarsat-1 Program was also an international partnership between Canada and the US. An International MOU (IMOU) was signed between Canada (through CSA) and its US partner (through NASA and NOAA).[387] Within this IMOU, the two parties mainly agreed that the US would get a bulk amount of data in

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[382] In 1999, RSI became a wholly owned subsidiary of MDA.

[383] *Memorandum of Understanding between the Ministry of Energy, Mines and Resources (EMR), the Canadian Space Agency (CSA) and Radarsat International (RSI)*, September 1990. [1990 MOU]

[384] "Since Radarsat is a cooperative project with the US, RSI is seeking a private sector partner in the US to share the global marketing." Lockheed Martin Astronautics was selected as the US partner of RSI. See Mallett, *supra,* note 354 at 57.

[385] *Master License Agreement between the Canadian Space Agency, the Department of Energy, Mines and Resources and RADARSAT International Inc.*, 23 September 1994.

[386] See Bourbonnière & Haeck, *supra,* note 368 at 265.

[387] *Memorandum of Understanding (MOU) between the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), and the Canadian Space Agency (CSA) concerning the RADARSAT project*, dated February 27, 1991. [CSA-NASA-NOAA International MOU].

exchange for a free launch of Radarsat.[388] NASA also required two mappings of the Antarctic continent within Radarsat's projected five-year life.[389] The parties involved also established the Radarsat-1 International Steering Committee (ISC), a governing body for Radarsat-1 at the international level, comprising of members from CSA, NASA and NOAA.[390] The ISC is in charge of managing and supervising the satellites operations and prevent possible conflicts. [391]

At this point, it is important to mention that Canada does not have the resources to carry out its national space program on an independent basis. For instance, Canada does not have its own launching platform. Early on, it was considered unnecessary by successive Canadian Governments to invest in launch facilities.[392] They recognized that Canada's investment would not be profitable given the frequency of Canadian satellite launches and given the numerous other launching platforms available to foreign satellites operators.[393] Hence, Canada's policy has been to rely on partnerships such as the cooperative launches negotiated with the US in projects such as Radarsat.

With this mix of national and international contractual ties, CSA had ensured success on the Canadian-led project through 1) the cooperation of foreign space agencies in the reception of Radarsat signals (i.e. IMOU) and 2) the role of RSI as a commercial arm of the Canadian remote-sensing program, jointly with EMR (i.e. MLA). [394]

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[388] Under the *CSA-NASA-NOAA International MOU*, NASA and NOAA are entitled to approximately 15% of the satellite's on-time imaging capacity for research and operational purposes. See NESDIS International & Interagency Affairs Office, June 2005, online: NOAA at <http://www.nesdisia.noaa.gov/foreigntext.htm>

[389] See "Satellites: Radarsat-1: Construction and Cost", online: Canadian Space Agency at: <http://www.space.gc.ca/asc/eng/satellites/radarsat1/construction.asp>.

[390] See Bourbonnière & Haeck, *supra,* note 368 at 265.

[391] See NESDIS, *supra*, note 388.

[392] See Mallett, *supra*, note 357 at 55.

[393] *Ibid.*

[394] See Salin, *supra,* note 145 at 112.

4.2.1.3 Intellectual Property Rights or Ownership and Value-Added Services

During the Radarsat-1 era, the Canadian space policy was partly carried out by CSA which in turn, was governed by the provisions of the CSA Act. Under this piece of legislation, the commercial exploitation of space capabilities, technologies, facilities or systems was to be encouraged by the Agency.[395] Further, CSA had the legal capacity to license, sell or make available any patent, copyright or other proprietary rights controlled or administered by the Ministry[396] and to enter into contracts, MOU or other contractual arrangements in the name of the Government of Canada.[397] Such a large mandate gives the Agency a large array of capabilities in regard the establishment of a commercial market for Radarsat-1 data.

In order to ensure the organization and marketing of Radarsat-1 SAR data, the ownership and right of distribution issues were negotiated in the MLA between CSA and RSI. Basically, copyrights and ownership are vested in CSA while RSI holds an exclusive right of worldwide distribution and marketing of the data described in the agreement. A royalty was to be collected by RSI on behalf of the Agency for all commercial data distribution and value-added products that allow for the retrieval of the original SAR raw data.[398]

The license provides for a right-to-use only, and so the right of transfer of the raw data is therefore restricted.[399] It states that: "all copyright and ownership rights for SAR data will be vested or reserved solely in or to CSA, the other party having rights of use as described in this MOU to the extend permitted by the laws of the Parties".[400] The recipients of the data "are required to agree that the intellectual property rights to the data belong to CSA".[401] Any recipient of SAR data must ensure that the data is not distributed

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[395] See *CSA Act, supra,* note 364, Article 5.2 (d).
[396] See *CSA Act, supra,* note 364, Article 5.3 (f).
[397] See *CSA Act, supra,* note 364, Article 5.3 (g).
[398] See Bourbonnière & Haeck, *supra,* note 368 at 265.
[399] See Salin, *supra,* note 145 at 153, 155.
[400] See *1990 MOU, supra,* note 383, Article 8.
[401] See Mahmood *et al,, supra,* note 378 at 490.

to third parties or used by them in ways other then those for which they were provided, without the written consent of CSA or its designate.[402] This not only applies to RSI but also to value-added service providers that commercially purchased the SAR raw data.

According to the MOUs, the selling of value-added products is not exclusively the right of RSI.[403] Other service value-added providers can purchase Radarsat-1 data and generate different products.[404] When purchasing raw data from RSI, providers must state the intended purpose for the use of the data and recognize CSA's ownership of the raw data. They are required to re-obtain RSI's consent if the purpose or use of the data changes and pay royalties if the raw data can be retrieve from the value-added services they have provided. As it regards to the data obtained by the Governments or Agency Participants to the Radarsat-1 Program, the value-added services can be performed and distributed in a non-commercial basis and used within the limits of governmental activities and operations. [405]

Adding further protection for CSA's copyrights of Radarsat-1 data at the international level, CSA states within the IMOU that any governmental agencies or organizations outside the Parties will have to enter into a separate agreement with CSA wherein they will agree to support Radarsat-1 Program objectives, including restrictions on data distribution. This clause was also embodied in the MOU between CSA and RSI whereby RSI is instructed to keep CSA informed about any intention or activity it may have in relation to the value-added market.[406]

4.2.1.4 Data Acquisition and Distribution, Archiving and Pricing Policies

Data is available in a multi-tier system. The specific data supplied to a customer will depend on that customer's access profile.[407] The data entitlement of the Radarsat-1

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[402] *Ibid.*
[403] See *CSA-NASA-NOAA International MOU, supra,* note 387, Article 7.1.
[404] See Bourbonnière & Haeck, *supra,* note 368 at 272.
[405] See Bourbonnière & Haeck, *supra,* note 368 at 265.
[406] See *1990 MOU, supra*, note 383, Article 7.
[407] See Symposium, *supra,* note 265.

Program partners, contributors and participants is determined pursuant to the various agreements already mentioned. Furthermore, a Radarsat Data Policy dated July 13, 1994, provides for the provision of commercial data from the satellite and the conditions for access to the data.[408]

At the national level, RSI has the obligations of distributing SAR data to agencies parties to the IMOU, to the Canadian Federal departments and agencies, and to the contributing or participating Provinces. RSI is also under the obligation to develop and maintain an international catalogue of SAR data, to promote its international utilization, and to market Radarsat data globally. Finally, RSI has to be consistent with the 1986 UN Principles on remote sensing.

In return, CSA grants RSI 40% of its access time to the data for commercial purposes. An exclusive distribution and marketing license is granted to RSI for the satellite data and data products, including access to the archives.[409] In Canada, CCRS is in charge of the operations of the Canada data archiving facility for Radarsat-1. Any of the receiving facilities licensed worldwide are required to archive data or offer a copy to the Canadian archive maintained by CCRS.[410] All Governments and Participants to the Radarsat-1 Program, including RSI, have unlimited access to the archive's raw data.

At the international level, data acquisition is allocated in proportion to the value of each Party's contribution. They received the data at the cost of processing and distribution.[411] Each Party must provide for the reception, processing and distribution of the data. Archives are accessible to them in a primary data format (i.e. raw data), at communication cost, and CSA's subcontractor RSI, maintains an international catalogue of archived data. They also have free access to the Radarsat data available in the archives of the other party, provided that they do not sell them to third party. Under the IMOU,

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[408] See Smendziuk, *supra*, note 372.
[409] See *CSA-NASA-NOAA International MOU*, *supra*, note 387, Article 3.2.
[410] "The primary mode of operation for the provision of data worldwide is through local distributors licensed by RSI for various regions of the world. RSI provides the distributors with the necessary data and data products for distribution." See Smendziuk, *supra*, note 372.
[411] See Bourbonnière & Haeck, *supra*, note 368 at 265.

data distribution is also carried out in accordance with a policy of non-discrimination, in line with the 1986 UN principles on remote sensing.[412]

The prices of Radarsat-1 commercial data and data products are established by RSI.[413] The company publishes a commercial price list and terms of sale. The prices are primarily determined by the level of processing required, the imaging beam selected, and the nature of the data requested and the means of delivery.[414] Apart from the RADARSAT Program Participants and research programs, the pricing policy is uniform and non-discriminatory.[415]

4.2.2 The Radarsat-2 Era

The RADARSAT-2 Program flows from the LTSP mandate mentioned earlier. In order to ensure sustainability and continuation of the program and Canada's Radarsat-1 system, the Government of Canada decided to invest in Radarsat-2 to maintain the flow of data. Yet to be launched,[416] Radarsat-2 will provide commercially available sensing capabilities for industrial, commercial, maritime, environmental and other primarily non-defense related applications.

4.2.2.1 Technical Considerations

Like its predecessor, Radarsat-2 "incorporates state-of-the-art technology and will provide the most advanced commercially available radar imagery in the world."[417] It will be a lighter, cheaper and a more-capable follow-on satellite to Radarsat-1.[418] As an

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[412] *Ibid.* at 270.
[413] See Bourbonnière & Haeck, *supra,* note 368 at 265.
[414] See Mahmood *et al,, supra*, note 378 at 491.
[415] See Smendziuk, *supra*, note 372.
[416] Radarsat 2 is scheduled for launch in December 2006 by a Starsem Soyuz launch vehicle at the Baikonur Cosmodrome in Kazakhstan, Turkestan. See "Soyuz to Launch Radarsat-2", Space Daily News, 11 January 2006, online at : <http://www.spacedaily.com/news/Soyuz_To_Launch_Radarsat2.html>.
[417] See "Radarsat-2: A New Era In Earth Observation", online: CSA at <www.space.gc.ca>
[418] "RADARSAT-2 is a significant technological evolution from RADARSAT-1. Its spatial resolution will be more than twice as high as RADARSAT-1's, its launch mass is reduced by 500 kg and its on-board recording capabilities are significantly improved." See CSA Earth Report, *supra,* note 170 at 5.

improved version of Radarsat-1, Canada's second remote sensing satellite will be able to image at spatial resolutions ranging from an ultra-fine 3 meters to 100 meters with nominal swath widths ranging from 10 to 500 kilometers.[419] The satellite, scheduled for launch in 2006, is designed to be operational for a period of seven years.

4.2.2.2 Private-Public Partnership or PPP

Radarsat-2 program is the result of a special collaboration between the GOC and the private sector.[420] This time, the funding was done through a unique public-private partnership between CSA and MacDonald, Dettwiler and Associates Ltd (MDA), a world leader in space and information technologies. In June 1994, CSA received the instruction by GOC to develop an arrangement with the private sector for the development and operation of a RADARSAT follow-on program to maintain continuity of data following RADARSAT-1. MDA was selected in February 1998, after CSA put out a Request for Proposal (RFP) to build, develop, market and operate a Radarsat-2 system.[421] The RFP called for substantial financial investment from the private sector in the construction and operation of the satellite.[422] In return, CSA would provide the balance of the funding and be reimbursed with Radarsat-2 data of same value. CSA would hand over the Radarsat Mission Control to the company nine months prior to the satellite's launch. Hence the winning bidder would be the sole owner of the spacecraft and of the data rights.

CSA and MDA signed a Master Agreement in December 1998. Under this firm price agreement, MDA initially invested CAN$80 million out of the CAN$305-million total investment required.[423] Furthermore, "MDA was responsible for spacecraft operations and business development, while CSA is responsible for arranging the launch

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[419] See Radarsat-2: A New Era, *supra,* note 417.
[420] *Ibid.*
[421] See Lucy Stojak, "Regulatory Framework for Commercial Remote Sensing Satellite Systems: The Canadian Story", 2004, Paper No. IAC-04-IISL.1.02, presented during the 55th International Astronautical Congress in Vancouver, Canada, 2004.
[422] *Ibid.*
[423] "The Master Agreement between CSA and MDA was updated in January 2000 to reflect changes in the schedule and the latest cost estimates." See «Report on Plans and Priorities», 2004, CSA online at <http://www.espace.gc.ca/asc/eng/resources/publications/rpp-2004-annexes.asp#section7-3-2>.

and maintaining the long-term national archive of RADARSAT-2 data. CSA will also provide an additional, "in-kind" contribution of certain assets, plus the services of its David Florida Laboratory and the NRC Institute of Aerospace Research Laboratory for spacecraft integration and testing." [424]

4.2.2.3 The United States Connection

The development of imaging capabilities using radar satellites of such a high resolution and the PPP arrangements created some concerns amongst States, in particular the US. When negotiating with them on their involvement in the Radarsat-2 program, Canada expected that it would again be able to receive a free launch from NASA in return for data, the same way it did for Radarsat-1.[425] But the Canadian Government did not reach any agreement with the US and NASA. The US refusal to launch Radarsat-2 was mainly due to the commercial partnership of Canada with MDA and the resulting absence of control by the GOC over the operation of the satellite and over the distribution of Radarsat-2 data. Plus, Radarsat-2 would be the only satellite on the commercial market using SAR technology capable of offering high-resolution images of three meters. Under the US legislation, the lowest resolution allowed on the commercial market for radar technology was of 5 meters.[426] Hence, the absence of control and the high resolution of Radarsat-2 were interpreted by the US as a threat to their national security.[427] To them, given the dual-use nature of Radarsat data (i.e. serving both civilian and military needs), the primary use of earth imagery would most probably be for military intelligence. Canada's remaining option was to turn to commercial launch at cost.[428]

Not only the US did not renew their experience with Radarsat-1 but while refusing to launch Radarsat-2, they prohibited Orbital Sciences Corporation, the US sister

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[424] *Ibid.*
[425] "The CSA-NASA Enhanced Cooperation Agreement of 1994 stated that NASA would participate in the Radarsat-2 satellite under conditions similar to those established for the Radarsat-1 satellite." See Bourbonnière & Haeck, *supra,* note 368 at 277.
[426] See O'Connell & Hilgenberg, *supra,* note 347 at 156.
[427] See "NASA refuses to launch Canadian satellite", CBC News, 10 November 2000, online: CBC at: <http://www.cbc.ca/story/news/?/news/1999/02/18/cansat990218>.
[428] See *supra,* text accompanying note 416.

company of MDA, to provide the bus and antenna deployment platform of Radarsat-2. They did so by refusing to grant the export licenses necessary under the newly modified US regulatory structure on export-control permits.[429] Indeed, at about that time, Canada had just lost its favored status, enjoyed for several generations, with respect to both the International Traffic in Arms Regulations (ITAR)[430] and technical assistance agreements with the US.[431]

In 1998, President Clinton had amended the ITAR through the implementation of regulations on commercial arms transfers. No item appearing on the United States Munitions List (USML) was to be exported without a license. According to such list, remote sensing satellites were designated as "significant military equipment" and were listed in Category XV of the USML. Hence the use of any US component was subject to obtaining one or multiple US export licenses. Before the 1998 modification, Canadian companies were exempted from the obligation to obtain export licenses for certain high-technology materials that were on the USML.[432] This new requirement was causing unpredictable delays for Canadian companies.

Moreover, Canadian Industry Minister John Manley "accused the US Government of illegally applying US rules to Canada." Under the regulations, a US company was not able to obtain export permits if it was to send data, plans or products to foreign businesses employing workers with dual citizenship and who would handle the goods or services.[433] As an example, "if a Canadian firm has a Canadian-British engineer working on a project deemed sensitive by Washington, the firm would not be allowed to deal with US

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[429] See Bourbonnière & Haeck, *supra,* note 368 at 279.

[430] International Traffic in Arms Regulations (ITAR) is a set of United States government regulations that authorizes the President of the United States to control the export and import of defense-related material and services. The regulations are described in Title 22 (Foreign Relations), Chapter I (Department of State), Subchapter M of the Code of Federal Regulations. See ITAR, online: Wikipedia, a free encyclopedia at: <http://en.wikipedia.org/wiki/International_Traffic_in_Arms_Regulations>.

[431] See Dave Caddey, "Radarsat-2: A cautionary tale", Aerospace America Online, January 2001, online: <http://www.aiaa.org/aerospace/Article.cfm?issuetocid=45&ArchiveIssueID=9>.

[432] See Bourbonnière & Haeck, *supra,* note 368 at 283.

[433] See Heather Scoffield, "Ottawa to Cut U.S. out of Satellite Project: Manley Takes Radarsat Business to Europe", The Globe and Mail, August 11, 1999, online: The Globe and Mail at: <http://www.globeandmail.com/gam/National/19990811/UMANLN.html>.

companies or bid on US projects."[434] But Canada's Charter of Rights and Freedoms forbids Canadian companies from discriminating against employees on the grounds of nationality. Despite many political discussions between the two countries on that particular issue, the US was objecting to Canada's dual-citizenship laws.

Hence, one can see that the implications of these policy changes spread immediately beyond the boundaries of the United States. When faced with the extraterritorial applications of the US export-controls on data transfer, GOC directed its industry not to use US suppliers for Radarsat-2.[435] MDA had therefore to find another commercial partner for Radarsat-2 and due to this contretemps, the originally schedule launch of 2002 was postpone to 2006.[436]

It has been reported that "the US authorities [...] argued that their refusal to grant the necessary export licenses was in fact Canada's fault, since the Canadian Government had refused to acquiesce to US demands to restrict sale of high-resolution Radarsat-2 imagery."[437] However, many American authors have deplored the strictness of the US export control regulations which played and continue to play a deterrent role in the contracting by Canadian and other foreign companies with US entities.[438] This situation is creating a noncompetitive environment in the US. It has been rightly observed that in the particular case of Radarsat-2, "the approval of the export license became tied up in the US Government's desire to encourage Canada to develop appropriate controls on remote sensing data—appropriate meaning acceptable to the US" [439]

In the mean time, the US continued to insist that Canada maintain a certain control over Radarsat-2 by establishing a special right of intervention in case of national security or foreign policies issues (i.e. shutter control) and by limiting availability of high-

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[434] *Ibid.*
[435] See Preston, *supra*, note 291 at 96.
[436] In December 1999, MDA awarded a $74-million contract to Italy's Alenia Spazio to build the bus and antenna deployment platform for the Radarsat-2. See "CSA-Canadian Space Milestones", online at: <http://www.space.gc.ca/asc/eng/about/csm_complete.asp>.
[437] See Bourbonnière & Haeck, *supra,* note 368 at 279.
[438] See Williamson & Bakerb, *supra*, note 203 at 114. See Bourbonnière & Haeck, *supra,* note 368 at 280.
[439] See Caddey, *supra*, note 431.

resolution imagery through a legal licensing regime. The political pressures from the US led the Canadian Government to reconsider its remote sensing space policy in light of these issues.

4.2.2.4 The Access Control Policy of 1999

As mentioned above, national security concerns were the main drivers of the US position about data policy access and distribution. The ultra-fine resolution of 3m of Radarsat-2 data was above the 5m resolution allowed in the US. NASA was not willing to be part of a program that would not be in line with the US Government's national security standards.[440] Hence, in July 1999, the Canadian Minister of Foreign Affairs announced a new Canadian Access Control Policy for Commercial Remote Sensing Satellites[441] which was "attuned to the concerns of its southern neighbor."[442] He noted that the new policy "will protect national security, help safeguard human lives and enhance Canadian competitiveness in the growing space sector."[443] With the transfer of its civilian remote sensing satellite ownership from the public to the private sector, Canada agreed that is was necessary for such Access Control Policy to protect the country's vital interests. The policy announced government controls on data acquisition and dissemination in urgent and critical temporary situations.

Under the policy, an interdepartmental team of experts was in charge of elaborating and drafting a corresponding regulatory regime for commercial remote sensing space systems. The team was to be lead by the Department of Foreign Affairs and International Trade (DFAIT) and composed of members from the Minister of Industry (through CSA), the Minister of Public Safety and Emergency Preparedness and the

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[440] See Bourbonnière & Haeck, *supra,* note 368 at 278.
[441] See *Developing a Canadian Access Control Policy for Commercial Remote Sensing Satellites,* News Release No.134, Department of Foreign Affairs and International Trade, Government of Canada, Ottawa, 9 June 1999. [hereinafter Access Control Policy].
[442] See Bourbonnière & Haeck, *supra,* note 368 at 280.
[443] See Stojak, *supra,* note 421. Construed from "Canada to Control Imaging Satellites", Access Control Policy, *supra,* note 441.

Department of Defense (DND).[444] Amongst other things, DFAIT had to ensure that the legislative process to implement the policy would include consultations with all parties concerned, including the private sector.[445]

Mainly, the policy established guidelines in the form of principles to be followed in drafting future legislations, regulations and licensing procedures pertaining to the data of high resolution remote sensing satellites. A brief overview of these principles allows one to better understand the essence of future rules and regulations that will permit private companies to own and operate satellites in Canada.

Firstly, the Government of Canada reserves itself certain rights namely, 1) the GOC will have the prerogatives of examining and approving the requests from potential owners, operators or registered entities on a case by case basis and according to national security or foreign affairs interests[446] and 2) It will retain the right to interrupt the service and the right of priority in the access to the data when national safety is concerned or when international political needs justify it.[447]

Secondly, a series of requirements for operation of a commercial remote sensing space system are enumerated within the policy.[448] They include, *inter alia*, the following main duties and responsibilities:[449]

- Registering with an appropriate GOC department for approval of the system;
- maintaining a record of all satellite tasking and allowing the GOC timely access to this record;

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[444] See Jason Bates, "Canadian Bill Would Align Remote Sensing Law With U.S.", Space News, 7 July 2005, online: Space News at <http://www.space.com/spacenews/businessmonday_050207.html>
[445] See "Canada to Control Imaging Satellites", Access Control Policy, *supra*, note 441.
[446] See Access Control Policy, *supra*, note 441, Rights reserved by the Government of Canada, Principle 1.
[447] *Ibid.* Principle 2 and 3.
[448] See Access Control Policy, *supra*, note 441, Duties and responsibilities of the owner, operator or registered entity, Principles 1 to 17.
[449] Stojak, *supra,* note 421, construed from Access Control Policy, *supra*, note 441, Principles 1, 2, 3, 5, 6 and 8. See also Access Control Policy, *supra*, note 441, Principles 9, 11, 13 and 14.

- notification and approval of the appropriate minister(s) of any change in operational charasteristics;

- obtaining permission of the appropriate minister(s) for transfer of ownership, operation or registration to any company (foreign or domestic);

- maintaining positive control of the satellite at all times and executing such control solely from the jurisdiction of the GOC;

- use GOC approved cryptographic devices to deny unauthorized access;

- ensuring, upon receipt of an accredited means of authorization, timely access to the satellite for the DND, DFAIT, the Canadian Security Intelligence Service (CSIS) and the Royal Canadian Mounted Police (RCMP) of the Ministry of the Solicitor General;

- notifying DFAIT of an intent to enter into significant or substantial agreements with foreign customers;

- offering to the Government of Canada, at cost of reproduction and transmission, any data acquired by the system prior to the destruction of that data; and

- providing periodic reports containing information necessary and sufficient to ascertain compliance with duly established regulations to the GOC.

Finally, the policy refers to the international UN Remote Sensing Principles already discussed and the related national security issues.[450] First, it is said that the operator of the satellite will have the obligations to make available (on the request of any sensed State) the data obtained over its territory according to UN provisions. Secondly, the UN non-discriminatory spirit is diminished by the following affirmation contained in Principle 12 of the Access Control Policy: "such data shall not be provided to the sensed state if its uncontrolled release is determined to be detrimental to Canada's national security and foreign affairs interests."[451] Alike similar provisions in the US and as already

[450] *Ibid.* Principle 12.
[451] *Ibid.*

discussed, such clause is likely to increase the existing concerns that the UN non-discrimination principle is being eroded.[452]

At last, reference is made to the unique Canadian Charter of Rights and Freedoms, in regards to which applications could result in imposing more restrictions on the Government's use and utilization of data.

4.2.2.5 The Canada-United States Memorandum of Understanding of 2000

As Canada was working on imposing explicit regulations on its own commercial remote sensing satellite activities, a Canada-US bilateral agreement concerning the operation of commercial remote sensing satellite systems was signed.[453] It mainly stated that the commercial policies to be adopted in Canada should be in tune with those of the US. The Access Control Policy of 1999 was integrated into the Canada-US agreement as Annex 1 and as one can notice, the guidelines it contained are very similar to the ones within the US.

Furthermore, the 2000 Canada-US Agreement aimed to ensure that "private remote sensing satellite systems would be controlled in each country in such a manner as to protect shared national security and foreign policy interests, while promoting the commercial benefits to be derived from these systems."[454] The Agreement recognized the mutual interests of both countries in regulating and controlling private remote sensing satellite systems operating from their respective territories or subject to their respective jurisdictions. The agreement also specifically covers the operations of RADARSAT-2.

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[452] See Stojak, *supra,* note 421.
[453] "Canada and Unites States Sign Agreement Concerning Operation of Commercial Remote Sensing Satellite Systems", News Release No.153, Department of Foreign Affairs and International Trade, Government of Canada, Ottawa, 16 June 2004. [Canada-US MOU]
[454] *Ibid.*

4.3 An Act Governing the Operation of Remote Sensing Space Systems

As previously shown, Canada had never enunciated a commercial space policy for remote sensing in the same way the US did. However, decisions have been made by successive Governments which have encouraged the private sector to provide space-based services and to invest in space ventures. Following the Radarsat-2 program and international pressures, Canada has finally developed suitable legislation for the commercial licensing process of remote sensing satellites. The first Act Governing the Operation of Remote Sensing Space Systems (Bill C-25) in Canada is about to be implemented by the GOC. [455]

4.3.1 Background

At the outset, it is important to indicate that the proposed legislation observes Canada's commitments derived from the June 2000 Canada-US Bilateral Agreement (which included the Access Control Policy of 1999).[456] Furthermore, not only was the Remote Sensing Act greatly influenced by US considerations but the language used is comparable to that of similar legislation in the US.

According to the preamble of a news release issued by DFAIT on 23 November 2004, "the legislation is aimed at protecting Canada's national security, national defense and foreign policy interests, while supporting our continued leadership in the provision of satellite remote sensing data and services to Government and private clients."[457]

The Act allows private companies to own and operate remote sensing satellites according to specified conditions and subject to certain restrictions on the distribution of

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[455] The proposed legislation received Royal Assent on 25 November 2005 but is not in force at the time of writing. See *An Act Governing the Operation of Remote Sensing Space Systems* (Bill C-25), Statutes of Canada S.C. 2005, c. 45. [Hereafter the Remote Sensing Act or the Act].

[456] See "Canada's Remote Sensing Space Systems Act", Canada-US MOU, *supra*, note 453.

[457] See "Canada Tables Legislation Regulating Remote Sensing Space Systems", News Release No.136,November 23, 2004, online: DFAIT at: <http://w01.international.gc.ca/minpub/Publication.asp?publication_id=381805&Language=E&docnumber=136>. [Bill C-25]

the data gathered by these systems. The Canadian Government is responsible for, *inter alia*, the licensing of remote sensing satellite systems, regulating the data dissemination of the satellites and imposing shutter control.[458] In fact, the main features of the proposed legislation provide for the interruption or reprioritization of Radarsat data to serve Canadian national security, defense or international relations interests and to observe international obligations.[459] These special powers attributed to the GOC constitute the "leitmotif" of the Remote Sensing Act.

Bill C-25 was presented to the House of Commons by the Minister of Foreign Affairs on November 23, 2004. After a second reading, the proposed legislation was referred to a Standing Committee on Foreign Affairs and International Trade (SCFAIT) on 7 December 2004. The SCFAIT was mandated to examine and discuss each provision of the Bill in order to submit a conclusive report to the House of Commons and later to the Senate. During the meetings, representatives from the industry were invited to participate in the debates. Bill C-25 is tabled in the House of Commons under the short title of Remote Sensing Space Systems Act.[460] It contains 47 clauses of which the key provisions will be summarized below. It is important to stress that although the Act has been passed by both Houses of Parliament (i.e. the House of Commons and the Senate) and has received Royal Assent, it has not come into force as of January 2006.

4.3.2 Definitions

At the outset, it is important to mention that the Minister referred to throughout the Act is the Minister of Foreign Affairs.[461] Nevertheless, power is given to the Governor in Council to designate a member of the Queen's Privy Council for Canada to be the Minister for the purposes of the Act.[462] There are 12 provisions in the legislation that

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[458] See Symposium, *supra,* note 265.
[459] See *Remote Sensing Act, supra,* note 455, Summary.
[460] *Ibid.* Clause 1.
[461] *Ibid.* Clause 2, "minister"
[462] *Ibid.* Clause 3.

give powers to the Minister of Foreign Affairs or other ministers.[463] Concerning delegation of power, the 12 provisions allow for a delegation of authority with the exception of two provisions: 1) the shutter control (where the Minister cannot delegate authority at all) and 2) priority access (where a minister can delegate the authority but only to a deputy head level).[464] Clause 21 further specifies to whom and in what circumstances a delegation of power may occur.[465]

The most important notions of the Remote Sensing Act reside in the definitions of the terms "*person*", "*remote sensing space system*", "*system participant*", and "*controlled activity*" which are defined in clause 2.

A "person" is broadly defined as a partnership, a Government, a Government Agency and an unincorporated organization.[466] The legislator then differentiates the notion of "remote sensing *satellite*" from the notion of "remote sensing space *system.*" This last concept encompasses not only the satellite portion of a system (single or in series) but the mission control centre and other facilities used to operate the satellites.[467] These are also considered part of a system which are "the facilities used to receive, store, process or distribute raw data from the satellites, even after the satellites themselves are no longer in operation."[468]

Controlled activity, in turn, refers to the specific activities in the operation of a remote sensing space system, that is "(a) formulating or giving a command to a remote sensing satellite of the system; (b) receiving raw data from a remote sensing satellite of the system; (c) storing, processing or distributing raw data from the system;

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[463] See Bruce Mann, Senior Counsel, Justice Legal Services Division, Department of Foreign Affairs and International Trade, The Standing Senate Committee on Foreign Affairs, Evidence, November 22, 2005
[464] See *Remote Sensing Act, supra,* note 455, clause 21. See Mann, *supra*, note 463.
[465] See *Remote Sensing Act, supra,* note 455, clause 21.
[466] *Ibid.* Clause 2, "person".
[467] *Ibid.* Clause 2, "remote sensing space system", (a).
[468] *Ibid.* Clause 2, "remote sensing space system", (b).

(d) establishing or using (i) cryptography in communications with a remote sensing satellite of the system, or (ii) information assurance measures for the system"[469]

Finally, can also participate in a system a "system participant", that is a person designated in a license condition by the Minister when he considers such designation appropriate.[470] This includes authorizing the licensee to permit the designated person to carry on any controlled activity in the operation of the licensed system that the Minister specifies.[471]

4.3.3 Application of the Act

Under clause 4, the Act is binding on the Crown and all the Provinces.[472] However, it has been asserted that the regulations would only affect a national or federal area of jurisdiction and not affect provincial jurisdiction.[473] The provision also indicates that the Governor in Council (i.e. Cabinet) may order some modification in the application of the Act to systems operated by DND or CSA.[474] He may define the manner and extent to which the proposed Act and its regulations apply to such systems.[475] Finally, under certain conditions, an exemption of the application of any provisions or regulations of the Act can be granted pursuant to a Minister's order to any person of a remote sensing space system.[476] Paragraph 3 indicates that such conditions can be, *inter alia*, the absence of injuries to the national security or defense of Canada, to the safety of the Canadian Forces or to Canada's conduct of international relations or obligations. It has been

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[469] *Ibid.* Clause 2, "controlled activity".
[470] *Ibid.* Clause 2, "system participant" and paragraph 8(5)(*b*).
[471] *Ibid.* Paragraph 8 (5) (*b*).
[472] *Ibid.* Paragraph 4 (1).
[473] See Hon. Dan McTeague, Speech during Second Reading, 38th Parliament, 1st Session, Edited Hansard, Number 040, December 7, 2004, online: <http://www.parl.gc.ca/38/1/parlbus/chambus/house/debates/040_2004-12-07/han040_1155-E.htm#Int-1060876>.
[474] See *Remote Sensing Act, supra,* note 455, paragraph 4 (2).
[475] See Lalita Acharya, "Legislative Summary of Bill C-25", 20 December 2004, online: Library of Parliament at <http://www.parl.gc.ca/common/Bills_ls.asp?lang=E&source=library_prb&Parl=38&Ses=1&ls=C25#1end#1end>.
[476] See *Remote Sensing Act, supra,* note 455, paragraph 4 (3).

clarified during debates by SCFAIT that this wide exemption clause was intended for certain cases that is where a system has no security implication. An example is when the satellite does not have any high resolution capabilities. Also, it covers the situation when there is more than one jurisdiction applicable to a system, and where Canada is satisfied that the other jurisdiction is looking after Canada's security through a similar licensing regime.[477] An example would be a Canada-US system that would be licensed in the US subject to the terms of the 2000 MOU Agreements between the two countries.

4.3.4 Operation of Remote Sensing Space Systems

This section of the bill "establishes a licensing system for the operation of remote sensing satellite systems. It sets out who requires a license; how and by whom licenses are issued, approved, amended, renewed, suspended or cancelled; and under what conditions a licensee may be required to interrupt service or provide priority access to the Government of Canada."[478]

4.3.4.1 Requirement for a License

Clause 5 affirms that a license is mandatory for any person operating a remote sensing space system. Then, clause 6 specifies that a license is also required for the activities outside Canada carried out by Canadian citizens, permanent residents, federal or provincial corporations and members of any prescribed class of persons having a substantial connection to Canada related to remote sensing space systems.[479] A little further along the Act, we see in paragraph 20(1)(b) that the members of "any prescribed class of persons who have a substantial connection to Canada" will be determined by the Minister through regulations.[480]

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[477] See Standing Committee On Foreign Affairs And International Trade, Evidence, Number 018, 1st Session, 38th Parliament, February 1, 2005. [Standing Committee: Evidence 18]
[478] See Acharya, *supra*, note 471.
[479] See *Remote Sensing Act, supra,* note 455, paragraphs 6 (a) to (d).
[480] *Ibid.* Paragraphs 20(1) (b).

4.3.4.2 Applications, Licenses and Related Matters

Applications regarding licenses, issuance, amendment or renewal of licenses as well as the terms and conditions of the issued licenses are governed by clauses 7 to 9 of the Act. The application is made to the Minister in a prescribed form and manner and must be supported by a system disposal plan proposal.[481] The applicant must enclose the applicable fees and any other prescribed information or documents.[482] Upon receiving the application, the Minister may, having regarded national security, the defense of Canada, the safety of Canadian Forces, Canada's conduct of international relations, Canada's international obligations and any prescribed factors, either issue, amend or renew the requested license or provisionally approve the licensees application.[483] A provisional approval is binding on the Minister. In case of a refusal of the application, he must promptly enunciate the reasons.[484]

The conditions of the license are listed in paragraphs 8 (4) to (7). They can be within the Act or specified by the Minister when related to communication of raw data or provision of remote sensing products.[485] Amongst the major conditions specified within the Act is the condition for the licensee to keep control of the licensed system and to forbid any other person to carry on a controlled activity except in accordance with the license.[486] Finally, the license has a pre-determined period of validity and is non-transferable.

It is also interesting to note that the non-discriminatory 1986 UN Principle on Remote Sensing is part of the license conditions and gives effect to Canada's international observance of its international obligations. Again, and perhaps even more than its US equivalent, the Canadian provision related to non-discriminatory access is being

[481] *Ibid.* Clauses 7 and 9.
[482] *Ibid.* Clause 7.
[483] *Ibid.* Paragraphs 8 (1) (a) to (c).
[484] *Ibid.* Paragraphs 8 (2) and (3).
[485] *Ibid.* Paragraphs 8 (5), (6) and (7).
[486] *Ibid.* Paragraph 8 (4) (a) and (b).

considerably reduced in scope. This derogation can be easily evidenced by a simple comparison between the two provisions.

Principle XII of the UN Remote Sensing Principles articulates, in its first part that, "as soon as the primary data and the processed data concerning the territory under its jurisdiction are produced, the sensed State shall have access to them on a non-discriminatory basis and on reasonable cost terms." Hence there should be no restrictions or delays in the delivery of the sensed data to the sensed States. Nor should there be discriminatory access or unreasonable cost terms. The second part of Principle XII indicates that, "the sensed State shall also have access to the available analyzed information concerning the territory under its jurisdiction in the possession of any State participating in remote sensing activities on the same basis and terms (...)." Here the principle is that, not only raw data but also analyzed or value-added information should be made available to any sensed States.

As illustrated hereafter, almost all of these obligations have been altered by GOC within the Remote Sensing Act. Although the Canadian Government has followed the UN Principles in essence, it has reduced almost every aspect of the non-discriminatory principle or made them conditional to its approval. Indeed, in Paragraph 8 (4) (c) of the Act, the Canadian Government edicts that:

> "raw data and remote sensing products from the system about the territory of any country — *but not including data or products that have been enhanced or to which some value has been added* — be made available to the Government of that country *within a reasonable time*, on reasonable terms and *for so long as the data or products have not been disposed of*, but *subject to any licence conditions* under subsection (6) or (7) applicable to their communication or provision [emphasis added]"[487]

[487] *Ibid.* Paragraph 8 (4) (c).

Subsections 6 refer to the transmission of raw data while subsection 7 refers to the transmission of remote sensing products. In both cases, theses subsections include conditions such as the obligation to request the Minister's prior approval before providing the data, or the obligation to communicate raw data under a legally enforceable agreement, entered into in good faith, which includes measures respecting the security or the further communication of the data.

As one can see, the Canadian provision undeniably substantiates the global concern that UN principles are being eroded and rendered obsolete within national legislation. The wording of the Remote Sensing Act indicates that enhanced or value-added data will not be available to sensed States. Moreover, there might be a delay in the provision of the data with the use of the terms "within a reasonable time". Finally, there is a discretionary time limitation for such availability which will only be accessible "so long as the data or products have not been disposed of." Finally, similar restrictions to those in the US might be imposed under the Act for the distribution of sensed data to sensed States.

4.3.4.3 Amendments, Suspension and Cancellation of Licenses

For reasons of national security, the defense of Canada, the safety of Canadian Forces, Canada's conduct of international relations, Canada's international obligations and any prescribed factors, the Minister may take the initiative to amend a license, suspend a license (in whole or in part for a period of up to 90 days), extend a suspension or an extension and cancel a license.[488] With regard to a number of factors described within the Act, the licensee might be entitled to be notified of the proposed changes, the reasons for the changes and be given the opportunity to make representations regarding these changes. Upon suspension, cancellation or expiration of a license, the Minister may order the licensee (or former licensee) to take a number of measures that he considers

[488] *Ibid.* Clauses 10 to 12.

advisable with respect to the national security considerations as mentioned above and to the system disposal plan. [489]

At this point, it is worth mentioning that there is no specific definition within the Act, of terms like "national security", "defence of Canada", "safety of Canadian Forces", "Canada's conduct of international relations", "Canada's international obligations" or "any prescribed factors". These terms, endlessly repeated within the Act, are subject to the arbitrary interpretation of each Minister in a position to justify an action based on any of these terms. As pointed out during parliamentary debates by members of the opposition, the vagueness of the language in the Remote Sensing Act allows a limited number of Ministers to decide where the national interests of Canada lie and decide what is important for Canada and what is not.[490]

Such arbitrary interpretation may have severe implications for the Canadian private industry. Namely, it creates a situation where it is nearly impossible for commercial operators to predict the imposition of restrictions on their systems and data sales. The resulting business environment is that of uncertainty and is associated with high levels of risk. Plus, there is so far no indication that the different Ministers, whose decisions could result in imposing limitations on commercial operators, will coordinate and agree on the adequate situation to impose such limitations. Based on what happened in the US with the shutter clause, a clear understanding of what constitutes "national security", "defence of Canada", "safety of Canadian Forces", "Canada's conduct of international relations", "Canada's international obligations" or "any prescribed factors",

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[489] *Ibid.* Clause 13.

[490] See Second Reading, 38th Parliament, 1st Session, Edited Hansard, Number 040, December 7, 2004, online:<http://www.parl.gc.ca/38/1/parlbus/chambus/house/debates/040_2004-12-07/han040_1155-E.htm#Int-1060876>.

will have to be reached between the several Departments of the GOC, in order for the Canadian private industry to come forward and enter the remote sensing business.[491]

4.3.4.4 Interruptions of Service and Priority Access

The core of the legislation resides in the following two clauses namely 14 and 15. They are almost a "blue print" of the US Interim Final Regulations. According these clauses, all licenses will be subject to two extraordinary powers granted to certain ministers under emergency circumstances: shutter control and priority access for response to possible major security crises arising in the future. When presenting the Bill to the Canadian Parliament, the Honorable Dan McTeague, Parliamentary Secretary to the Minister of Foreign Affairs noted that "the United States of America has had similar powers available to it since 1992 under its Landsat remote sensing act, but has never once invoked them. Prudence dictates, however, that such powers be available to the Government of Canada in a time of need."[492]

The shutter control clause covers the interruption of normal service.[493] Under clause 14, the Minister is granted power to interrupt or restrict normal service for a specific period when a continuation of operation by a licensed system would be injurious to Canada's conduct of international relations and obligations. The Minister of National Defense can give a similar order concerning operation that would be injurious to the defense of Canada or the safety of Canadian Forces. Both Ministers may direct the non-disclosure of details of the order to any other person if the minister in question is satisfied that such disclosure could harm the national interests listed in clause 14.[494] The order

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[491] In fact, the US Departments of Commerce, State, Defense, Interior and the Intelligence community had to sign an MOU concerning the application of the shutter clause in order to reassure their private sector, similarly faced with the use of vague terminology. See also the comments made on the impact of the shutter clause on the private sector, *above*, Chapter three: Section 3.2.2.1.1: 'Licensing Restrictions and Shutter Control".

[492] See McTeague, *supra,* note 473.

[493] *Ibid.*

[494] See Acharya, *supra*, note 475.

takes effect upon notification to the licensee but the latter shall have an opportunity to make representations during a limited period of time.

The priority access clause entails invoking priority access for overriding normal service.[495] One of the objectives of the Act is to ensure that the Government has access to satellite imagery in emergency situations.[496] In such cases this legislation could give the Government the power to request satellite images, taking priority over other requests from other users.[497] According to SCFAIT, "the ordering of priority access service to satellite data enables certain ministers or their deputies to "jump the order queue" at times when it is necessary to support a Government response to emergencies or other urgent circumstances."[498]

Under clause 15, the foreign affairs minister is granted powers to order a licensee to provide any remote sensing service to the Government of Canada that the Minister believes is desirable for the conduct of international relations or the performance of Canada's international obligations. Similarly, the Minister of National Defense is granted the ability to order the same thing for the safety of the Canadian Forces.

Finally, the Solicitor General of Canada[499] may also make an order requiring a licensee to provide any service through the licensed system desirable for the fulfillment of the duties and functions of the RCMP, the CSIS or GOC for reasons of critical infrastructure protection or emergency preparedness. Any of these ministers may include a direction in the order that prohibits, for the same reasons that the order was issued, disclosure of details of the order. Again, the opportunity to make representations is

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[495] See McTeague, *supra,* note 473.
[496] *Ibid.*
[497] *Ibid.*
[498] *Ibid.*
[499] Since Bill C-6: *An Act to establish the Department of Public Safety and Emergency Preparedness and to amend or repeal certain Acts, Statutes of Canad: 2005, c.10.* entered into force on April 4, 2005, the expression "Solicitor General of Canada" used in clause 15 (3) will be replaced by the expression "Minister of Public Safety and Emergency Preparedness". See *Remote Sensing Act, supra,* note 455, clause 46. See also Bill C-6, online LegisInfo at: <http://www.parl.gc.ca/LEGISINFO/index.asp?Lang=E&query=4212&Session=13&List=toc>.

granted to the licensee. The duration of the ordered reprioritization and related details are provided to the licensee by the minister in question.

As noted by SCFAIT, these special powers are only applicable to licensed system and "will not apply to how end users make use of satellite data and images and create value added products."[500]

4.3.4.5 Transfer of Remote Sensing Satellites

Another important provision is the prohibition on the transfer of control to outsiders. Clause 16 established that no command to a remote sensing satellite of the licensed remote sensing space system is to be given from outside Canada or by any other person other than the present licensee, unless the command can be overridden from Canada or the command from the outsider operator has been approved by the Minister.

4.3.5 Inspection and Requests for Information

The Act allows for the designation of inspectors.[501] Under clause 18, powers are established for them to perform audits to ensure that satellite operations and data protection plans approved under the license are being carried out.[502] Further, the Minister may send a notice asking any person who he believes has any information relevant to the administration or enforcement of the Act to provide that information to the Minister or any person designated by the Minister. The information is to be provided within any reasonable period that the Minister specifies. This power is quite broad and even foresees a right to obtain a court order in case of failure or refusal by the person to comply with the notice. It also dictates that on a hearing, a judge may override any interests of the person (including privacy interest) when the public interest in having the information outweighs it in importance.

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[500] See McTeague, *supra,* note 473.
[501] See Acharya, *supra*, note 475.
[502] See McTeague, *supra,* note 473.

4.3.6 Absence of Liability

The Act specifically sets out the absence of any right of compensation from the GOC, for any financial losses incurred by a licensee, which results from a series of discretionary actions taken in good faith by a Minister, as authorized by the Act.[503] In particular, any financial lost related to the amendment or arrangements of a system disposal plan,[504] the amendment, suspension or cancellation of a license,[505] the making of an order pursuant to certain measures upon suspension or termination of a license,[506] the shutter control clause[507] and the priority access clause,[508] will not be compensated.

However, paragraph 22 (2) stated that in the case of an order of priority access pursuant to clause 15 (i.e. priority access clause), a minister "may" pay to a licensee an amount determined in accordance with the regulations for the service provided. Several concerns were raised by different members of the Parliamentary Houses regarding the intended meanings of clause 22. But they were explained that the purpose of this clause was not to second (or expropriate) the use of a private sector satellite (such as RADARSAT-2) without appropriate compensation.[509] Although it was admitted that the wording in the Act on payment of use for priority access is discretionary, the drafters of the Act asserted that the intention was to reimburse financial lost.[510] They explained that the purpose of the priority access measures was to accelerate the delivery of the data for any given ministries and would not affect the ability of the GOC to pay for the data it would normally have purchased.[511]

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[503] See *Remote Sensing Act, supra,* note 455, clause 22.
[504] Pursuant to clause 9 of the *Remote Sensing Act, supra,* note 455.
[505] Pursuant to clauses 10 to 12 of the *Remote Sensing Act. Ibid.*
[506] Pursuant to clause 13 of the *Remote Sensing Act. Ibid.*
[507] Pursuant to clause 14 of the *Remote Sensing Act. Ibid.*
[508] Pursuant to clause 15 of the *Remote Sensing Act. Ibid.*
[509] See the Ninth Report of the Committee, Observations of the Standing Senate Committee on Foreign Affairs, 24 November 2005.
[510] See Standing Committee: Evidence 18, *supra,* note 477.
[511] *Ibid.*

4.3.7 Administrative Monetary Penalties and Offences

Compliance provisions are predicated largely on a system of administrative monetary penalties prescribed by regulation. Clauses 23 to 37 of the proposed legislation established "monetary penalties for violations of the Act, and deals with the designation of officers to enforce the proposed legislation. It details what the content of notices of violation should be and how they are to be served. It also establishes how responsibility and monetary penalties for violations are determined, and how decisions with respect to alleged violations or penalties can be appealed."[512] Clauses 38 to 45 "set out which contraventions under the proposed Act constitute an offence, the penalties for committing those offences, and rules regarding offences."[513]

The Act contains a new feature called compliance agreements.[514] According to Dan McTeague of DFAIT, this feature is to make the Act more user-friendly. He explains that "should a licensee be given notice of a violation by an enforcement officer, it has the option to enter into an agreement to bring operations into compliance, in lieu of paying the penalty and without admitting a violation. In this way, the Act would encourage a licensee to continuously improve the security of its operations with investments rather than pay fines for violations." [515]

It has been observed by members of the Parliament that these sanctions mechanisms (i.e. clauses 23 to 47) are quite generous since the penalties are not very serious.[516] In fact the maximum fine prescribed is $250,000 and the maximum imprisonment is of 18 months duration. Moreover, since a defense of due diligence is allowed under these clauses, it is possible to avoid a certain number of offences. Hence, as rightly stated, "in terms of sanctions, this approach is based more on warnings than on

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[512] See Acharya, *supra*, note 475.
[513] *Ibid.*
[514] See *Remote Sensing Act*, *supra,* note 455, clause 27.
[515] See McTeague, *supra,* note 473.
[516] See Pierre Paquette, Debates During Second Reading, 38th Parliament, 1st session, Edited Hansard, Number 040, December 7, 2004 online: <http://www.parl.gc.ca/38/1/parlbus/chambus/house/debates/040_2004-12-07/han040_1155-E.htm#Int-1060876>

penalization."[517] The drafters of the Act specified that even if the penalties may look potentially light given the possibility of revenues, this is balanced by the fact that the various penalties involved can be imposed every day that the offence continues.[518] The adding up of these penalties can increase their value quite fairly.

4.3.8 Regulations and Coming into Force

The Act will come into force on a day to be fixed by order of the Governor in Council. So far, it has received royal assent on November 25, 2005. As soon as the Act is declared to be in force, regulations must be completed and brought into force. Officials must also set up the administrative structure for the Act to be implemented, using existing financial resources within DFAIT, DND, Public Safety and Emergency Preparedness Canada and CSA.[519] Further, RADARSAT-2 must then be licensed under the Act.

4.3.9 Observations

During the myriad of discussions, debates or comments surrounding the adoption of Bill C-25, a number of concerns were brought up by members of the GOC. During parliamentary debates at the House of Commons, at the Senate or during meetings of SCFAIT, the following issues were raised: [520]

- The perceived associations between the Act and the ballistic missile defense program proposed for the United States by the Bush administration;

- the lack of compensation for system operators for financial losses resulting from ministerial orders to interrupt or restrict service;

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[517] *Ibid.*
[518] See Standing Committee: Evidence 18, *supra,* note 477.
[519] See The Honourable Dan McTeague, Parliamentary Secretary to the Minister of Foreign Affairs, The Standing Senate Committee On Foreign Affairs, Evidence, November 22, 2005. See also Standing Committee: Evidence 18, *supra,* note 477.
[520] See Standing Committee: Evidence 18, *supra,* note 477. See Acharya, *supra*, note 475.

- the fact that a single minister has the power to make decisions regarding the necessity for priority access or interruption of service;

- the issue of provincial Government access to data from a Canadian licensee and whether the proposed legislation respects provincial jurisdiction;

- whether the legislation will hinder commercial development of remote sensing space systems;

- the costs of implementing and operating a licensing regime;

- the unusual retroactivity of the Act to Radarsat-2;

- whether the proposed Act will lead to the invasion of privacy of individuals; and

- the non-disclosure of the provision of the 2002 MOU between the US and Canada to the Members of Parliament.

4.4 Data Policy in Canada

From now on, data policy in Canada will vary depending on the satellites from which the data is obtained. Radarsat-1 data policy has a specific regime that has been fully described earlier on. With respect to Radarsat-2, the terms negotiated between the GOC and MDA states that the Canadian Government is entitled to receive "pre-purchased" data from Radarsat-2, corresponding to its financial investments in the project. The pre-purchased data will be used to meet all the GOC's operational and scientific needs.[521] A cost will be charge to researchers for the processing of the data.[522] As regard the rights of the GOC in acquiring, using, sharing and distributing the pre-purchased data of Radarsat-2 for non-commercial purposes, no specific agreement have been set out on these points.

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[521] See Stojak, *supra*, note 421.
[522] *Ibid.*

Concerning copyrights and ownership, CSA has the copyrights over the data produced by Radarsat-1. As seen, the Government negotiated a "master agreement" with RSI which entitles the Government to receive royalties in exchange for RSI's freedom in retaining the rights to use the data. With Radarsat-2, MDA will retain the copyrights & ownership of the data and in addition, the collection of data from Radarsat-2 will be granted exclusivity to MDA and its authorized partners. The distribution of the raw data will be made in accordance with a policy of non-discrimination under the Act.[523] Plus, the use of encryption devices, that is encrypting the data to make them only accessible with access key, might be required for commercial remote sensing systems under the new Remote Sensing Act.[524] Radarsat-2 data, because of the dual-use nature of the system (i.e. for commercial and military uses), will be encrypted.[525] RSI currently processes, markets and distributes data from RADARSAT-1. Being wholly owned by MDA, RSI will also market and distribute data received from RADARSAT-2.[526]

As regards pricing of commercial data as well as appropriation of data by the value-adding firms, adjustments are yet to be made by MDA with the advent of an operational Radarsat-2 system. But the company is committed to fostering and supporting the value-added infrastructure and services industry. [527]

Finally, according to CSA, CCRS will be in charge of capturing data and maintaining archiving systems for RADARSAT-2 imaging at their downlink facilities located in Quebec and Saskatchewan.[528] With the forthcoming regulations on remote sensing, the archiving of raw data for any commercial system, including the public access to the archived data, will be addressed.[529] The Access Data Policy's guidelines, as an indication, states that the operator of the satellite will have the obligations to offer to the

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[523] See *Remote Sensing Act, supra,* note 455, paragraph 8 (4).
[524] *Ibid.* Paragraphs 8 (5) and 9 (2). See Access Control Policy, *supra,* note 441, Principle 8.
[525] See Stojak, *supra,* note 421.
[526] See "Overview of RADARSAT-2 Program", online: CSA at <http://www.espace.gc.ca/asc/eng/satellites/radarsat2/inf_over.asp>
[527] *Ibid.*
[528] *Ibid.*
[529] See *Remote Sensing Act, supra,* note 455, paragraph 20 (1) (g.1).

GOC, at the cost of reproduction and transmission, any data acquired by the system prior to the destruction of that data.[530]

Finally, because long-term storage of vast quantities of data can be very expensive to carry out, the drafters of the Remote Sensing Act indicated that it would be preferable to treat the issue of archiving on a case-by-case basis.[531] Section 8(4) (c) envisages a minimum archival capacity to fulfill the obligation of the licensee regarding non-discriminatory access to raw data pursuant to the UN principle. But it was specified that the analysis process referred to as well as the archiving will be done on a needs basis and public access to the archived material will be restricted, depending on national security and other concerns.[532]

4.5 Other Requirements

According to the Access Control Policy, any commercial satellites operators of private remote sensing systems will be require to get the appropriate authorizations to the service it wants to offer (i.e. authorizations of export/import, launch and radio frequency attribution). [533]

4.6 Conclusion

At this point in time, Canada is exceptionally well positioned in the emerging international commercial market of remote sensing data since it has an innovative, technologically advanced industry, and has an experienced privatized satellite data marketing with Radarsat International. Moreover, the development of a high performance Radarsat-2 by the industry will further enhance Canada's competitive position in Earth observation.

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[530] See Access Control Policy, supra, note 441, Principle 13.
[531] See Standing Committee on Foreign Affairs and International Trade, Evidence, Number 030, 1st Session, 38th Parliament, April 5, 2005 [Standing Committee: Evidence 30]
[532] *Ibid.*
[533] See Access Control Policy, supra, note 441, Principle 4.

Nevertheless, "the Canadian space activities remain fundamentally dependent upon, and hence vulnerable to changes in, the space policy, programs and power of the US."[534] This basic pattern is nowhere more evident than in the recent changes in the Canadian space regulatory regime on remote sensing satellites. In fact, the potential uses of high-resolution radar data by RADARSAT-2 have brought challenges to Canada and its remote sensing industry. Lacking an effective national set of regulations on remote sensing activities, it seems that Canada had underestimated the significance of balancing the legitimate foreign policy and security issues of the country with the legitimate business issues of the industry.[535] But with his recent initiative of establishing an adequate licensing regime, Canada shall further ensure that its commercial industry will remain at the leading edge in the remote sensing arena.

In conclusion, Canada's decision to encourage its private industry to enter the remote sensing market is not unique. And like in other countries, the high costs, high risks and long waiting period for economic returns have deterred and will continue to deter some private sector investment. Hence, the Canadian Government's role is surely to remain important in the future, especially as the main remote sensing system of Canada (i.e. Radarsat-2) passes from public to private hands. The GOC will be required to remain involved as an active participant in the development of a domestic space industry, through policy and financial support, either directly with research and development contracts, or indirectly by providing a national market.

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[534] See Kirton, *supra*, note 374 at 70.
[535] See Caddey, *supra*, note 431.

CONCLUSION

The remote sensing industry was government run for many years. However, many countries, like the US and Canada, now have private earth observation systems. Since commercialization is a long-term policy, both these countries do and will have to frequently assess the needs of the market and take into account the role of the various players. Each must decide whether to embrace or resist the spread of high-resolution imagery by commercial operators.

As we can see, the American and Canadian policies have been increasingly focused on positioning the remote sensing industry toward a global user-driven commercial market. To date, the following concerns remains: Is there really a remote sensing market? Is there a risk in having too many players? Do we need this many operators and are they maximizing the use of remote sensing data? Do we need international standards? Is there a need for new set of principles to be drafted to address the actual issues? If so, should it be done by the UN or by the main players? What about the privacy issue and the use of the information? What about human rights/personal freedom e.g. Canada's Charter of rights?

Be that as it may, Governments will surely retain a critical role in adapting the remote sensing industry to these new realities.

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