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# U.S. National Security And Government Regulation Of Commercial Remote Sensing From Outer Space

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## I. INTRODUCTION

Space-based remotely sensed imagery became commercially available on a world wide nondiscriminatory basis in 1972 with the advent of the United States of America's (U.S.) Earth Resources Technology Satellite (ERTS).<sup>1</sup> Until that time, such information was the exclusive province of military and intelligence communities of the major world powers. With the launch of the French *Système Probatoire d'Observation de la Terre* (SPOT) I satellite in 1986, remotely sensed imagery with ten meter resolution<sup>2</sup> became commercially available. In 1987, the former Soviet Union made data with five meter resolution available.<sup>3</sup> Today, Space Imaging Inc., a private company, sells images with better than one meter resolution on the international market and hopes to achieve 0.5 meter resolution by 2004.<sup>4</sup> While Space Imaging Inc. was the first to produce commercial images for sale, "only Space Imaging, Inc. has put a one-meter craft into orbit, other companies in the U.S., Russia, Japan, Israel, and South Korea are planning to follow suit."<sup>5</sup> It is estimated that the remote sensing market will generate \$2 to \$2.5 billion dollars in revenue by 2005.<sup>6</sup>

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<sup>1</sup> See M. Umberger, *Commercial Observation Satellite Capabilities*, in *COMMERCIAL OBSERVATION SATELLITES AND INTERNATIONAL SECURITY* 9 (M. Krepon et. al., eds., 1990) [hereinafter *Commercial Observation Satellite Capabilities*].

<sup>2</sup> The term "resolution" can have different meanings. For the purposes of this paper, resolution corresponds to the size of the smallest discernible object in an image.

<sup>3</sup> See *Commercial Observation Satellite Capabilities*, *supra* note 1.

<sup>4</sup> In December 2000, Space Imaging, Inc.'s next-generation imaging satellite, capable of 0.5 meter resolution, was granted a license by the National Oceanic and Atmospheric Administration (NOAA). Space Imaging, Inc. plans to launch the satellite in 2004. See V. Loeb, *U.S. is Relaxing Rules on Sale of Satellite Photos; After a Year-Long Policy Review, Far Greater Detail Being Allowed*, WASH. POST, Dec. 16, 2000, at A.3. See also J.C. Anselmo, *Commercial Spaces' Sharp New Image*, 152:5 AV. WK. & SPACE TECH., Jan. 31, 2000, at 52 [hereinafter *Sharp New Image*].

<sup>5</sup> See W.J. Broad, *Snooping's Not Just for Spies Any More*, N. Y. TIMES, Apr. 23, 2000, at 4.6 [hereinafter *Snooping's Not Just for Spies Any More*].

<sup>6</sup> *Sharp New Image*, *supra* note 4, at 54.

From its beginning in the early 1960s and through the mid 1980s, remote sensing activities were operated by the U.S. government. In 1984, the U.S. attempted to privatize the industry with limited success.<sup>7</sup> Space-based remote sensing by private companies became possible when the U.S. Congress passed its 1992 Land Remote Sensing Policy Act (Remote Sensing Policy Act) authorizing the Secretary of Commerce to issue licenses for private space-based remote sensing systems.<sup>8</sup> The Clinton Administration gave the go-ahead to sell remotely sensed data internationally in 1994.<sup>9</sup>

The commercial availability of high-resolution imagery presents both a great benefit and a deep concern for U.S. national security and military operators. On one side of the coin is the fact that the U.S. government is a primary customer of the commercial remote sensing industry. The military is certain to benefit from access to high-resolution commercial imagery, potentially saving it the billions of dollars required to produce, field and operate some space-based remote-sensing systems. There is a dark side, however. Just as the military will have access to high-resolution commercial imagery, so too will the general public and foreign entities, allies and adversaries alike. Without proper protections, military movement and build-up, the lay-out of military facilities and even the locations of individual pieces of military equipment could be made available to the public eye within a matter of hours. Obviously, this circumstance could have grave consequences for military operations and U.S. national security. With the potential profits to be realized and technological advances to be achieved from the commercialization of space-based remote sensing, it is clear that a balance must be struck between maintaining the viability and profitability of the commercial industry and protecting the national security of the U.S.

This article examines the national security safeguards incorporated into U.S. law, regulations, and policy. It also examines the way in which the needs of the commercial industry have been balanced with national security concerns. Section II provides background information, including relevant

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<sup>7</sup> The U.S. Government operated its space-based remote sensing "Land Satellite" (Landsat) system until 1984 when the U.S. Congress passed the Land Remote Sensing Commercialization Act. Land Remote Sensing Commercialization Act, 15 U.S.C. § 4201 *et. seq.* (1984), repealed by Land Remote Sensing Policy Act, 15 U.S.C. § 5601 *et. seq.* (1992). Under the 1984 act, a private company would operate the Landsat System, but the Government would continue to own it. In 1985, the U.S. government contracted with EOSAT Corporation to operate the system and EOSAT was designated as the Government's agent. *See* R. BENDER, *LAUNCHING AND OPERATING SATELLITES: LEGAL ISSUES* 242 (1998) [hereinafter *LAUNCHING AND OPERATING SATELLITES*].

<sup>8</sup> Land Remote Sensing Policy Act, 15 U.S.C. § 5601-5672. (1992). In 1992, the Land Remote Sensing Policy Act was enacted repealing the 1984 Act and permitting full commercialization (privately owned and operated) of remote sensing satellite systems with the exception of weather systems which remain within the public domain. *Id.* § 5671.

<sup>9</sup> U.S. POLICY ON FOREIGN ACCESS TO REMOTE SENSING CAPABILITIES, H.R. 6133 at 243, 103d Cong. (1994) (commonly referred to as Presidential Decision Directive 23 or "PDD 23") [hereinafter PDD 23].

definitions, a technical summary of space-based remote-sensing, a brief discussion of remote-sensing applications, and a synopsis of the relevant international law. Section III analyzes how law, policy, and the regulatory regime promulgated to implement the law and policy actually protect national security, and attempt to balance that protection with the needs of commercial industry. A final section summarizes the examination contained herein, and draws some concluding observations.

## **II. BACKGROUND INFORMATION**

### **A. Definitions, Technology & Applications**

#### *1. Definitions*

Under the Remote Sensing Policy Act, land remote sensing is defined as “the collection of data which can be processed into imagery of surface features of the earth from [a] ... satellite ...”<sup>10</sup> In essence, space-based remote sensing is the collection of data regarding the surface of the earth by satellite. Various technical means are employed to accomplish data collection from space.

There are four types of remote sensing data or information: (1) raw data, (2) unenhanced data, (3) processed data, and (4) analyzed information. Raw data is data collected by a satellite that has not been processed at all. Unenhanced data basically consists of energy signals that have been preprocessed beyond raw data but have not yet been processed into a usable image or other product.<sup>11</sup> Processed data is defined as “the products resulting from the processing of the primary data, needed to make such data usable.”<sup>12</sup> Processed data can then be further analyzed and once it has been so analyzed, it is referred to as “analyzed information.” Analyzed information is information gleaned from the interpretation of the processed data, including inputs of data and knowledge from other sources.<sup>13</sup> For example, a processed image may clearly depict an aircraft. However, to ascertain the type of aircraft the image must be analyzed using outside data or knowledge. Once processed and analyzed, remote sensing data can be utilized for a variety of applications.

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<sup>10</sup> Land Remote Sensing Policy Act, 15 U.S.C. § 5602(5) (1992).

<sup>11</sup> The Land Remote Sensing Policy Act defines the term as follows: “The term ‘unenhanced data’ means land remote sensing signals or imagery products that are unprocessed or subject only to data preprocessing.” Land Remote Sensing Policy Act, 15 U.S.C. § 5602(13) (1992).

<sup>12</sup> *Principles Relating to Remote Sensing of the Earth from Outer Space*, Principle I(c), U.N. Doc. A/Res/41/65 (1986) [hereinafter *UN Remote Sensing Principles*].

<sup>13</sup> *Id.* at Principle I(d).

## 2. Technical Summary

Remote sensing from space can be as simple as taking photographs of the Earth from space using an optical camera and photographic film. More often, however, sensors on board a satellite in either geosynchronous orbit (GSO), or an inclined or polar low-Earth orbit (LEO), perform remote sensing from space.<sup>14</sup> The satellites are able to sense electromagnetic radiation from the objects they are viewing.<sup>15</sup> Once the sensors collect the data, it is then transmitted to earth stations where it can be processed and analyzed. Sensing instruments can be classified into two categories, passive and active. Passive instruments merely observe radiation emanating from the sensed object or reflected from another source. Active instruments emit energy and measure the energy reflected or "backscattered" from the object.<sup>16</sup>

Several types of passive and active sensors exist. These sensors measure different types of energy and are used for obtaining several types of data. Table 1 lists various sensor types and the measurements they perform.

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<sup>14</sup> D.H. Staelin & J. Kerekes, *Remote Sensing Capabilities*, in HEAVEN AND EARTH: CIVILIAN USES OF NEAR EARTH SPACE, 163 (D.G. Dallmeyer & K. Tsipis, eds., 1997) [hereinafter *Remote Sensing Capabilities*]. A satellite in the geosynchronous orbit flies at an altitude of approximately 22,300 miles and appears to remain relatively fixed over a point on Earth because its speed and altitude match the rotation of the earth on its axis. Low-Earth orbits range from 60 to 250 miles in altitude. See JOHN M. COLLINS, *MILITARY SPACE FORCES: THE NEXT 50 YEARS* 151 (1989).

<sup>15</sup> *Remote Sensing Capabilities*, *supra* note 14, at 164.

<sup>16</sup> *Remote Sensing Capabilities*, *supra* note 14, at 164.

**TABLE 1****Remote Sensing Instrument Types and Measurements<sup>17</sup>**

<b>SENSOR TYPE</b>	<b>MEASUREMENTS</b>
<b>Passive</b>	
Imagers	Reflected sunlight or emitted radiation at any wavelength, yielding high spatial resolution images of the surface or atmosphere
Multispectral	Reflected sunlight or emitted radiation in several wavelength bands producing false color images
Sounders	Emitted radiation in five or more wavelength bands from which vertical profiles of atmospheric temperature and composition are computed
Radiometers	Reflected sunlight or emitted radiation with little or no spatial resolution; measures total power
Monitors	Magnetic fields, particles, x-rays in the vicinity of the sensor
<b>Active</b>	
Radars	Backscattered radiowaves from the surface or atmospheric particulates to measure distance, altitude, or velocity
Synthetic Aperture Radars	Backscattered radiowaves from the surface resulting in high spatial resolution images
Lidars	Backscattered laser light from surface or atmospheric particulates to measure composition or wind speed

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<sup>17</sup> *Remote Sensing Capabilities*, *supra* note 14, at 165.

### *3. Remote Sensing Applications*

Applications of space-based remote sensing data are seemingly endless. Perhaps most widely known is the use of remotely sensed imagery in weather forecasting seen daily on every local television news program. While news media applications continue to grow, remote sensing applications in the civilian sector go far beyond reporting the news and forecasting the weather. In agriculture, crops can be monitored for disease and drought, ultimately providing estimates of crop yields. Similarly, the health of forests can be ascertained and the scale of deforestation monitored. Geographical and geological studies allow for detailed mapping of the earth's surface and the discovery of potential mineral resources. Water and marine resources can be observed to monitor pollution or to track icebergs and marine life. Air pollution and the depletion of the ozone layer can be monitored as well. Remote sensing can also be of assistance in monitoring and relieving the devastation caused by natural disasters. In addition to the numerous civilian applications, remote-sensing technology is also used for military reconnaissance and verification of compliance with arms control treaties, contributing to world security.<sup>18</sup> Although certainly not inclusive, Table 2 lists various remote sensing applications.

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<sup>18</sup> See, e.g., S. GOROVE, DEVELOPMENTS IN SPACE LAW: ISSUES AND POLICIES 294 (1991) [hereinafter DEVELOPMENTS IN SPACE LAW].

**TABLE 2**  
**Remote Sensing Applications<sup>19</sup>**

CATEGORY		APPLICATIONS
Environment	Earth	Glacier evolution
		Snow cover and runoff
		Forestry: evolution, diseases, fires, deforestation
		Agriculture: yield prediction, damage assessment, diseases
		Surface composition
		Artifacts, urban development
	Air	Temperature profiles
		Humidity profiles
		Trace constituent profiles
		Cloud types
		Wind
		Smoke and air pollutants
	Water	Temperature
		Currents
		Wave spectra
		Contaminants
		Biological activity
		Ice cover
Military	Atmosphere	Iceberg monitoring
		Magnetospheric conditions
		Ionospheric conditions
		Solar wind
		Aurora
		Ozone monitoring
		Reconnaissance
		Missile launch detection
		Strategic and tactical planning
		Arms treaty compliance

<sup>19</sup> Partially reproduced from *Remote Sensing Capabilities*, *supra* note 14, at 167.



Media	News gathering
Cartography	Various types
Humanitarian	Natural disaster assistance

## B. Relevant International Law

All activities conducted in outer space are subject to a body of international law. The United Nations Committee on Peaceful Uses of Outer Space (COPUOS) promulgates the majority of international law related to space activities.<sup>20</sup> While there is no specific treaty dealing with remote sensing from space, there are several treaties relevant to the subject. Moreover, the United Nations General Assembly (UNGA) has adopted a non-binding Resolution embodying several remote sensing principles.<sup>21</sup>

### 1. International Treaties

There are three international space treaties of import to commercial remote sensing: (1) the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies<sup>22</sup> (Outer Space Treaty); (2) the 1975 Convention on Registration of Objects Launched Into Outer Space<sup>23</sup> (Registration Convention); and (3) the 1972 Convention on International Liability for Damage Caused by Space Objects<sup>24</sup> (Liability Convention). The U.S. and all other current space-capable nations are party to these treaties.<sup>25</sup>

<sup>20</sup> COPUOS was created in 1958 as an ad hoc committee of the UN. *Questions on the Peaceful Use of Outer Space*, GA Res. 1348 (XIII), Dec. 13, 1958. In 1959 it was extended for two additional years. *International Co-Operation in the Peaceful Uses of Outer Space*, GA Res. 1472 (XIV), Dec. 12, 1959. It was re-established as a permanent committee in 1961. *International Co-Operation in the Peaceful Uses of Outer Space*, GA Res. 1721 (XVI), Dec. 20, 1961.

<sup>21</sup> See *UN Remote Sensing Principles*, *supra* note 12.

<sup>22</sup> 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, T.I.A.S. No. 6347 (entered into force Oct. 10, 1967) [hereinafter Outer Space Treaty].

<sup>23</sup> Convention on Registration of Objects Launched Into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15, T.I.A.S. No. 8480 (entered into force Sept. 15, 1976) [hereinafter Registration Convention].

<sup>24</sup> Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187, T.I.A.S. No. 7762 (entered into force Sept. 1, 1972) [hereinafter Liability Convention].

<sup>25</sup> For a list of current parties to all space treaties, see Office for Outer Space Affairs, Status of International Agreements Relating to Activities in Outer Space, last modified Jan. 1, 2001, at

Article I of the Outer Space Treaty requires the “exploration and use of outer space . . . be carried out for the benefit and interests of all countries . . . and shall be the province of all mankind.”<sup>26</sup> Article I further provides that “[o]uter space 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 . . .”<sup>27</sup> Under Article II, “[o]uter space . . . is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”<sup>28</sup> These are the so-called “common interest,” “freedom” and “non-appropriation” principles. These three principles are relevant to remote sensing in relation to the collection and distribution of data. Unlike airspace, outer space is free and is not subject to State sovereignty. States cannot dictate the activities of others in space even when orbiting above their territory. The common practice of States has been to allow free passage of space objects over their territories. Thus, it can be argued that remote sensing satellites are free to collect data from space regarding any portion of the Earth. Additionally, since space activities must be carried out for the benefit and interest of all mankind, many states argue that any such data collected should be made available to everyone.<sup>29</sup>

Article VI of the Outer Space Treaty is of particular importance.<sup>30</sup> Under Article VI, State parties bear international responsibility for national activities in outer space including any activities by non-governmental entities. States must assure any activities carried out by private entities are done so in conformity with the Treaty. Furthermore, the activities of non-governmental entities require authorization and continuing supervision by the appropriate

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[http://www.oosa.unvienna.org/Reports/treaty\\_status\\_2001E.pdf](http://www.oosa.unvienna.org/Reports/treaty_status_2001E.pdf) (copy on file with the *Air Force Law Review*).

<sup>26</sup> Outer Space Treaty, *supra* note 22, at Art. I.

<sup>27</sup> Outer Space Treaty, *supra* note 22, at Art. I.

<sup>28</sup> Outer Space Treaty, *supra* note 22, at Art. II.

<sup>29</sup> See generally R. BENDER, LAUNCHING AND OPERATING SATELLITES: LEGAL ISSUES 215-218 (1998) [hereinafter LAUNCHING AND OPERATING SATELLITES].

<sup>30</sup> The full text of Article VI read as follows:

State 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 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 out 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 State Parties to the Treaty participating in such organization.

Outer Space Treaty, *supra* note 22, at Art. VI.

State. Hence, Article VI essentially requires that States regulate the space activities of non-governmental or private entities.

Article VII of the Outer Space Treaty is unique in international law in that it holds States liable for damage caused by private entities in their space endeavors.<sup>31</sup> The 1972 Liability Convention is an expansion and clarification of Article VII of the Outer Space Treaty. Under the Liability Convention, 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.<sup>32</sup> For damage caused to a space object itself, or to persons or property on board a space object, located other than on the surface of the earth, or to an aircraft in flight, fault based liability attaches.<sup>33</sup> As such, States must be sure to address liability concerns in any regulatory scheme.

Finally, pursuant to Article VIII of the Outer Space Treaty, States that place space objects on their national registry retain jurisdiction and control over such objects<sup>34</sup>. The 1975 Registration Convention expands and clarifies Article VIII, requiring that launching States maintain a national registry and that the Secretary General of the UN maintain an international registry.<sup>35</sup> Under Article IV of the Registration Convention, States must furnish the Secretary General with specific information regarding each space object maintained on its registry.<sup>36</sup> States comply with these requirements by, in turn, regulating private entities involved in space activities.

## *2. United Nations Remote Sensing Principles*

After a lengthy debate over whether remotely sensed data should be internationally available on a nondiscriminatory basis and the alleged right of prior consent on the part of the sensed state, the UNGA adopted the UN Remote Sensing Principles in the form of a non-binding Resolution on January 22, 1987.<sup>37</sup> Initial discussions regarding remote sensing from outer space took place at the First UN Conference on Peaceful Uses of Outer Space in Vienna in 1968.<sup>38</sup> In the early 1970s, Argentina, Brazil and other

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<sup>31</sup> Outer Space Treaty, *supra* note 22, at Art. VII.

<sup>32</sup> Liability Convention, *supra* note 24, at Art. II.

<sup>33</sup> Liability Convention, *supra* note 24, at Art. III.

<sup>34</sup> Outer Space Treaty, *supra* note 22, at Art. VIII.

<sup>35</sup> Registration Convention, *supra* note 23, at Arts. II, III.

<sup>36</sup> Registration Convention, *supra* note 23, at Art. IV.

<sup>37</sup> *UN Remote Sensing Principles*, *supra* note 12, at Principle I(a).

<sup>38</sup> C.Q. CHRISTOL, *THE MODERN INTERNATIONAL LAW OF OUTER SPACE* 721 (1982) [hereinafter CHRISTOL]. Progress in the area was begrudgingly slow primarily due to disagreements concerning State sovereignty rights and the freedom of outer space. During the discussions, two major disputes arose, the first regarding prior consent of the sensed State and the second regarding the right to access and disseminate remotely sensed data. See, e.g., *id.* at 722; DEVELOPMENTS IN SPACE LAW, *supra* note 18 at 294-298; H. DeSaussure, *Remote*

developing countries asserted that each State has permanent sovereignty over natural resources within their territory and that any information acquired regarding those resources was included in the concept of sovereignty.<sup>39</sup> Thus, developing countries argued that the consent of the sensed State was a prerequisite to any space-based remote sensing of their sovereign territory. Moreover, they maintained that if remote sensing did occur, they were entitled to any data generated and that the distribution of such data to third parties was impermissible without the consent of the State sensed.<sup>40</sup>

The U.S. has long been a proponent of the international availability of remotely sensed data on a nondiscriminatory basis, commonly referred to as the "Open Skies" policy. The UN Remote Sensing Principles (UN Principles) largely embody this policy.<sup>41</sup> Although non-binding, the U.S. commercial

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*Sensing Satellite Regulation by National and International Law*, 15 RUTGERS COMPUTER & TECH. L.J. 351, 354-355 (1989) [hereinafter *Remote Sensing Satellite Regulation*].

<sup>39</sup> See DEVELOPMENTS IN SPACE LAW, *supra* note 18, at 294-298; *Remote Sensing Satellite Regulation*, *supra* note 38, at 354-355; LAUNCHING AND OPERATING SATELLITES, *supra* note 7, at 215-216.

<sup>40</sup> In 1974, the Soviet Union and France announced their positions, through a draft convention submitted to the UN, that consent prior to remotely sensing a State's territory was unnecessary. However, it was their view that any data obtained must be provided to the sensed State on mutually acceptable terms and that the distribution of any data to third parties would require the permission of the sensed State. LAUNCHING AND OPERATING SATELLITES, *supra* note 7, at 216. The U.S. and some Western European countries took the position that no consent of any kind was required. That is, it was their position that remote sensing activities did not require prior consent of the sensed State and any data obtained via remote sensing was freely distributable to third parties on a nondiscriminatory basis without the permission of the sensed State. This position is commonly referred to as the "Open Skies" policy and is founded in the principle of freedom of outer space. The U.S. argued that pursuant to the freedom principle under an early UNGA Resolution, and Article I of the Outer Space Treaty, States are free to conduct remote sensing activities in space. See UNGA Resolution 1721 (XVI), *International Co-Operation in the Peaceful Uses of Outer Space*, Dec. 20, 1961, GA Res. 1721(XVI). Furthermore, they asserted that remote sensing activities are beyond the sovereign control of any state pursuant to Article II of the Outer Space Treaty. See LAUNCHING AND OPERATING SATELLITES, *supra* note 7 at 218. Hence, the Open Skies position regarding remote sensing is that all States may be sensed without prior consent. The collection and distribution of data, however, occurs on earth, not in space so the same argument cannot be maintained. Regarding the ground segment, the U.S. relies on Article 19 of the Universal Declaration of Human Rights which provides that "[e]veryone has the right to . . . seek, receive and impart information through any media and regardless of frontiers." *Universal Declaration of Human Rights*, G.A. Res. 217 (III), UN GAOR, 3d Sess., Supp. No. 13, at 71, UN Doc. A/810 (1948). The U.S. claims that any restrictions on the right to collect and distribute remotely sensed data on earth would violate Article 19. Thus, the U.S. maintains that remotely sensed data may be freely distributed without the permission of the sensed State.

<sup>41</sup> The UN Remote Sensing Principles are essentially a compromise between the Open Skies and Prior Consent positions, with Open Skies advocates emerging victorious on most issues and Prior Consent proponents earning a few concessions. The only potential victory achieved by proponents of prior consent is the right of access to primary data, processed data and analyzed information on a nondiscriminatory basis and on reasonable cost terms. While this could be viewed as a victory, it should be noted that the U.S. has always been a proponent of

remote sensing regulatory regime recognizes them, for the most part, as international obligations and requires those licensed in the U.S. to comply with the data accessibility principle. The UN Principles apply only to "natural resources management, land use, and the protection of the environment," meteorological and military (reconnaissance) applications are not included.<sup>42</sup> In a nutshell, the UN Principles permit States to freely sense and distribute data from outer space without the consent of the sensed State. Moreover, it is now well-established customary international law that remote sensing may be conducted without prior consent.<sup>43</sup>

Under the UN Principles, remote-sensing activities must be carried out for the benefit and interest of all countries and in accordance with international law.<sup>44</sup> Additionally, remote-sensing activities must be conducted with respect to all States' permanent sovereignty over its wealth and natural resources, and may not be conducted in such a manner detrimental to the legitimate rights of the sensed State.<sup>45</sup> These particular UN Principles are merely a restatement of terms from the Outer Space Treaty or other well-established customary international law. Furthermore, States conducting remote sensing are required to provide technical assistance on mutually agreed terms and are encouraged, preferably through regional agreements, to establish data collection, storage, processing and interpretation facilities.<sup>46</sup> The UN Principles also make it clear that the protection of the earth's environment and the protection of mankind from natural disasters are of extreme importance.<sup>47</sup>

States conducting remote sensing activities must inform the Secretary General of the UN regarding their remote sensing program.<sup>48</sup> Moreover, states conducting remote sensing activities must make available to all States, at their request and to the greatest extent feasible and practicable, any relevant

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nondiscriminatory access and it was part of the Open Skies policy to begin with. Nevertheless, this could be viewed as a victory when it comes to furthering the development of lesser developed countries in that they should have access to state of the art data and information, provided they have the means to pay for it. Problems remain, however. How will the sensed State know the data or information has been produced? What is the real meaning of "nondiscriminatory?" What are reasonable cost terms? In the end, the Principles provide little more than political influence for developing countries advocating prior consent.

<sup>42</sup> *UN Remote Sensing Principles*, *supra* note 12, at Principle I(a).

<sup>43</sup> See generally DEVELOPMENTS IN SPACE LAW, *supra* note 18.

<sup>44</sup> *Principles Relating to Remote Sensing of the Earth from Outer Space*, Principles II, III, U.N. Doc. A/Res/41/65 (1986).

<sup>45</sup> *Id.* at Principle IV. While remote sensing activities must be conducted with respect to State sovereignty over natural resources and may not be detrimental to the rights and interest of the sensed State, one is left wondering exactly what this means. It merely restates well-established law and under the circumstances, appears to be but a small concession to the concerns of developing countries containing little substantive meaning.

<sup>46</sup> *Id.* at Principles VI, VII.

<sup>47</sup> *Id.* at Principles X, XI.

<sup>48</sup> *Id.* at Principle IX.

information regarding such activities.<sup>49</sup> Additionally, remote-sensing States are required to enter into consultations with sensed States upon request.<sup>50</sup> Finally, and most significantly, sensed States shall have access to primary and processed data concerning the territory under their jurisdiction as soon as it is produced on a nondiscriminatory basis and on reasonable cost terms.<sup>51</sup> This includes access to available analyzed information in the possession of any State participating in remote sensing on the same basis and terms.<sup>52</sup>

### III. PROTECTING NATIONAL SECURITY

The commercial availability of better than one-meter resolution imagery is a double-edged sword. As discussed in Section II above, the benefits for the military, agriculture, the environment, and countless other applications are immense. Such benefits include the potential commercial profit to be realized by remote sensing. Along with those benefits, however, come national security risks. Processed images taken by Space Imaging Inc.'s IKONOS satellite are available on the international market within a day of the object or area being sensed.<sup>53</sup> Thus, any type of military build-up or movement is easily monitored throughout the world. Moreover, the layout of static military sites and positioning of military equipment generally unknown to the general public could soon become common knowledge for both friend and foe. For instance, IKONOS recently produced an image of a secret missile launch site in North Korea. When the image was shown to a U.S. intelligence official, the official remarked, "that's classified."<sup>54</sup> Images of the infamous "Area 51" or "Groom Lake" in Nevada, as well as a nuclear reactor and missile base in Pakistan, and several Chinese air bases have recently become commercially available as well.<sup>55</sup>

While the commercial production of such images can certainly play a role in advancing international security through arms control monitoring and deterrence, it also poses potential threats to national security. One such threat

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<sup>49</sup> *Id.* The requirement that sensing States provide information regarding their remote sensing programs upon request and to the greatest extent feasible and practicable is of little real value. Since "feasible and practicable" are not defined, one can fathom endless circumstances under which a sensing State would not consider it feasible or practicable to provide the requested information. Sensing States basically need some kind of undefined excuse to legitimately withhold information.

<sup>50</sup> *Id.* at Principle XIII.

<sup>51</sup> *Id.* at Principle XII.

<sup>52</sup> *Id.*

<sup>53</sup> See *Sharp New Image*, *supra* note 4, at 54.

<sup>54</sup> *Sharp New Image*, *supra* note 4, at 52.

<sup>55</sup> See, e.g., *Snooping's Not Just for Spies Any More*, *supra* note 5; A. Colhoun, *Top-Secret Kodak Moment in Space Shakes Global Security*, CHRISTIAN SCIENCE MONITOR, Mar. 21, 2000, at 2; Neil King Jr., *Activists Use Satellite to Challenge View that China's Air Force Menaces Taiwan*, WALL ST. J., May 12, 2000, at A20.

is the threat of attack on space systems, either on the ground segment or on the satellite itself through the use of anti-satellite (ASAT) weapons. According to Vice Admiral Thomas R. Wilson, the director of the U.S. Defense Intelligence Agency, countries are sure to develop capabilities to defeat space assets through denial and deception, signal jamming and ground segment attack; adding that satellite denial weapons are a future concern.<sup>56</sup> It is only a matter of time before both the ground and space segments of remote sensing systems are targeted and attacked in armed conflict. This type of threat brings into issue the protection of U.S. national space systems, an issue recently receiving substantial attention,<sup>57</sup> and is outside the scope of this article. However, the mere availability of high-resolution commercial imagery could be devastating to national security, especially during times of armed conflict, and is addressed herein. For instance, in the 1991 Persian Gulf War, Allied forces conducted a two-month build-up of forces without detection by Iraq.<sup>58</sup> Such operations could prove to be impossible today absent some type of control over the commercial industry.

In the past, the U.S. intelligence community protected its intelligence secrets and methods, as well as other national security interests, in two ways: (1) spatial resolution limitations; and (2) access to data.<sup>59</sup> The Remote Sensing Policy Act and 1994 Clinton Administration Policy on Foreign Access to Remote Sensing Capabilities (Presidential Decision Directive (PDD 23)) diminished the power of these two forms of control by permitting international access to high-resolution commercial imagery. However, the Act, PDD 23 and the regulations implementing them contain significant safeguards for the protection of national security.

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<sup>56</sup> Quoted in R. Wall, *NRO's Mission Under Scrutiny* 152:6 AV. WK. & SPACE TECH., Feb. 7, 2000, at 33.

<sup>57</sup> See, e.g., F.J. Gaffney, Jr., *Time for Countdown on U.S. Space Defense*, WASH. TIMES, Jan. 9, 2001, at A12; W. Pincus, *Rumsfeld Panel to Propose Councils to Safeguard Satellites*, WASH. POST, Jan. 9, 2001, at 24.

<sup>58</sup> J.C. Anselmo, *Commercial Satellites Zoom in on Military Imagery Monopoly*, 147:12 AV. WK. & SPACE TECH., Sept. 22, 1997, at 75.

<sup>59</sup> Y. Sneifer, *The Implications of National Security Safeguards on the Commercialization of Remote Sensing Imagery* 19 SEATTLE U.L. REV. 539, 562 (1996). [hereinafter Sneifer] (citing F.B. Henderson III, *Private Sector Satellite Remote Sensing: Barriers to Commercialization*, in 2 AMERICAN ENTERPRISE, THE LAW, AND THE COMMERCIAL USE OF SPACE 79, 102-105 (P.D. Mink, ed., 1986) [hereinafter Henderson]). Historically, high resolution imagery was the province of only the military and intelligence communities. Prior to the adoption of the 1992 Remote Sensing Policy Act, which allowed remote sensing by private companies, the U.S. Government owned and controlled all U.S. remote sensing systems. As such, it was able to control the type and quantity of data made available to the public as well as the quality of that data. For example, the government could choose to make unavailable to the public data regarding military installations. Moreover, although the government may have been capable of producing imagery with .05 meter resolution, it may have only made available to the public imagery with two meter resolution. Thus spatial resolution limitations and controlled access to data were and continue to be two methods of national security protection.

## A. General Protections

Through licensing rules, procedures and conditions for operation, the U.S. government not only complies with the relevant international law but also seeks to protect national security interests. To date, the Department of Commerce has not issued final regulatory rules and procedures under the 1992 Remote Sensing Policy Act. On November 3, 1997, the National Oceanic and Atmospheric Administration (NOAA) published a set of Proposed Rules and Regulations.<sup>60</sup> Based on the amount of substantive comments received, NOAA determined it appropriate to revise the proposed rules and seek further public comment.<sup>61</sup> From 1987 through August 30, 2000, the Rules and Regulations in effect consisted of those promulgated under the 1984 Act.<sup>62</sup> On July 31, 2000, the Department of Commerce issued an interim final rule which became effective on August 30, 2000.<sup>63</sup> The interim final rule requires a commercial remote sensing operator to obtain at least three and possibly four different licenses: (1) a remote sensing operating license; (2) a radio frequency license; (3) a launch license; and (4) an export license (if required).<sup>64</sup>

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<sup>60</sup> Proposed Commercial Remote Sensing Satellite System Rules, 62 Fed. Reg. 59317 (Nov. 3, 1997).

<sup>61</sup> See Department of Commerce Statement of Regulatory and Deregulatory Priorities, 64 Fed. Reg. 63911, 63915 (Nov. 22, 1999) [hereinafter Statement of Regulatory Priorities].

<sup>62</sup> Licensing of Private Remote Sensing Space Systems, 15 C.F.R. § 960 (1987).

<sup>63</sup> Licensing of Private Land Remote-Sensing Space Systems, Interim Final Rule, 15 C.F.R. § 960, 65 Fed. Reg. 46821 (July 31, 2000) [hereinafter Interim Final Rule].

<sup>64</sup> The remote sensing operating license procedures and their associated conditions are the focus of this article. However, licensing requirements do not end with the remote sensing operating license. Radio frequency, launch and export licensing procedures and conditions have their own separate regulatory regimes. While a remote sensing operating license grants permission to operate a commercial system, it does not provide the means to do so. To operate a space-based remote sensing system, radio frequencies must be utilized and to gain access to those frequencies, a separate license is required. Radio frequency licenses in the U.S. are the domain of the Federal Communications Commission (FCC). The 1992 Land Remote Sensing Policy Act requires that a separate application be filed with the FCC for any radio facilities involved with commercial remote sensing space systems. Land Remote Sensing Policy Act, 15 U.S.C. § 5656(a) (1992). Radio frequency license application requirements and procedures are located at Satellite Communications Licensing Regulations, 47 C.F.R. § 25.101-25.531 (1997). After permission to operate a commercial remote sensing system is obtained through the remote sensing operating license and the means to operate the system have been obtained through a radio frequency license, a commercial operator must then launch its system into outer space. To do so, a third license is required, the launch license. While a request for launch authorization may be included in the radio frequency license application, no person may launch a launch vehicle from the U.S. without a launch license issued under the Commercial Space Launch Act. Commercial Space Launch Act of 1984 as Amended 1988, 49 U.S.C. § 70101-70121 (1999). A U.S. citizen or entity must obtain a U.S. launch license to launch a vehicle outside the U.S. as well. Commercial Space Transportation Licensing Regulations, 14 C.F.R. § 413.3(b) (1999). Launch licenses are issued through the Department of Transportation and application requirements and procedures are located at Commercial



The Land Remote Sensing Policy Act and interim final rule set out in detail operating licensing procedures and operating conditions.<sup>65</sup> Under the Act, the Secretary of Commerce is authorized to license private parties to operate private space-based remote sensing systems in consultation with other appropriate U.S. Government agencies.<sup>66</sup> Licensing authority has been delegated to the National Oceanic and Atmospheric Administration (NOAA).<sup>67</sup> The Secretary is also empowered to condition and transfer licenses.<sup>68</sup> A license may not be issued until the Secretary determines that the applicant will comply with all of the requirements of the act, any regulations issued pursuant to the act, and any international obligations and national security concerns of the U.S.<sup>69</sup> The Secretary may terminate, modify, or suspend licenses on an immediate basis if the Secretary determines that the licensee has substantially failed to comply with the Act, the terms and conditions of the license, or with the international obligations and national security concerns of the U.S.<sup>70</sup> It is strictly prohibited to operate a private remote sensing system without a license. Any person<sup>71</sup> who is subject to the jurisdiction or control of the United States who operates or proposes to operate a private remote sensing space system,

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Space Transportation Licensing Regulations, 14 C.F.R. § 400.1-440.19 (1999) . An export license may also be required depending on where the remote sensing operator chooses to launch its satellite. Remote sensing satellites have been designated as "significant military equipment," and are listed in Category XV of the United States Munitions List (USML). International Traffic in Arms Regulations, 22 C.F.R. §§ 120.7, 121.1 (1999). No item appearing on the USML may be exported without a license. Arms Export Control Act, 22 U.S.C. § 2778(b)(2) (1999). As such, if the launch is to take place outside U.S. territory, an export license must be obtained from the Secretary of State under the U.S. export control regime. Export license requirements and procedures are located at International Traffic in Arms Regulations, 22 C.F.R. § 120.1-120.29 (1999).

<sup>65</sup> Land Remote Sensing Policy Act, 15 U.S.C. § 5621-5622 (1992); Interim Final Rule, *supra* note 63.

<sup>66</sup> Land Remote Sensing Policy Act, 15 U.S.C. § 5621(a)(1) (1992).

<sup>67</sup> Interim Final Rule, *supra* note 63 at 46822.

<sup>68</sup> Land Remote Sensing Policy Act, 15 U.S.C. § 5623(a)(1) (1992).

<sup>69</sup> *Id.* at § 5621(b)(1).

<sup>70</sup> *Id.* at § 5623(a)(2).

<sup>71</sup> A person is defined as:

(1) an individual who is a United States citizen, or a foreign person subject to the jurisdiction and control of the United States; (2) A corporation, partnership, association, or other entity organized or existing under the laws of any state, territory, or possession of the United States; (3) a subsidiary (foreign or domestic) of a U.S. parent company; (4) an affiliate (foreign or domestic) of a U.S. company; or (5) any other private remote sensing 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.

Interim Final Rule, *supra* note 63, at 46823-46824.

either directly or through any subsidiary or affiliate, or who establishes substantial connections with the U.S. regarding the operation of a private remote sensing system, must obtain a license to operate the system.<sup>72</sup> Once a license has been issued, operators are required to notify the Secretary of any deviation from the submitted orbit and data collection characteristics of the remote sensing system.<sup>73</sup>

The application is reviewed not only by the Commerce Department but also by the Department of Defense (DOD), the State Department, the Department of the Interior, and any other Federal agencies determined to have a substantial interest in the matter.<sup>74</sup> The Secretary of Defense is responsible for determining the conditions necessary to meet national security concerns of the U.S. and the Secretary of State is responsible for determining the conditions necessary to meet the international obligations of the U.S.<sup>75</sup> Space-based remote sensing applications are reviewed to ensure compliance with those conditions. To comply with U.S. international obligations, applicants must demonstrate the ability to make unenhanced data collected by the system available to the government of any sensed state (including the U.S.) as soon as the data is available and on reasonable terms and conditions.<sup>76</sup>

PDD 23 contains several provisions aimed at combating any potential national security problems as well.<sup>77</sup> Pursuant to the Policy, operators licensed under the 1992 Remote Sensing Policy Act are required to maintain a record of all satellite taskings over the previous year and provide the U.S. Government access to such records.<sup>78</sup> Licensees may not change the operational characteristics of their systems without formal notice and approval of the Department of Commerce.<sup>79</sup> All encryption devices must be approved by the U.S. Government for the purpose of denying unauthorized access during periods when national security, international obligations or foreign policies

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<sup>72</sup> Interim Final Rule, *supra* note 63, at § 960.2(a).

In determining whether substantial connections exist with regard to a specific system, the factors NOAA may consider include, but are not limited to: the location of a system control center or operations centers and stations; the administrative control of the system; use of a U.S. launch vehicle; location or administrative control of ground receiving stations; the investment, ownership, or technology included in the system.

Interim Final Rule, *supra* note 63, at § 960.2(b).

<sup>73</sup> Land Remote Sensing Policy Act, 15 U.S.C. § 5622(b)(5) (1992).

<sup>74</sup> Interim Final Rule, *supra* note 63, at § 960.6(a).

<sup>75</sup> Land Remote Sensing Policy Act, 15 U.S.C. § 5657 (1992); Interim Final Rule, *supra* note 63, at § 960.1(b).

<sup>76</sup> Land Remote Sensing Policy Act, 15 U.S.C. § 5622(b)(2) (1992).

<sup>77</sup> See PDD 23, *supra* note 9.

<sup>78</sup> See PDD 23, *supra* note 9.

<sup>79</sup> See PDD 23, *supra* note 9.

may be compromised.<sup>80</sup> Furthermore, operators must use a data downlink format<sup>81</sup> that provides the Government access and use of the data during such periods.

### **B. Specific Protections—Conditions for Operation**

It should already be quite evident that significant national security safeguards exist within the 1992 Act, PDD 23 and the interim final rule issued by the Commerce Department to implement the provisions of both the 1992 Act and PDD 23. Various types of conditions for operation may be included in any commercial remote sensing license. Section 960.11 of the interim final rule sets forth 12 minimum conditions that must be included in all licenses, the following six of which are directly relevant to national security:

- (1) Specific limitations on operational performance, including, but not limited to, limitations on data collection and dissemination;
- (2) A requirement that the operator maintain operational control of the system from a location within the U.S.;
- (3) Operators must maintain and make available records of system tasking, operations, and other data as specified in individual licenses for the purposes of monitoring and compliance. Moreover, operators must allow NOAA access to all facilities comprising the remote sensing system for inspection;
- (4) Operators may be required to limit data collection and/or distribution by the system as determined to be necessary to meet national security or foreign policy concerns, or international obligations of the U.S. During any such limitation, the operator must provide unenhanced images on a commercial basis exclusively to the U.S. Government using encryption and a format that allows the Government access to the data;
- (5) Operators must notify NOAA of any significant or substantial foreign agreement and submit the agreement for review; and
- (6) No data shall be provided to a foreign state if the release of such data is contrary to the national security concerns of the U.S. The Government may require, as a specific license condition, coordination with NOAA prior to providing specific foreign state requests for unenhanced data.<sup>82</sup>

The conditions for operation can be grouped into four primary categories: (1) limitations on operational performance; (2) monitoring and compliance; (3) limitations on foreign involvement; and (4) limitations on data collection and/or dissemination or "shutter control."

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<sup>80</sup> See PDD 23, *supra* note 9.

<sup>81</sup> Data downlink refers to the transmission of remotely sensed data from a satellite to an earth-based ground station. Such data can be transmitted in different formats or even be encrypted.

<sup>82</sup> Interim Final Rule, *supra* note 63, at § 960.11.

## 1. Limitations on Operational Performance

As a general rule, remote sensing operating licenses will be issued covering the full operational capability of a remote sensing system.<sup>83</sup> In other words, all data and imagery the system is capable of collecting and disseminating may be collected and disseminated under the license. However, where new or advanced technologies are involved, such as the employment of hyperspectral and synthetic aperture radar (SAR) systems, a so-called "two-tiered" license may be issued.<sup>84</sup> Such a license will allow the operator to operate its system at one level, available to all users, while reserving the full operational capability of the system for the U.S. Government or U.S. Government approved customers only.<sup>85</sup> Moreover, while the conditions for operation contained in section 960.11 of the interim final rule apply to all systems, specific limitations may be placed on the operational parameters, design characteristics, and data throughput<sup>86</sup> of hyperspectral and SAR systems due to national security, foreign policy and international obligations.<sup>87</sup> Some of the more significant limitations could include resolution limitations; system throughput; and protection, such as encryption, of uplinks and downlinks.<sup>88</sup> Thus, although a remote sensing system may be capable of producing images with a half-meter resolution in a matter of hours, the operational limitations contained within a specific license may, for example, only permit the collection of images with a one meter resolution made available for dissemination no earlier than 24 hours after data collection. This puts commercial operators in the unique position of possessing highly sensitive remote sensing data unavailable to the rest of the world.

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<sup>83</sup> Interim Final Rule, *supra* note 63, at 46826.

<sup>84</sup> Interim Final Rule, *supra* note 63, at 46826.

<sup>85</sup> Interim Final Rule, *supra* note 63, at 46826.

<sup>86</sup> Throughput is the measurement of time during data collection, ground processing, and dissemination.

<sup>87</sup> Interim Final Rule, *supra* note 63, at 46826.

<sup>88</sup> Potential limitations for SAR systems include, but are not limited to: (1) resolution in terms of impulse response (IPR); (2) grazing angles; (3) geolocational accuracy; (4) multiple polarization; (5) system throughput (i.e., measurement of time during data collection, ground processing, and dissemination); (6) protection of phase history data; (7) location and function of non-U.S. operations centers and stations; and (8) protection of all uplinks and downlinks. Potential limitations for hyperspectral systems include, but are not limited to: (1) spatial and spectral resolution; (2) co-registration of hyperspectral data with data provided by other on-board sensors; (3) operational wavelengths; (4) system throughput; (5) protection of remote sensing space system commanding, sensor tasking, and tasking information; (6) protection of raw data; (7) location and function of non-U.S. operations centers and stations; and (8) protection of all uplinks and downlinks. Interim Final Rule, *supra* note 63, at 46826.

## 2. Monitoring and Compliance

The department of Commerce has established a fairly rigorous monitoring and compliance program. Operators are subject to reporting and record keeping requirements (including records of system tasking, operations and other data as specified in individual licenses), records reviews, audits and on-site inspections.<sup>89</sup> Quarterly reporting is required for any anomalies or events that have caused the systems to operate outside license parameters.<sup>90</sup> Various records of operation for the previous year, as specified in individual licenses, must be maintained and made available to the U.S. Government upon request.<sup>91</sup> Licensees are "expected to provide various data as verification of compliance with the operating restrictions detailed in the operating license."<sup>92</sup> An on-site audit must be conducted at least annually to assure compliance with the national security, foreign policy, international obligations of the U.S. and all other license conditions.<sup>93</sup> Finally, a separate annual operational audit is also required under the interim final rule.<sup>94</sup>

## 3. Limitations on Foreign Involvement

In an attempt to strike a balance between promotion of the commercial industry and protection of national security, foreign entities may be involved in the operation of a remote sensing system only after approval from NOAA. Remote sensing system operators are required to notify NOAA of any significant or substantial agreement<sup>95</sup> that they intend to enter into with any foreign nation, entity or consortium.<sup>96</sup> NOAA will then ensure that the

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<sup>89</sup> See Licensing of Private Land Remote-Sensing Space Systems, Interim Final Rule, 15 C.F.R. § 960.119(b)(3), 65 Fed. Reg. 46821 (2000).

<sup>90</sup> *Id.* at 46825.

<sup>91</sup> *Id.*

<sup>92</sup> *Id.*

<sup>93</sup> *Id.*

<sup>94</sup> *Id.*

<sup>95</sup> Significant and substantial foreign agreement is defined as

an agreement with a foreign nation, entity, consortium, or person that provides for one or more of the following: (1) Administrative control which may include distributorship arrangements involving the routine receipt of high volumes of the system's unenhanced data; (2) Participation in the operations of the system; (3) Direct access to the system's unenhanced data; or (4) An equity interest in the licensee held by a foreign nation and/or person, if such interest equals or exceeds or will equal or exceed ten (10) percent of total outstanding shares, or entitles the foreign person to a position on the licensee's Board of Directors.

*Id.*, at § 960.3.

<sup>96</sup> *Id.* at § 960.111(5).

proposed foreign agreement contains provisions to ensure compliance with all requirements regarding national security including the ability to implement restrictions on the foreign party's acquisition and dissemination of imagery as imposed by the license.<sup>97</sup> NOAA will also ensure the agreement sets forth the obligation of the operator to convey to the foreign party any reporting and record keeping requirements, and the obligation to facilitate any monitoring and compliance activities required by the license.<sup>98</sup> The proposed foreign agreement will be reviewed not only by NOAA but also by any other interested Federal Agencies as well.<sup>99</sup> The proposed agreement may not be implemented until NOAA is sufficiently satisfied that any such agreement will not affect NOAA's ability to enforce the Commercial Remote Sensing Act or the operator's ability to comply with the Act, the regulations or the terms and conditions of the operator's license.<sup>100</sup>

The fundamental requirement for the protection of national security where foreign entities are involved in the operation of a system is that "operational control" must be maintained from a location within the United States.<sup>101</sup> Operational control is defined as "the ability to operate the system or override commands issued by any operations center or station."<sup>102</sup> Thus, while a foreign entity may have a hand in the operation of a space-based remote-sensing system, the ability to shut it down must reside on U.S. soil. This requirement also complies with U.S. obligations under the 1967 Outer Space Treaty that hold State government's responsible for private entities' actions in outer space.<sup>103</sup>

#### 4. Shutter Control

Perhaps the most important, and most controversial, national security protection is the ability of the U.S. Government to limit data collection and/or dissemination, more commonly referred to as "shutter control." PDD 23 provides that:

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

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<sup>97</sup> *Id.* at § 960.8(b).

<sup>98</sup> *Id.*

<sup>99</sup> *Id.*

<sup>100</sup> *Id.* at § 960.8(d).

<sup>101</sup> *Id.* at § 960.11(b)(2).

<sup>102</sup> *Id.* at § 960.3.

<sup>103</sup> Outer Space Treaty, *supra* note 22, at art. VI.

Secretary of State, as appropriate. Disagreements between Cabinet Secretaries may be appealed to the President. The Secretaries of State, Defense and Commerce shall develop their own internal mechanisms to enable them to carry out their statutory responsibilities.<sup>104</sup>

Shutter control essentially provides the U.S. Government the ability to shut down U.S. commercial remote sensing operators when national security concerns dictate, such as in time of armed conflict. This capability is of great importance to military operations as it ensures that high-resolution imagery depicting military movement, facilities and equipment locations will not be made available to the general public by U.S. commercial operators.

On February 2, 2000, the Departments of Commerce, State, Defense, Interior and the Intelligence Community entered into an inter-agency memorandum of understanding (MOU) outlining the procedures for exercising shutter control.<sup>105</sup> The MOU requires all parties to consult in an attempt to come to an agreement as to the appropriate conditions to be imposed.<sup>106</sup> However, the Secretaries of State and Defense can determine that the urgency of a given situation precludes consultation.<sup>107</sup> Moreover, the MOU makes clear that the Secretaries of Defense and State can exercise shutter control even over the objections of the Secretary of Commerce.<sup>108</sup> Any decision to exercise shutter control will remain in effect until the President reverses it or the secretary making the decision withdraws it.<sup>109</sup>

While the Clinton administration promised a hands-off approach except in extreme situations, American military officials debated whether to impose restrictions on Space Imaging's IKONOS satellite during the Kosovo conflict in 1999.<sup>110</sup> The issue became moot when the satellite was destroyed in a launch mishap and the replacement satellite was not launched until after the conclusion of the NATO campaign.

The Commerce Department received numerous comments on the November 3, 1997 proposed rules and regulations regarding shutter control.<sup>111</sup> Commercial space-based remote sensing operators asserted that the conditions for implementation were too vague, that there were no clear guidelines as to when the shutter control may be invoked, and that they lacked needed

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<sup>104</sup> PDD 23, *supra* note 9.

<sup>105</sup> Fact Sheet Regarding the Memorandum of Understanding Concerning the Licensing of Private Remote Sensing Satellite Systems, Feb. 2, 2000, 15 C.F.R. 960, Appendix 2; 65 Fed. Reg. 46836 (July 31, 2000) [hereinafter MOU].

<sup>106</sup> *Id.* at para. B(3).

<sup>107</sup> *Id.* at para. B(4).

<sup>108</sup> *Id.*; see also J. Bates, *U.S. Industry Upbeat, but Wary About Satellite Imaging Rules*, 11:9 SPACE NEWS, Mar. 6, 2000, at 1.

<sup>109</sup> MOU, *supra* note 105, at para. B(5).

<sup>110</sup> See *Sharp New Image*, *supra* note 4, at 52.

<sup>111</sup> See generally Interim Final Rule, *supra* note 63, at 46822-46829.

transparency.<sup>112</sup> Shutter control has been criticized as being so vague and over broad that not only is it detrimental to the commercial industry, but it violates the First Amendment to the U.S. Constitution.<sup>113</sup> Critics claim that the uncertainty of the policy makes the space-based remote sensing business a risky undertaking as there are no clear conditions under which the shutter control can be implemented. Critics further argue that the policy deters investment in U.S. companies and systems for the same reason and will only increase foreign competition. Free speech advocates claim the vagueness of the policy gives government officials too much latitude in making the decision to invoke the policy.<sup>114</sup> Some journalists would go as far as requiring a federal judge to approve any shutter control.<sup>115</sup> What the critics fail to acknowledge is that the conditions for implementation must be somewhat vague. It is impossible to predict the precise conditions under which it would be necessary to limit data collection or distribution pursuant to the policy. Furthermore, requiring judicial approval to invoke shutter control would undermine its very purpose. The delay necessitated by judicial approval could prove devastating to national security and even deadly to military troops.

It has also been suggested that the decision to invoke shutter control should rest with the President as opposed to the Secretaries of Commerce, Defense and State. According to former U.S. Central Intelligence Agency director R. James Woolsey, this would make it more likely that the policy would be invoked only in extreme cases, providing additional protection for the operators.<sup>116</sup> This recommendation fails to recognize the potential urgency of any given national security situation. The current decision-making policy provides adequate safeguards for both industry and for national security. It gives the Secretaries of Commerce, Defense, and State the ability to make immediate decisions, protecting national security interests when the urgency of any given situation requires an immediate decision.

Despite the concerns of some in the industry and of various other critics, the Commerce Department has concluded "the regulations strike an appropriate balance between promoting the U.S. commercial remote sensing industry and protecting U.S. national security, foreign policies and international obligations."<sup>117</sup> That finding is quite justifiable as the fundamental underlying concept of both the Remote Sensing Policy Act and

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<sup>112</sup> Interim Final Rule, *supra* note 63, at 46823. Transparency refers to making the reasons for invoking shutter control readily apparent.

<sup>113</sup> See, e.g., M. Bourbonniere, *A Critical Review of American Regulations Pertaining to Commercial Remote Sensing Market Structures*, XXII-I ANN. AIR & SP. L. 455, 465-469 (1999) [hereinafter Bourbonniere]; Sneifer, *supra* note 59, at 564; J.C. Anselmo, *Shutter Controls: How Far Will Uncle Sam Go?*, 152:5 AV. WK. & SPACE TECH., Jan. 31, 2000, at 55 [hereinafter *Shutter Controls*].

<sup>114</sup> See *Shutter Controls*, *supra* note 113, at 55.

<sup>115</sup> See *Shutter Controls*, *supra* note 113, at 56.

<sup>116</sup> See *Shutter Controls*, *supra* note 113, at 55.

<sup>117</sup> Interim Final Rule, *supra* note 63, at 46823.



the policy decision to allow commercial sale of remotely sensed imagery (PDD 23) is the protection of national security, foreign policies, and international obligations.

Moreover, the U.S. government is not free to exercise shutter control on a whim. The inter-agency MOU provides that "[a]lternatives to prohibitions on collection and/or distribution shall be considered such as delaying the transmission or distribution of data, restricting the field of view of the system, encryption of the data if available, or other means to control the use of the data."<sup>118</sup> Furthermore, under the terms of the MOU, shutter control should be imposed for the smallest area and for the shortest time necessary to protect national security.<sup>119</sup> Finally, it is likely that the exercise of shutter control will have little or no adverse impact on commercial operators in times of national crisis. Although commercial operators stand to lose profits generated by private entities and foreign governments during a period of shutter control, U.S. Government demand for commercial remotely sensed data is likely to increase substantially during the same period. That increased demand seems likely to more than offset any profits lost from private entities and foreign governments. For instance, if shutter control had been imposed on Space Imaging, Inc. during the Kosovo conflict in 1999, U.S. Government demand for IKONOS imagery of the region would likely have increased a great deal.

Debate over shutter control is likely to continue until it either becomes moot or is resolved within the international community. The ability to implement shutter control applies only to commercial remote sensing operators licensed in the U.S. As commercial remote sensing systems with high-resolution capabilities become more commonplace worldwide, the debate may well become moot. While U.S. companies may be able to maintain somewhat of a technological edge over foreign companies, space-based remote sensing capabilities throughout the world will most likely continue to improve. There will be no reason for the U.S. to invoke the shutter control clause and shut down one of its companies when identical data can be obtained from a French or Russian remote sensing company. In fact, the images that recently became available of Area 51 were generated by a Russian remote sensing system.<sup>120</sup> Some analysts believe remote-sensing satellites have become so numerous and competitive that government abilities to control what is disseminated have already been substantially diminished.<sup>121</sup>

Due to the increasing availability of commercial imagery, the international community may conclude that to protect both national and world security interests, the creation of some type international shutter control is in order. International shutter control could arise from diplomatic pressure or it

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<sup>118</sup> MOU, *supra* note 105, at para. B(2).

<sup>119</sup> MOU, *supra* note 105, at para. B(2).

<sup>120</sup> *Snooping's Not Just for Spies Any More*, *supra* note 5.

<sup>121</sup> *Snooping's Not Just for Spies Any More*, *supra* note 5.

could arise in the form of formal bilateral or multilateral treaties. While high-resolution imagery can play an important role in world security by creating transparency and monitoring compliance with arms control treaties, States are likely to remain concerned about the implications of high-resolution imagery on their national security when systems similar to those in the U.S. become common throughout the world. The resulting collective concern may lead to some form of international agreement or agreements containing provisions similar to that of the U.S. shutter control.

### C. The Kyl-Bingaman Amendment

The U.S. has already made a move toward protecting the security interests of its allies. The U.S. has advocated nondiscriminatory access to space-based remote sensing data since the inception of the data distribution debate in the late 1960s.<sup>122</sup> This position, for the most part, has not changed unless national security concerns dictate otherwise. The 1992 U.S. Land Remote Sensing Policy Act requires that any unenhanced data generated by any land remote sensing system funded and owned by the U.S. Government be made available to all users on a nondiscriminatory basis and on reasonable terms.<sup>123</sup> In accord with the UN remote sensing principles, the Commerce Department's interim final rule includes a requirement that *all* unenhanced data be made available on a nondiscriminatory basis.<sup>124</sup> This requirement applies to any cases in which the U.S. Government funds all or a substantial part of the development, fabrication, launch, or operation costs of a remote sensing system.<sup>125</sup> If the U.S. government has not provided any such funding, unenhanced data collected by a remote sensing system must be made available to the government of any country, upon request, concerning *only* the territory under the jurisdiction of such government in accordance with reasonable commercial terms and conditions.<sup>126</sup>

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<sup>122</sup> Canada has adopted the nondiscriminatory-collection-and-distribution-of-data policy with regard to its space-based remote sensing system, RADARSAT. The 1994 RADARSAT Data Policy states that data shall be available to users on a nondiscriminatory basis. Furthermore, "[d]ata distribution shall be consistent with the United Nations Resolution 41/65 of December 3, 1986 on the Principles Relating to Remote Sensing of the Earth from Space." CSA, NASA & NOAA/NESDIS, RADARSAT Data Policy, RSCA-PR0004 § 10.1(a) (July 13, 1994) at 11. For analysis of RADARSAT, SPOT, and European policies, see e.g. C. Phillipe, *Civilian Satellite Earth Observation Policies in France and Canada: Comparative Analysis of RADARSAT and SPOT Policies* (1996) (unpublished International Space University paper) (copy on file with the author); F.G. VON DER DUNK, *EARTH OBSERVATION AND DATA POLICY IN EUROPE: THE LEGAL ISSUES* (1999).

<sup>123</sup> Land Remote Sensing Policy Act, 15 U.S.C. § 5651(a) (1992).

<sup>124</sup> Interim Final Rule, *supra* note 63, at § 960.12(a).

<sup>125</sup> Interim Final Rule, *supra* note 63, at § 960.12(a).

<sup>126</sup> Interim Final Rule, *supra* note 63, at § 960.12(b). Reasonable commercial terms and conditions include making data available to different classes at different prices has been determined to be reasonable. Interim Final Rule, *supra* note 63, at 46826.

Thus, U.S. Government funded systems must make all unenhanced data available on a nondiscriminatory basis whereas nongovernment-funded systems need only make unenhanced data available to "sensed states." However, there is an exception to these general rules. The data need not be so provided where the release is contrary to national security, foreign policy or international obligations. Additionally, under two-tier licenses, only data and imagery licensed for commercial sale is subject to these requirements, and even then the operator is required to notify NOAA of any sensed-state requests. If the U.S. Government has provided some of the funding, NOAA, in consultation with other appropriate U.S. agencies, shall, subject to national security concerns, determine whether any data should be made available on a nondiscriminatory basis. There is some evidence to suggest that the U.S. may be backing away from its "Open Skies" policy, if ever so slightly.

In 1996, the U.S. Congress passed a law as part of the National Defense Authorization Act for Fiscal Year 1997 restricting the collection and dissemination of imagery with respect to Israel.<sup>127</sup> Under this law, commonly referred to as the Kyl-Bingaman Amendment, private remote sensing operators may not be licensed to sell imagery regarding Israel unless the imagery to be sold is no more detailed or precise than that routinely available from other commercial sources.<sup>128</sup> "Pursuant to that law, the Department of [C]ommerce will make a finding as to the level of detail or precision of satellite imagery of Israel available from commercial sources."<sup>129</sup> At a minimum, the Department of Commerce reviews non-U.S. commercially available imagery on an annual basis. Its findings will be in the Federal Register.<sup>130</sup> At present, the best

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<sup>127</sup> Relevant provisions read as follows:

PROHIBITION ON COLLECTION AND RELEASE OF DETAILED  
SATELLITE IMAGERY RELATING TO ISRAEL

(a) COLLECTION AND DISSEMINATION—A department or agency of the United States may issue a license for the collection or dissemination by a non-Federal entity of satellite imagery with respect to Israel, only if such imagery is no more detailed or precise than satellite imagery of Israel that is available from commercial sources.

(b) DECLASSIFICATION AND RELEASE—A department or agency of the United States may declassify or otherwise release satellite imagery with respect to Israel, only if such imagery is no more detailed or precise than satellite imagery of Israel that is available from commercial sources.

National Defense Authorization Act for Fiscal Year 1997, § 1745, Pub. L. No. 104-201, H.R. 3230, S. 1064 104th Cong., 2nd Sess. (1996), [hereinafter National Defense Authorization Act].

<sup>128</sup> Commercial sources is interpreted for the purposes of the Interim Final Rule "as referring to satellite imagery so readily and consistently available from non-U.S. commercial entities that the availability of additional imagery from U.S. commercial sources may be permitted." Interim Final Rule, *supra* note 63, at 46827.

<sup>129</sup> Interim Final Rule, *supra* note 63, at 46827.

<sup>130</sup> Interim Final Rule, *supra* note 63, at 46827.

resolution available from other commercial sources is approximately two meters.<sup>131</sup>

To obtain an operating license, private remote sensing operators must submit a plan explaining how its proposed system will comply with these restrictions.<sup>132</sup> Hence, while private companies such as Space Imaging Inc. are technically capable of producing imagery with better than one-meter resolution, they cannot sell such imagery regarding Israel. Beyond this, the President of the U.S. has the power under the law to designate other countries or geographic areas as falling under the same policy. There are no restrictions or guidelines as to when or under what circumstances the President may make such designations. Presumably, the President would exercise his prerogative for national security or foreign policy reasons but the law places no such restrictions on any designation.

It seems unlikely that the U.S. will significantly back away from its Open Skies policy unless national and world security concerns dictate otherwise. However, the passage of the 1997 Defense Authorization Act opens the door to such a scenario. In 1996, imagery with one-meter resolution was not available on the commercial market. With the currently available high-resolution imagery, it is likely that countries are much more concerned about the dissemination of commercial imagery today than they were four years ago. The problem the U.S. may soon have to contend with is States other than Israel demanding equal treatment. This could pose competitive problems for the U.S. commercial remote sensing industry as well as foreign relations problems for the U.S. Government. In the near future, the U.S. may well be faced with the choice of either abolishing the policy regarding Israel or extending the policy to other States.

#### **D. Miscellaneous Protections**

There are additional U.S. laws restricting the collection and distribution of remote sensing imagery in the interests of national security. Federal espionage statutes prohibit gathering and disseminating defense information, photographing defense installations, and gathering and delivering defense information to foreign governments.<sup>133</sup> Additional national security safeguards exist in export control statutes and regulations. For example, during times of crisis, the Trading with the Enemy Act of 1917 is applicable.<sup>134</sup> These laws add to the national security protections contained within the remote sensing regulatory regime.

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<sup>131</sup> *Snooping's Not Just for Spies Any More*, *supra* note 5.

<sup>132</sup> *Interim Final Rule*, *supra* note 63, at 46827.

<sup>133</sup> 18 U.S.C. § 792-799 (2000).

<sup>134</sup> 50 U.S.C. Appendix § 1-44 (2000).

#### IV. CONCLUSION

Space-based remote sensing consists of collecting data regarding the surface of the earth via satellite. Various technical means are employed to collect the data. The information gleaned from such data can be used in a variety of applications. Existing international legal instruments essentially require national regulation of space-based remote sensing activities. Under existing international law, remote sensing activities may be conducted without the prior consent of the sensed State and any data collected should be made available to everyone on a non-discriminatory basis.

The 1992 U.S. Remote Sensing Policy Act opened the door to private remote sensing operators. The widespread availability of high-resolution imagery presents a paradox for the military. On the one hand, they can certainly benefit from the use of such imagery. On the other hand, providing too much information to potential adversaries about sensitive U.S. military installations and operations could prove devastating to overall military operations.

A fundamental precept under the Remote Sensing Policy Act is the protection of national security. An extensive regulatory regime exists under the Act and is aimed at balancing the competing interests of the commercial remote sensing industry and national security concerns. Through limitations on operational performance, an extensive monitoring and compliance program, limitations on foreign involvement, and limitations on data collection and/or dissemination or "shutter control," the U.S. law, policy and regulatory regime adequately protect national security while preserving the viability of the commercial industry.

The greater threat to U.S. national security may well be posed by the advancing technologies of foreign remote-sensing operators. While the U.S. can control its own commercial remote sensing industry, it cannot control those of other states. To resolve this potential threat, U.S. officials should exert diplomatic pressure on foreign states to implement practical and legal controls on the dissemination of commercial remotely sensed data similar to those of the U.S. Moreover, as high-resolution imagery becomes increasingly available from foreign sources, it may become necessary to conclude bilateral or multilateral treaties with other states providing for controls on the distribution of data in times of crisis.