CURRENT STATUS AND RECENT DEVELOPMENTS IN BRAZILIAN REMOTE SENSING LAW

Hilcéa Santos Ferreira & Gilberto Câmara[*]

I. INTRODUCTION

Earth observation and GIS technology is one of the great successes of advanced information technology for improving humankind. The powers provided by satellite imagery, digital maps, and associated information have transformed our ability for understanding the forces that shape the geographical space. In developing nations, many of which lack strong traditions of cartography and mapping, these technologies have proven essential for developing public policies on issues such as deforestation assessment and management, urban planning, agricultural production, and environmental assessment.

Brazil is one of world's leading countries on Earth Observation (EO). It builds satellites, receives and distributes remote sensing data, and develops applications. Brazil's EO projects for monitoring tropical deforestation are recognized worldwide as one of the prime examples of using EO data for the benefit of society. Brazil is the world's largest provider of EO data, with more than 100,000 remote sensing images delivered yearly via the Internet.

Since 1961, INPE (National Institute for Space Research), a Brazilian governmental entity, has been carrying out most of civilian R&D in remote sensing. INPE has managed a *LANDSAT* ground station, receiving data since 1974. It set up a Remote Sensing Division in 1972, which has been conducting research and application projects, and a graduate program in Remote Sensing and GIS that has granted more than 150 Masters degrees since 1974 (a Ph.D. program was started in 1998).

[*] National Institute for Space Research (INPE) Av dos Astronautas, 1758, São José dos Campos SP 12227-001, Brazil, e-mail: hilcea@dpi.inpe.br; gilberto@dpi.inpe.br.

INPE has also developed free and open source software for GIS and image processing. China and Brazil have a joint program called the *China-Brazil Earth Resources Satellite*. The *CBERS* satellites have global coverage, using optical multispectral cameras. Currently, the CBERS program includes five satellites. They are: (a) *CBERS-1*, launched in October 1999, operations ended in July 2003; (b) *CBERS-2*, launched in October 2003; (c) *CBERS-2B*, launched in September 2007, now fully operational; (d) *CBERS-3*, to be launched in October 2009; (e) *CBERS-4*, to be launched in October 2011. *CBERS 5, 6* and *7* are under final discussions.

All institutions work in a historical and social context, and INPE is no exception. In remote sensing, INPE's actions have been constrained by laws that date back to Brazil's military regime (1961-1985). This paper will examine how remote sensing law has evolved in Brazil in the last thirty years, and how a civilian institution which is committed to openness has managed to overcome constraints and controls.

II. REMOTE SENSING LAW UNDER BRAZIL'S MILITARY REGIME (1964-1985)

From 1964 to 1985, Brazil was ruled by a military regime, which acted under a dual-tier doctrine. The first part of this doctrine was a broad definition of national security that included defense against external aggression and internal defense against insurgency and communism. Using repressive measures, the military countered domestic insurgencies successfully from 1967 through 1973. The second part of the doctrine was a belief on economic development as a means of regional assertiveness. Under the military, the role of the State in the economy grew by expanding Brazil's industrial base. High economic growth rates between 1968 and 1973 helped to legitimize military rule. Although the military government was fiercely anti-communist, its relationship with the United States was troubled by Brazil's nationalistic tradition and its rejection of external controls. Thus, from 1970s onwards, Brazil's military developed a strategy of assertiveness as a local power. It promoted scientific and technological development, especially in technological

areas such as nuclear, energy, agribusiness, space, aeronautics, telecommunications, and computers.

This dual strategy of national security and regional power assertiveness brought a legacy of contradictory actions. On the positive side, the military promoted R&D institutions such as INPE, encouraging research and open scientific international relations. Thus, in 1974, INPE set up a *LANDSAT* ground station, which has worked continuously since then[1]. Remote sensing images received by INPE were distributed without controls and many different applications were encouraged. On the other hand, the regime controlled aerial surveys and the main decisions of the space program were decided by the military.

In 1971, Gen. Emilio Médici, then president of Brazil, signed Decree no. 68099, that created the Brazilian Commission for Space Activities (COBAE), headed by the chief of EMFA, Brazil's equivalent to the Chairman of the Joint Chiefs of Staff. COBAE's mandate was to help the president in planning and carrying out national priorities in space-related matters. Although INPE continued to be a civilian institute, its plans had to be approved by the military.

The military felt the need to control all cartographic activities. Thus, in 1971 the government signed Decree-Law 1177/71, which determined that all aerial surveys should be strictly regulated by EMFA. Private companies needed authorization to perform any survey, and they had to keep the originals to provide to the government if needed. This decree did not deal with remote sensing data from satellites.

Decree-Law 1177/71 was subsequently amended by the Decrees 71,267/72, 75,779/75), and 84,557/80[2]. None of them included remote sensing, since it was felt the 80-metre resolution of the first three *LANDSAT* satellites had no intelligence value. Thus, up to the end of the military regime in 1985, satellite remote sensing activities in Brazil were technically unregulated.

---

[1] Álvaro Fabrício dos Santos, *Remote Sensing in Brazil*, 84 REVISTA DA SBDA DIREITO AERONÁUTICO E DIREITO ESPACIAL [BRAZILIAN JOURNAL OF AVIATION AND SPACE LAW] (2004), *available at* http://www.sbda.org.br/revista/Anterior/1768.htm.

[2] Raimundo Mussi, *O Sensoriamento Remoto E Sua Regulamentação*, 86 REVISTA BRASILEIRA DE DIREITO AEROESPACIAL [BRAZILIAN JOURNAL OF AEROSPACE LAW] (2003), *available at* http://www.sbda.org.br/revista/Anterior/1752.htm.

In practice, however, there was an indirect control of INPE's actions by COBAE.

III. THE TRANSITION TO DEMOCRATIC RULE (1985-2000)

Brazil's transition from a military regime to a full-fledged democracy was a negotiated process. Partly because of Brazil's historical tradition of negotiated transitions and partly because the regime had been much less repressive than countries such as Chile and Argentina, there was an implicit consensus. Although politics is now under full civilian control, the military continues to preserve an influence over areas which are judged to be sensitive to national security, including space policy.

The natural solution after the regime change would have been to assign INPE, which had developed into one of Brazil's main scientific institutions, the powers of a civilian space agency. This would have been similar to what had happened in the U.S. in 1958 when NASA was created. The negotiated nature of the transition dictated otherwise. Thus, in 1994, after lengthy and delicate negotiations, the government passed Law 8854/94, which created the Brazilian Space Agency (AEB) and ended COBAE. AEB is a civilian organization which is in charge of deciding space policy matters. AEB and INPE are independent bodies, a state of affairs which is unusual among nations that have a space program. AEB's highest body is its Superior Council, which has seventeen members, of which six are from the military.

Also, the vision that aerial survey was a sensitive national security issue and should be subject to strict government control continued to prevail after the transition to democracy. By the 1990s, government officials started to regard remote sensing data as also being of intelligence value. Thus, in 1997, the civilian government of President Fernando Henrique Cardoso signed Decree 2278/97, which regulates both aerial surveys and remote sensing and remains valid to this day. The decree treats remote sensing data as aerial photography taken by satellites.

Due to this misunderstanding about remote sensing, Decree 2278/97 contains inappropriate dispositions. It ignores the technical nature of remote sensing and disregards the United Na-

tions Remote Sensing Principles. To distribute or use remote sensing data in Brazil, a satellite operator would need an authorization from the Brazilian Ministry of Defense. Since this condition is non-applicable in practice, Brazilian companies that carry out remote sensing activities and international operators that distribute images in Brazil have ignored the legislation, without any practical consequence.

IV. FIGHTING ARCANE LEGISLATION WITH OPEN ACCESS: INPE'S DATA POLICY

Recognizing the need to reform the remote sensing law, but fearing that political negotiations could lead to a compromise where some military control of remote sensing activities would remain, INPE decided to adopt a *de facto* data policy. Such policy was to give out free on the Internet all remote sensing data received by INPE, the resulting maps, and the software for image processing and GIS. The SPRING software was placed on the Web in 1997, the Amazon deforestation maps in 2003, *CBERS* images in 2004, and the INPE's full *LANDSAT* archive (30 years of data) in early 2008.

This policy met with a huge success. Before 2004, INPE delivered 2,000 *LANDSAT* images per year. This figure is comparable with the 18,000 images delivered yearly by USGS. Free distribution on the Internet changed this. From April 2004 to January 2008, more than 350,000 *CBERS* images have been delivered by INPE to more than 5,000 users, including government at the federal, state, and municipal levels; educational institutions; non-governmental organizations; and the private sector.

Success at the local front encouraged INPE to promote open access data policies for remote sensing worldwide. China and Brazil agreed to deliver *CBERS* data free to African countries, in a partnership that include Italy, South Africa and Spain. By this proposal, their ground stations covering most of Africa will receive and give out *CBERS* data timely and free-of-charge. Brazil has been vocal at international forums promoting the *CBERS* free data distribution policy, which is considered to be an example to other nations. This international recognition has

been instrumental in supporting INPE's position for open access to remote sensing data in Brazil, despite the legal hurdles.

V. OLD HABITS DIE HARD: THE CURRENT DEBATE ON REMOTE SENSING LEGISLATION (2000-PRESENT)

In 2000, a working group composed of members of the Ministry of Defense, the Ministry of Science and Technology, the Ministry of Foreign Affairs, and the Brazilian Space Agency gathered to discuss a specific legislation for remote sensing and an update of Decree 2278/97. It proposed a new legislation (Project Law 3587/00) that was forwarded to the Brazilian Congress. Once again, this action neglected the Brazilian remote sensing community, ignored the U.N. Remote Sensing Principles and neglected the technological advances.

The proposed legislation defines broadly remote sensing as "the set of operations of reception, processing, interpretation, or distribution of satellite-collected data, that under any form covers part the Brazilian territory." The goal is to allow the government to control the institutions involved in remote sensing and aerial surveys. Any citizen would need permission from the government to use remote sensing data. Such a view conflicts with the open access policy already in place. INPE and members of the remote sensing community have expressed their strong opposition to PL 3587/00. Given such opposition, it is unlikely the proposal will be approved by Congress. Even if it is approved, it will be impossible to be put into practice.

Additionally, the Brazilian Congress is also examining a legislative proposal (Project-Law 1120/07) that mandates an open access policy to all scientific works produced using public grants. This proposal requires all publicly funded R&D institutions to set up institutional repositories that would disseminate papers and reports published by their staff. This open access data policy would directly conflict with PL 3587/00.

VI. PRACTICE MAKES PERFECTION: HOW KANT AND THE INTERNET MAKE A GOOD PAIR

The debate on remote sensing legislation in Brazil is still open. PL 3587/00 awaits final decision by Congress. But INPE

and the remote sensing community have good reasons to be optimistic, especially since we have the moral companion of Immanuel Kant and the effectiveness of the Internet in our side.

In *Perpetual Peace*, Kant writes: "All actions relating to the right of other human beings are wrong if their maxim is incompatible with publicity." Kant refers to it as the "transcendental principle of the publicity of public law."[3] A public debate on PL 3587/00 would result in retracting the proposal, since its flaws are too obvious and it would be untenable in practice. As for the Internet, as Manuel Castells argues in "*The Internet Galaxy,*" it was "purposely designed as a technology of free communication," and "it is a particularly malleable technology, susceptible to be deeply modified by its social practice."[4] The social practice of open access remote sensing data distribution adopted by INPE has changed how remote sensing is used in Brazil.

The trend towards openness and free access to remote sensing data worldwide is gaining momentum. The next decade will likely see the emergence of a global land-imaging consortium, which would provide data access to a constellation of satellites. The land imaging satellite constellation will provide free 10-30 meter global land cover multispectral images available worldwide at least once a week, and if possible, every two days. This timely data will meet the needs for fast-response applications, which are critical in all areas.

Thirty years of experience using land-imaging satellites shows that timely, free and high-quality geospatial data provide significant societal benefits. There is a high likelihood that this policy will become widespread. Then, the currently proposed remote sensing legislation in Brazil will be seen as a failed try to roll back the clock of history.

---

[3] IMMANUEL KANT, GROUNDWORK OF THE METAPHYSICS OF MORALS 347 (1785).

[4] MANUEL CASTELLS, THE INTERNET GALAXY: REFLECTIONS ON THE INTERNET, BUSINESS, AND SOCIETY (Oxford University Press, USA, Dec. 13, 2001).

REGULATING REMOTE SENSING SPACE SYSTEMS IN CANADA – NEW LEGISLATION FOR A NEW ERA

Thomas Gillon[*]

On 23 November 2004, then Canadian Minister of Foreign Affairs, Pierre Pettigrew, announced the introduction of legislation to regulate the operation of remote sensing space systems. The press release said, "[t]he legislation is aimed at protecting Canada's national security, national defence and foreign policy interests, while supporting our continued leadership in the provision of remote sensing data and services to government and private sector clients."[1] The *Remote Sensing Space Systems Act* received Royal Assent in 2005 and came into force in April 2007. The legislation, and the regulatory regime that it creates, places Canada at the forefront of establishing rules for the operation of remote sensing space systems and for the dissemination of data and imagery generated by these systems. While it is recognized that the U.S. regulatory regime is one standard by which other such mechanisms will be assessed, the Canadian remote sensing regulatory system is uniquely Canadian.

From Whence it Comes

In the mid-to-late 1990s, advances in satellite remote sensing technology in the private sector started to drive the development of commercial space systems that were increasingly capable, matching in many cases, the performance capabilities that had previously been within the realm of military or intelli-

---

[*] Dr. Thomas Gillon is currently the Remote Sensing Space System Policy and Licensing Officer with the Department of Foreign Affairs and International Trade. Previously Dr. Gillon was a Senior Policy Officer in the Directorate of Arms and Proliferation Control Policy in the Canadian Department of National Defence and was Senior Analyst/Acting Section Head-Policy and Cooperation in the Directorate of Space Development, Department of National Defence, Canada

[1] Press Release, Foreign Affairs Canada No. 136, Canada Tables Legislation Regulating Remote Sensing Space Systems (Nov. 23, 2004).