

IAC-04-IISL.1.02

REGULATORY FRAMEWORK FOR COMMERCIAL REMOTE SENSING SATELLITE SYSTEMS: THE CANADIAN STORY

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ABSTRACT

The history of space data policy in Canada has been largely driven by the development of the RADARSAT-1 program, the first Earth observation satellite built and operated by Canada. RADARSAT-1 was an innovative public/ private partnership. Its successor RADARSAT-2, currently scheduled to be launched in the latter part of 2005 will be owned by the private sector, albeit with upstream financial support provided by the Canadian Space Agency (CSA).

In 1999, Canada announced its Access Control Policy for the regulation of commercial remote sensing satellite systems. This paper will discuss Canada's Access Control Policy and focus on a few challenges facing the *ad hoc* interdepartmental working group tasked with developing the necessary legislative means to implement the Access Control Policy.

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INTRODUCTION

The launch of Canada's first Earth observation satellite RADARSAT-1 in 1995 demonstrated Canada's commitment to supporting sustainable resource development through the use of remote sensing. It also confirmed the on-going cooperation between the public sector, notably the Canadian Space Agency (CSA) and the Canada Centre for Remote Sensing (CCRS), and the Canadian private industry in the development and commercial exploitation of this technology. In developing RADARSAT-1, Canada adopted a hybrid public-private funding and operational arrangement. A series of Memoranda of Understanding (MOUs) were signed between CSA and Program Partners, participating Provinces and Contributing Provinces, while a private company RADARSAT International (RSI) was created and granted exclusive commercial data distribution rights.

In June 1994, the Government of Canada gave approval to the Long Term Space Program II which *inter alia* established Earth observation as a priority of the Canadian Space Program. In 1997, the

CSA put out a Request for Proposals (RFP) for RADARSAT-2, Canada's next generation imaging radar program. The RFP called for substantial private-sector financial investment in the construction and operation of the satellite. In return, CSA would provide the balance of funding and would turn over ownership of the satellite and exploitation of the data rights to the successful bidder. MacDonald Dettwiler and Associates (MDA) was selected to construct and manage RADARSAT-2. Unlike RADARSAT-1, RADARSAT-2 will be owned entirely by MDA, though substantial financial contribution was provided by CSA. The enhanced capabilities of RADARSAT-2 (3-metre ultra-fine resolution) will make RADARSAT-2 the highest resolution SAR commercially available at the time of its launch.

As the ownership of remote sensing satellites was to move from the public to the private sector, the Canadian Government announced its intention to develop new legislation to control commercial remote sensing satellites.

ACCESS CONTROL POLICY

The Access Control Policy was announced in June 1999. Its objective was to maintain Canada's industrial base, advance its technology, create economic opportunities and safeguard the lives of Canadians and their allies. As noted by the Canadian Minister of Foreign Affairs at the time, Mr. Lloyd Axworthy: "This new policy will protect national security, help safeguard human lives and enhance Canadian competitiveness in the growing space sector."¹

An *ad hoc* interdepartmental working group composed of representatives from CSA, the Department of Foreign Affairs and International Trade (DFAIT), the Department of Defense (DND) and IC was tasked with developing and drafting an appropriate regulatory regime for commercial remote sensing satellite systems.

The enactment of legislation, regulations and licensing procedures will ensure that Canada, as signatory to *the Outer Space Treaty of 1967* fulfills its obligation pursuant to Article VI of the Treaty namely to ensure 'authorization and continuing supervision' over the activities of its non-governmental entities.²

Rights reserved by the Government of Canada

Pursuant to the announced Access Control Policy, the Government of Canada (GOC) reserves the right to:

1. Review and approve all commercial remote sensing satellite systems owned, operated or registered in Canada, considering data access, system architecture, system performance and foreign ownership on a case-by-case basis and specifying limits deemed necessary and sufficient to protect Canada's national security and foreign affairs interests.
2. Interrupt normal commercial service when the availability of data may be detrimental to Canada's national security and foreign affairs interests. Access control directives may consist of

spatial, temporal, performance or customer specific denials or restrictions, or a combination thereof, as deemed necessary on a case-by-case basis. Decisions to invoke, modify or revoke the shutter control directives will be made at the level of a federal minister or designate.

3. Obtain priority access when the availability of data may be beneficial to Canada's national security and foreign affairs interests. Decisions to authorize priority access requests will be made at the level of a federal deputy minister or designate.

Duties and responsibilities of the owner, operator or registered entity

The Access Control Policy then enumerates a series of requirements for operation of a commercial remote sensing satellite system. These include *inter alia*:

- registering with an appropriate GOC department for approval of the system;
- maintaining a record of all satellite tasking and allowing the GOC timely access to this record;
- notification and approval by the appropriate minister(s) of any change in operational characteristics;
- obtaining permission of the appropriate minister (s) for transfer of ownership, operation or registration to any company (foreign or domestic)
- maintaining positive control of the satellite at all times and executing such control solely

from the jurisdiction of the GOC;

- use GOC approved encryption devices ;
- notify DFAIT of an intent to enter into significant or substantial agreements with foreign customers

On 16 June 2000, Canada and the United States entered into a bilateral agreement concerning the operation of commercial remote sensing satellite systems.³ In the preamble, both Parties recognize their mutual interests in regulating and controlling commercial remote sensing satellite systems operating from their respective territories or subject to their respective jurisdiction in accordance with their respective policies, laws and regulations. The Parties agreed to ensure that such commercial remote sensing satellite systems will be controlled by each Party in a comparable manner in order to protect and serve shared national security and foreign policy interests. The Agreement specifically covers the operation of RADARSAT-2 as well as all future Canadian commercial remote sensing satellite systems owned, operated or registered in Canada.

The Access Control Policy provides somewhat of a 'blue print' for what might eventually be included in the Canadian regulations. The language used is also very reminiscent of that adopted by the United States in the Interim Final Regulations relating to the Licensing Of Private Land Remote-Sensing Space Systems.⁴ These regulations implement the provisions of the *Land Remote Sensing Policy Act of 1992*⁵, as amended by the *Commercial Space Act of 1998*.⁶

It should be noted that although Canada has yet to adopt legislation and regulations pertaining to the operation of commercial remote sensing satellite systems, the access to data control policy announced on 9 June 1999 is to apply and forms an integral part of the bilateral agreement as Annex 1.⁷

SOME CHALLENGES IN DEVELOPING A CANADIAN REGULATORY REGIME

The *ad hoc* interdepartmental team has now been working on the elaboration of legislation and regulations for over three (3) years. Clearly, one of the biggest challenges is striking a balance between meeting Canadian national security and foreign policy objectives while at the same time advancing the Government's policy objective of fostering the commercialization of Canada's satellite remote sensing activities. Adding to the complexity is the changing nature of the commercial environment and the high level of competition.⁸

The composition of the *ad hoc* interdepartmental working group reflects the different federal stakeholders in the regulation of commercial remote sensing satellite operators. Comments made repeatedly by US private remote sensing operators underline the importance of developing a regulatory mechanism that is flexible and allows for efficient and timely decision making.⁹ It will be important therefore that the responsibilities and roles of the principal government stakeholders be clearly assigned and exercised. Consultation mechanisms will be required to assist those who ultimately will be designated

as responsible for making decisions related to issues such as licensing of systems, interruption of normal commercial service, ordering of priority access service and review of significant or substantial foreign agreements.¹⁰

Continued strong government involvement in the development of the remote sensing market is likely to continue for some time to come. Purchasing of satellite imagery by various government agencies, notably by the defense and intelligence communities will continue to provide guaranteed revenue to commercial operators. The new US Policy on Commercial Remote Sensing announced on 25 April 2003 (which replaces Presidential Decision Directive PDD-23 issued in 1994) clearly underscores this point.

The fundamental goal of this new policy is to advance and protect US national security and foreign policy interests by maintaining the nation's leadership in remote sensing space activities, and by sustaining and enhancing the US remote sensing industry. Commercial remote sensing systems are now recognized in the overall US Government remote sensing architecture. The US Government will "rely to the maximum practical extent on US commercial remote sensing space capabilities for filling imagery and geospatial needs for the military, intelligence, foreign policy, homeland security, and civil users."¹¹

The new US Policy further states that : "Foreign commercial remote sensing space capabilities, including but not limited to imagery and geospatial products and services, may be integrated in the United States Government

imagery and geospatial architectures, consistent with national security and foreign policy objectives.” Greater emphasis will be placed on government-to-government agreements. It can therefore be hoped that the existence of the June 2000 bilateral agreement between Canada and the US will serve as a basis for future opportunities for Canadian companies.

Data policy

Data policies are established nationally, by international organizations or by private sector entities. More often than not, they address the needs of specific user communities. For this reason, a data policy that serves the needs of one user community may not serve the other users equally well. Put in another way, data users in different categories generally want different outcomes from data policy.

Current data policy in Canada varies depending on the satellite. Access to data from scientific missions has primarily been very open and free of charge. This policy reflects the views held by the scientific community, namely that open access to data allows the research community to contribute to the processing of data into forms usable by a wider audience.¹²

By contrast, data available from Canada’s RADARSAT-1 satellite is available at a cost. Preferential prices exist for well defined partners (federal government users) or within the framework of promotional research projects.¹³ Outside of these well defined instances, RSI has a published commercial price list and terms of sale.

Certain volume discounts are available. In addition, , it should be noted that CSA retains ownership of the intellectual property rights in RADARSAT-1 data. CSA has a Master License Agreement with RSI which grants RSI exclusive rights to distribute and market all synthetic aperture radar (SAR) data received from the RADARSAT-1 space segment, as well as the data products described in the pricing section of its products document.¹⁴

With respect to RADARSAT-2, the GOC initially provided MDA with an investment of CDN\$225 million. This investment increased dramatically to cover unforeseen costs related to a change in contractors for the satellite bus and the need to launch RADARSAT-2 by a US commercial launcher.¹⁵ This increased investment contributes to the GOC’s ‘pre-purchase’ or ‘data credit’, and increases its entitlement to CDN\$445 million.

The GOC pre-purchased data is to be used to meet the government’s operational and scientific needs. Researchers will be required to pay costs associated with the processing of the data. What remains to be seen is what rights CSA will have in acquiring and distributing this pre-purchased data for non-commercial purposes. In other words, what usage will it have of this data. Will different Canadian federal government departments and other identified users be allowed to share the data? Who will have a say in these decisions?

Recent studies have shown that data sharing among a group of users (government agencies, educational institutions) is a means to increase user

familiarity, technology developments and market developments for remote sensing data. As a privately owned system, this approach to data distribution may not be favored by RSI, the commercial distributor of RADARSAT-2 data. Reaching a common understanding and agreement on this point is a key factor.

There is also a growing recognition of the public good nature of earth observation data. Public goods have been defined as: "goods...which are non-rival in consumption, and for which you can not exclude consumption." Non-rivalry implies that the consumption of the information by one user does not diminish the capability of another user to use the information. Non-excludability means that no one user can exclude the use of information by another user.¹⁶

The concept of Earth observation data as a public good is particularly applicable to data used by researchers for environmental, humanitarian and disaster relief efforts. Initiatives such as the Global Monitoring for the Environment and Security (GMES), the Global Earth Observation System of Systems (GEOSS) and the UN Charter for Disaster Management are indicative of this trend. In elaborating a data policy, it is important that Canada continue to meet its international obligations in terms of data supply. This implies that the data policy should allow for flexibility. There might well be instances where data should be made available free of charge to certain users during an emergency situation for example, while the same data could have a cost for other uses. This might be a means of serving broader GOC

objectives (such as humanitarian and disaster relief goals) while at the same time fulfilling the commercial objectives of RSI.¹⁷ This same argument could even be advanced for information products.¹⁸ Yet again, as a privately owned system, such an approach to data distribution may not be favored by a commercial distributor such as RSI.

The use of encryption devices as a means of controlling access to data should also be mentioned. Encrypted data can be considered as a form of a hybrid good (i.e. falling between public and private) since it retains the non-rivalry condition of a public good but would be exclusive, in that only those with access keys would be able to benefit from it.¹⁹ This distinguishes between categories of end-users and also provides a data policy mechanism to address the issue of dual-use systems. RADARSAT-2 data will be encrypted, though the pricing and access modalities have yet to be determined.

Finally, it should be mentioned that the Access Control Policy also provides that the owner, operator or registered entity shall make available to the government of any country, including Canada, data acquired by its system concerning the territory under the jurisdiction of such a government (sensed state) in accordance with the United Nations A/RES/41/65 Principles Relating to Remote Sensing of the Earth from space. However, such data will not be provided to the sensed state if its uncontrolled release is determined to be detrimental to Canada's national security and foreign affairs interests.²⁰ Similar wording is used in the US Interim Regulations. Such provisions have given rise to concerns that the non-discriminatory

principle found in the UN Remote Sensing Principles is being eroded.²¹

approach to national legislations will no doubt be required.

CONCLUDING REMARKS

The Canadian story with respect to the elaboration of the necessary means to regulate commercial remote sensing satellite systems remains unfinished. As of the date of publication of this paper, Canada has yet to finalize its legislative and regulatory framework for commercial remote sensing satellite systems. Achieving a balance between national security and foreign affairs interests *and* Canadian commercial competitiveness has proven to be a challenging task. In addition, the balance between public and private goods, and the means which need to be taken to foster the development of a knowledge-based economy, also need to be taken into account in adopting a data policy for commercial remote sensing satellite systems.

This article has raised but a few of the challenges faced by the *ad hoc* interdepartmental working group, focusing on data policy issues.²²

It is hoped that legislation will be tabled in the House of Commons and signed into effect prior to the launch of RADARSAT-2 currently scheduled in 2005.

Finally, it should be stated that an increasing number of private high-resolution Earth observation system operators will be entering the market in the next few years. No doubt other countries will soon be grappling with the same type of issues in drafting their own regulatory regime. A harmonized

¹ 'Canada to Control Imaging Satellites,' News Release No. 134, Department of Foreign Affairs and International Trade, Government of Canada, Ottawa, 9 June 1999.

² *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, 610 U.N.T.S. 205. Opened for signature 27 January 1967; entered into force 10 October 1967.

³ 'Canada and United States Sign Agreement Concerning Operation of Commercial Remote Sensing Satellite Systems', News Release No.

153, Department of Foreign Affairs and International Trade, Government of Canada, Ottawa, 16 June 2000.

⁴ US Department of Commerce: National Oceanic and Atmospheric Administration, 15 CFR, Licensing of Private Land remote Sensing Space Systems; Interim Final Rule Federal Register, Vol. 665, No.147 (31 July 2001), 46836-46837.

⁵ Public Law No. 102-555, 15 U.S.C. 5601.

⁶ Public Law No. 105-303, 42 U.S.C. 14701

⁷ *Supra* note 3. Section 2 states : Canada agrees to keep in place, until its provisions are enacted into law, the Canadian national access control policy announced on 9 June 1999, set forth in Annex I hereto, concerning such commercial remote sensing satellite systems owned, operated or registered in Canada.

⁸ Baines, P., 'Balancing Interests : Toward further progress in the development of a regulatory regime for commercial remote sensing space systems in Canada', unpublished paper presented at the First International Law Conference on Remote Sensing, University of Mississippi, 20-22 April 2002.

⁹ O'Connell, K., Baker, J.C., Lachman, B.E., Berner, S., Frelinger, D. and Gavin, K.E., **US Commercial Remote Sensing Satellite Industry: an Analysis of Risks**, RAND Report MR-1469-DOC, Washington, D.C., 2001, pp.25-26.

¹⁰ MDA recently announced that the government of Norway had agreed to purchase CDN\$15 million worth of RADARSAT-2 data. See, 'Norway Buys \$15 Million Worth of RADARSAT-2 Data from MDA', MDA Press Release, 29 January 2003. Downloadable from <http://www.spaceref.com/news/viewpr.html?pid=10556>

¹¹ U.S. Commercial Remote Sensing Policy, 25 April 2003, Fact Sheet, Section. II Policy Goal.

¹² Stojak, M.L., **Review and Analysis of Earth Observation Satellite Data and Policies in Support of Operational and research Use and related Commercialization Policies Around the World**, (2002), pp.66-68.

¹³ RADARSAT-1 Data for Research Use, downloadable from http://www.space.gc.ca/csa_sectors/earth_environment/radarsat/research/dru.asp

¹⁴ Stojak, *supra* note 12, pp.59-63.

¹⁵ 'Canada Chooses Delta to Launch Radarsat 2', *Space News*, 3 July 2000, p. 3 & 18.

¹⁶ Harris, R., **Earth Observation Data Policy**, John Wiley & Sons Ltd, Chichester (1997), at 155.

¹⁷ A similar recommendation was made within the framework of GMES. See, *Data Policy Assessment for GMES – Executive Summary of the Draft Final Report* prepared by Harris, R. and Browning, R., 15 November 2003, at 11.

¹⁸ *Ibid.*

¹⁹ See, Cohendet, P. and Meyer-Kramer, F., 'The theoretical and policy implications of knowledge codification', *Research Policy* 30 (2001), 1563-1591.

²⁰ For a discussion on the compatibility of such a principle with the 1986 UN Principles on Remote Sensing see, Jakhu, R., 'International Law Governing the Acquisition and Dissemination of Satellite Imagery', (2003) Vol. 29 J.of Sp. L. 65, at 89-90.

²¹ *Ibid.*; see also on this point and on the legal status of the UN Principles on Remote Sensing, Gabrynowicz, J.J., "Expanding Global Remote Sensing Services: Three Fundamental Considerations" in, **Proceeding of the Workshop on Space Law in the Twenty-first Century**, UNISPACE III Technical Forum, UN Doc. ST/SPACE/2, July 1999, at 117.

²² For a more detailed discussion on other areas of concern see, Baines, *supra*, note 8.