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RADARSAT-2 REGULATORY ISSUES AND INTERNATIONAL LAW PERSPECTIVES ON COMMERCIAL REMOTE SENSING AND MILITARY OPERATIONS

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ABSTRACT

This note briefly analyses the regulatory issues presently being considered by the government of Canada pertaining to space-based earth imaging. On an international perspective legal issues involving space-based earth imaging and military operations are analyzed. In particular, the international law regulating the legitimacy of targeting remote sensing satellites and ground installations are briefly reviewed.

The rapid gathering and dissemination of information has probably become the defining paradigm of our epoch permeating practically all dimensions of public and private interaction. No one can deny that space technology occupies an important part of this new reality. In fact, space technology is now a crucial component of our global information infrastructures. Satellites are the space component of our information pipeline. Space based earth imaging satellites collect a vast amount of data for military and civilian uses. Many countries have developed this technology through various commercialization efforts. The economic value, dependence, and hence, the strategic importance of space based earth imaging infrastructure is now well established. Generally speaking space assets, are easily comparable in importance in our epoch to that of hydrocarbons and electricity during the 19th and 20th centuries. In fact, information is so quickly infusing our lives and mores, and is doing this to such an extent, that one has to wonder if perhaps, by itself, information is not by itself, structuring a homogeneous universal ethos.

Revolutions in information concepts are however not unique to our epoch. Gutenberg had created an important revolution with the invention of the printing press, which was perhaps even more disturbing to his period of time than what we are presently experiencing. The printing press created a significant change in the distribution and accessibility of information. The accessibility of books to a large number of people created what can be referred to as the first step to the de-intermediarization of knowledge. That is, as the Bible became more accessible to a greater number of people, the Church lost its privileged position as the keeper and interpreter of knowledge.

The relationship between the Church and its members was to be forever changed.

Similarly, in the early 1900s electricity, radio, television, all, again revolutionized society, changing the way in which people and governments would relate to one another. Now cyber-space, global telecommunication networks, new methods of information gathering, some of which are not even on our planet (that is, they are space-based), coupled with the global dissemination of the data and information are again forcing us to adapt, changing the way in which we relate to one another, affecting even our consociations. Thus, governments have also been forced to adjust to a new reality. And according to the nature of the beast, governments adapt by regulating. However, if there is a constant within our history of knowledge and information it is that politics, laws, and issues of national security have been continuously redefined. Within our epoch the redefinition of these concepts will be contingent upon information paradigms. Perhaps, this capacity to adapt to a changing information environment can be qualified as 'information Darwinism'. Those who can adjust the best to their new information environment will survive.

The RADARSAT project represents an important part of an effort by the Canadian government to develop an information based economy. Canada has a small space program. In order to maximize returns Canada has astutely invested in certain key sectors creating expertise in important niche areas. With the RADARSAT project, Canada is at the forefront of SAR commercial and technical expertise. The RADARSAT satellites are part of the Canadian Government's strategy to have a sustainable indigenous earth observation business.

The RADARSAT-2 satellite is taking Canadian commercial space based earth imaging to the next level of commercialization with the ultimate goal being to achieve the full commercialization of the RADARSAT program. The conceptual structure consists of a strategic trilogy. The *"troika"* is composed of 1) capital investment; 2) a typically Canadian innovative interface between the public and private actors; 3) cutting edge technology designed for a broad range of clients.

The capital investment component was shared by CSA and MDA, with the lion's share being born by MDA. The capital outlay by CSA is considered by Canada as a strategic investment to be recuperated in future data. Thus, both CSA and MDA are investing considerable resources in the construction of the RADARSAT-2 system. Technically speaking the RADARSAT-2 will possess a spatial resolution ranging from 3 to 100 meters with minimal swath widths ranging from 10 to 500 kilometres[ii]. RADARSAT-2 will benefit from RADARSAT-1 existing ground operations infrastructures.

Among the target markets for RADARSAT-2 finer resolution we find the following, namely:

1. Management of natural resources (agriculture, forestry, geology, hydrology
2. Mapping and topography, coastal zone mapping

3. Disaster management, (damage assessment, relief efforts, search and rescue)
4. The defence markets (terrestrial and maritime surveillance, ground target detection, treaty verification, intelligence, mapping

One of the important criteria of satellite data use is the capacity to obtain data in real time. This factor is of particular importance for clients in the defence sector, and disaster relief. RADARSAT-2 will benefit from processing in as fast a timeline as 20 minutes thus allowing a rapid service in such utilities as target detection. However the exploitation of the defence industry as a client is a double-sided sword. From a commercial perspective a defence ministry is a valued client. It is a client with a strong need for imagery with an equally valued capacity to pay for the service. However an asset used for military purposes becomes, in times of armed conflict, a legitimate target[iii]. As a legitimate target the asset may be legally attacked and neutralized by belligerent forces. Furthermore, any infrastructure associated with the obtaining of data, the interpretation of data, and dissemination of this data for military purposes are also legitimate military objectives. Considering that the ability to neutralize a satellite in orbit is limited to a few states, the target of choice remains land-based infrastructures. On this point structures crossing national territories raises interesting legal issues. Although the analysis of belligerent rights and rights of neutral states are beyond the scope of this paper, these issues will need to be addressed in the near future. For example: Would a neutral state be obliged to limit access to ground infrastructure during times of belligerence? Should ground station agreements address issues of armed conflict? These questions have important implications in establishing foreign ground stations. RADARSAT-1 has ground infrastructures in such diverse locations as China, Australia, South Korea, Japan, Saudi Arabia and Thailand. RADARSAT-2 will also have ground stations in the remote arctic island kingdom of Svalbard, located halfway between the North Pole and mainland Norway.

DEFENCE MARKETS

Commercial satellite imagery is growing in importance for use by defence ministries or departments. For example, commercial imagery has proven useful in mission planning for mapping remote regions. Furthermore commercial satellite imagery has the added advantage of being easily disseminated as it is derived from an unclassified source. As intelligence imagery might not be easily releasable, commercial imagery presents a useful way to avoid the classification issue. Commercial imagery can be readily shared by military planners when working with civilian agencies such as response to humanitarian relief or natural disaster situation. Commercial satellite imagery could also be very useful for UN agencies which are sensitive about collecting intelligence from its member States.

At this point it is however important to stress that the present Canadian policy climate prevents the Canadian Forces from participating in the use of anti-satellite weapons or the

placement of weapons in space. However this Canadian policy position does not represent the state of present international law on the subject.

The success of the Canadian commercial strategy is contingent upon the future development of earth imaging markets. Thus, as markets evolve, the need for governmental financial implication will be reduced. A RADARSAT-3 satellite is foreseen for the year 2005, and would be operated in tandem with RADARSAT-2. These satellites will be designed to satisfy the national security concerns of Canada as well as to exploit commercial opportunities. Together, these satellites will provide very high quality images. Generally speaking, remote sensing satellites have greatly contributed in creating a global transparency of public and state activity. The origins of this activity rest in the quest by military organizations for the proverbial "high ground", obtaining information of enemy capabilities. The technology is therefore inherently dual use in nature. The Canadian military has a relatively small space- operating budget and thus does not have the required resources to have its own remote sensing satellites. Yet its missions and the reality of security needs within our present international system dictate that space is a vital asset to national security. In this sense Canada must develop an autonomy in space military applications. However the economic realities dictate that such an autonomy must be reached in partnership with commercial space ventures. To be successful in the development of space capability our military must work with the commercial sector.

REGULATORY STRUCTURE

The private ownership of RADARSAT-2 has forced Canadian legislators into space. RADARSAT-1 is owned by the Canadian government and therefore did not need a regulatory structure. RADARSAT-2, as a privately owned remote sensing satellite requires a regulatory structure. Canada announced an Access Control Policy in June 1999. A year latter, this regulatory issue was addressed jointly with the United States in an international instrument as an agreement signed at Washington on June 16 2000. Then foreign affairs minister Lloyd Axworthy announced that Canada and the United States had entered into an agreement concerning the establishment of regulations concerning the operation of commercial remote sensing satellites. Generally speaking, the agreement recognises that both countries have a mutual interest in controlling space based earth imaging. Specifically, the agreement addresses the RADARSAT-2 situation, which will be Canada's first privately owned and operated remote sensing satellite. It is important to stress that the scope of applicability of this agreement applies to high-performance earth imaging satellites. Other satellites such as those used for meteorological, navigation or communications are not within the scope of applicability. Both governments recognised their mutual interests in regulating and controlling private remote sensing satellite systems. Thus, Canada and the United States agreed to control in a comparable manner their respective industries serving their shared national security and foreign policy interests. Until Canada establishes a regulatory structure, Canada has agreed to maintain a national access control as outlined within an

annex I to the agreement. Annex I establishes a policy to review on a case by case basis commercial remote sensing systems in such a manner as to protect Canada's national security and foreign affairs interests. Canada maintains the right to interrupt normal commercial service when the availability of data may be detrimental to Canada`s national security and foreign affairs interests. It also establishes the right of the Government to demand priority access to the satellite capabilities from the commercial operator.

The future regulatory structure is outlined within Annex II. The two countries also agree to continue consultations on the evolution of their respective policies The Canadian government is presently developing a legislative and regulatory framework for privately owned high resolution earth imaging satellites. One of the concerns addressed within Canadian regulations will be to assure that the satellites and their imaging data are not employed in a manner which would be prejudicial to Canadian interests. The regulations will need to carefully balance the national security concerns and foreign policy interests on one hand versus the viability of the commercial endeavour on the other side. To be vibrant regulations must be credible. Regulatory credibility, on the other hand is contingent upon its pertinence to the reality and context of the activity. Regulations will have to be sensitive to the realities of the competitive international commercial climate. The shared security aspect emanates from the fact that Canada and the United States are not only strong economic partners but also inseparable military allies.

The future Canadian Regulations will therefore most probably be heavily inspired from the American model and include the following characteristics[iv], namely:

1) Licensing; There will be a review and approval of commercial satellites operators on a case by case basis. The issues of concern would be system performance and architecture, foreign ownership,
2) The possibility of imposing a shutter control. This will allow the Canadian Government to disrupt commercial activity of the satellite if it is deemed by government officials that the commercial availability of data is prejudicial to our national security concerns. There are various forms or techniques, which shutter control may take. Shutter control mechanism may vary from spatial, or temporal considerations, to certain commercial sales restrictions. This is a crucial issue involving civil rights, and must be dealt with at a very high level government, probably at, or close to, the ministerial level.
3) Priority Access to Data; Establishing a priority of data accessibility for DND during times of emergency, be it a military emergency of that of disaster relief will necessarily be included within the regulatory matrix. Similarly priority of access will most probably be granted for foreign affairs requirements.

Radarsat-2 is scheduled for launch in the latter part of 2003. The launch date also represents the deadline for an effective legislation and regulatory structure for Canadian commercial remote sensing satellite.

CONCLUSION

RADARSAT-2 will help to provide Canada with autonomy in space based remote sensing technology. The regulatory structure of RADARSAT 2 will be based on a delicate balance between commercial viability, addressing US concerns on data accessibility and uses, and establishing space autonomy for DND/DFAIT space data needs. The regulatory structure, yet to be finalized by Canada will most probably closely resemble the American model. The Canadian model will also most probably have a functional equivalent of the inter agency review of the American model. On this point, a joint civil-military national space policy involving CSA-DFAIT-and DND will need to be formulated to address contemporary national security concerns.

Fundamentally speaking there are two goals which a government imposed access control policy may have. First there is the national security goal. This can consist in either denying access to information to those who are considered as a threat or States of concern. Secondly the access control policy must assure the government priority access in times of crisis.

Shutter control can be exercised in many ways. For example, shutter control may establish a prohibition on the collection of data over a specific geographic area. On the other hand, a shutter control policy may delay delivery of the data to the end user. Shutter control may also be applied via technical performance such as reducing the resolution of the image. Commercially speaking certain customers may be established as security concerns and thus be imposed another form of shutter control. However these various methods of shutter control all share a commonality of concern over the commercial repercussions which they might cause.

The fact however remains that the global commercialization of space based earth imaging is creating a deintermediatezation of the data. That is, within a commercial paradigm, governments have a reduced level of control over who sees what.

Furthermore the exploitation of a military clientele by private commercial enterprises increases the business risk as these assets become legitimate military objectives. This issue will have to be addressed in a treaty. In the meantime, ground station contracts should address some of these issues.

The international regulatory structure of remote sensing data is very weak. The only document specifically addressing the issue remains the UN principles on the subject. However it must be remembered that these principles had been agreed to in an epoch where the paradigm of space activity was based on public state action. The commercialization of the activity necessarily leads to its privatization. The goals of the principles were noble. Developing countries should and must have access to remote sensing data. However these principles do not address the important issues of today's industry.

Commercialization can assure an equitable and efficient distribution of the data to all users. However such a process requires the market forces to function properly. Within a market structure issues such as market integration (vertical or horizontal), market entry, and unfair commercial practices become the issues of concern. Commercial remote sensing is presently an international activity governed by national laws. Perhaps it is time to take this to the next level and address the commercial structures for space based earth imaging collectively in an international instrument.

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[ii] This includes fully polarization options and the ability to acquire images to the left and right of the satellite, which will double the accessibility swath. The three meter resolution data generated by RADARSAT-2 will be the highest resolution commercially available SAR data, offering enhanced detection of closely spaced objects, as well as enhanced definitions of other objects. As the first commercial radar satellite to offer multi-polarization (HH, HV, VH, and VV), RADARSAT-2 will offer significantly improved surface discrimination. From RADARSAT Annual Review 200-2001, published by CSA p. 23.

[iii] Present legal instrument defines a military objective as those objects which by their location, nature, purpose, or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization in the circumstances ruling at the time, offers a definite military advantage. Protocol Additional I Art. 52 para.2.

[iv] News release, June 9, No.134