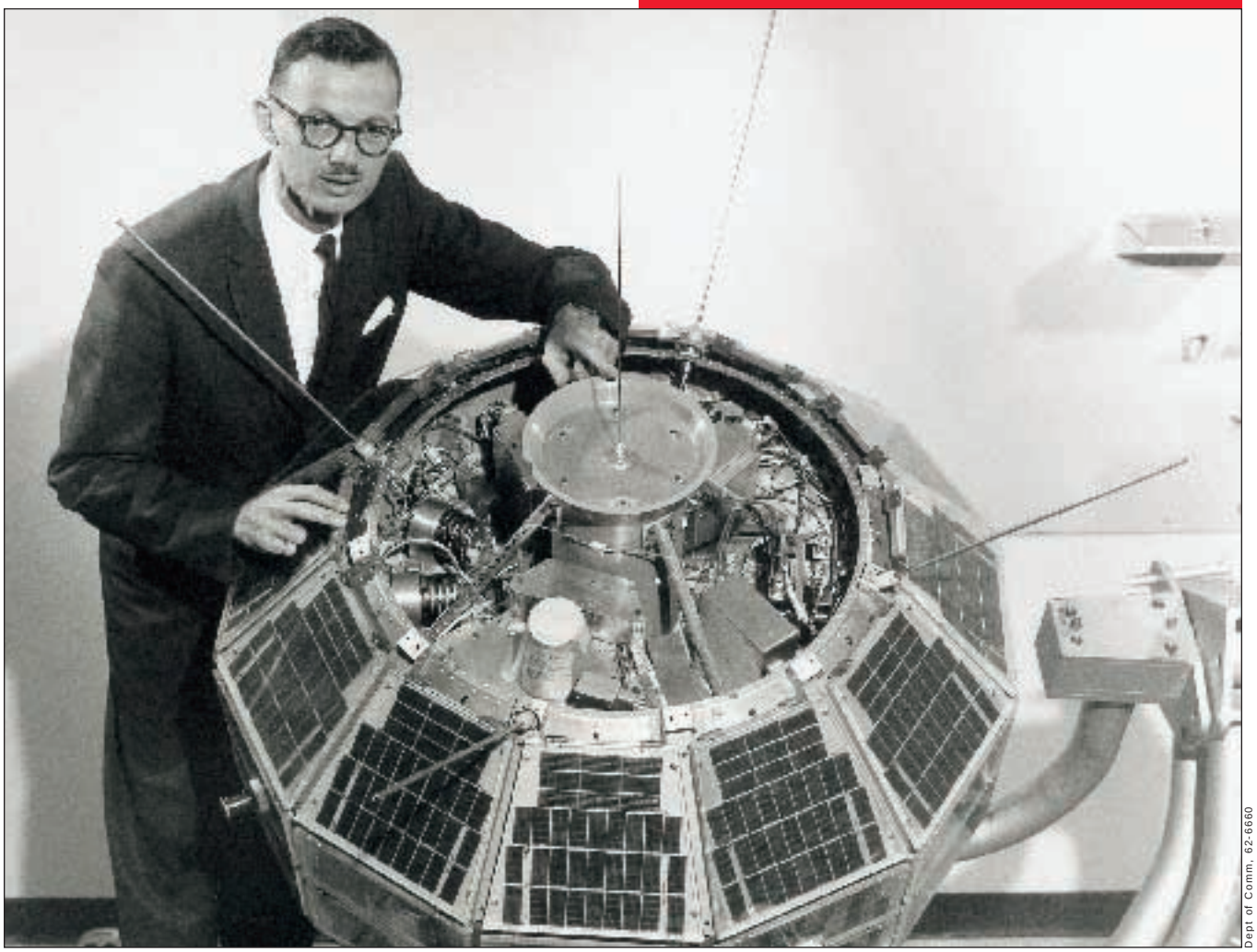
by Captain Andrew B. Godefroy



Dept of Comm. 62-6660

The founder and his work - Dr. John H. Chapman displays the details of Canada's first satellite.

IS THE SKY FALLING? CANADA'S DEFENCE SPACE PROGRAMME AT THE CROSSROADS

Canada's defence space programme is at a crossroads for the first time since 1986 when the question of the Strategic Defence Initiative (SDI) connection to the North American Aerospace Defence (NORAD) Command brought forward the need for a re-establishment of a Canadian military space policy.[1] Fifteen years later, Canada has once more been faced with the challenge of deciding which direction its future defence space programme will follow, and again the matter is tied to Canadian-American (CANUS) cooperation and the issues surrounding missile defence. With often over 4000 soldiers deployed in twenty-plus missions across the globe, Canada has a fundamental requirement for the space assets needed to support its soldiers on active service. Yet Canada simply lacks the resources to develop a large-scale defence space programme; therefore, it must depend heavily on a high level of cooperation between the Department of National Defense (DND) and the United States Department of Defence (DoD). Recently, that relationship has been challenged as a result of the costs involved in continuing cooperative ventures and the debate over Canadian support for the American National Missile Defense (NMD) programme. The issue will undoubtedly be a focal point in the next NORAD renewal agreement. If CANUS defence space cooperation shrinks, will Canada increase

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Launching the Hermes Communications Satellite - Canada remains dependent on foreign launch assets.

its indigenous space capability to compensate for the lack of allied support? What are Canada's choices? Should it pursue a cooperative relationship or would Canada benefit from a more autonomous defence space programme?

GHOSTS OF THE PAST

The present status of Canada's defence space programme is clearly reflective of its sporadic and politically complicated past. Geographically, the Cold War placed Canada directly between the Soviet Union and the United States of America, a position that led to a central role for the country in North American security and deterrence against Soviet attack. As Cold War technology evolved, deterrence came to include missile and space technology. Under the direction of the Defence Research Board (DRB), the Defence Research Telecommunications Establishment (DRTE), the Canadian Armament Research and Development Establishment (CARDE), and other military and civilian organizations, Canada directly participated in a number of defence space projects.[2] These projects included upper atmosphere studies, satellite design and construction, communications, rocketry design and testing, and ballistic missile development.[3]

Between 1957 and 1967, Canada significantly expanded its national space programme to the point where the next step would have been to create a formal civil-military space organization similar to the American National Aeronautics and Space Administration (NASA) to direct the country's national space strategy. By 1967, Canada had successfully developed an indigenous space structure, designed and launched the Black Brant rocket, built and launched (with American assistance) the Alouette satellite, making it the third country after the US and Soviet Union to put a man-made object in orbit, and cultivated a budding Canadian space industry. Unfortunately, the national space programme never materialized, and within half a decade of Canada's centennial celebration was but a mere shadow of its former self.

A number of factors contributed to Canada's demilitarization of space. While the dominant military influence in space projects during the 1950s and 1960s no doubt contributed to the success of Canada's space programme, the defence element was perceived as a contradiction to the evolving Canadian identity of the following decade. Canada's endorsement of the United Nation's treaty banning nuclear weapon tests in 1963 and the United Nation's Outer Space Treaty (UNOST) in 1967 were interpreted almost *verbatim* by Ottawa, and led to the removal of DRB control from most of Canada's space projects. The first Trudeau government saw no distinction between the militarization of space (placing military space assets in orbit) and the 'weaponization' of space (placing weapons in orbit), and moved quickly to deprive Canada's military of any space assets or capability. In 1968, the government withdrew financial support from most defence space projects, preferring instead to concentrate its resources on the development of a domestic satellite communications system. The difficulty with this strategy was that, at the time, Canada simply lacked the industrial capability to support such a project.[4] Meanwhile, the transition from a large defence economy to a civil-social-oriented economy during the early 1970s meant that DND alone simply could not afford expensive space technology, and government policy denied it any significant support from the civilian sector. The schism left the

national space programme as nothing more than a struggling, commercially-oriented, internationally-dependent civilian enterprise.[5]

Between 1970 and 1986, Canada was not making its own defence space strategy, even though it was more than capable of doing so. DND had very limited control over any space assets, and relied heavily on American and allied space support for everything from strategic intelligence to tactical communications. No official DND space policy existed, and Canada's defence policy gave no official direction. Although the 1971 *White Paper on Defence* placed the surveillance of Canada at the top of its defence policy priorities, little consideration was given to fulfilling this role with respect to space assets even though the country's air and maritime assets could not effectively carry out the task.

CANUS defence space cooperation became increasingly limited as the foreign policies of the two countries moved in opposite directions. The majority of Canada's space projects were not designed with the intention of contributing to collective security and deterrence, but rather to meet more pressing national priorities. While the US planned new space programmes within the context of threat, economic constraints, and national security, Canada planned its space programmes within the context of industry, economic parity, and national interest. The distinct nature of each approach highlighted the difference of priorities for space development between the two countries.[6] Unfortunately, Canada simply lacked the indigenous assets to fully develop its space programme, and relegated space industries to niche sectors, economic parity to short-term gains, and national interest to immediate benefits over long term evolution.


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Testing the Communications Technology Satellite prior to launch at the David Florida Labs.

In 1981 NORAD was renamed from 'air' to 'aerospace' to reflect the organization's increased roles in detection, tracking, and monitoring of space activities. However, these and other aspects of the new NORAD clearly demonstrated the evolving dichotomy between Canadian and American space capability in the 1980s. While the US forged ahead in its application of space technology to defence programmes, Canada's limited capabilities were increasingly marginalized. When the American government announced its SDI programme in 1983, Canadian-American defence space relations were all but completely severed. While SDI was vehemently opposed in Canada, it had a positive effect on the country's defence space policy. Essentially, SDI initiated a strong policy debate that eventually led to the re-establishment of a defence space programme in Canada in 1986. Though very modest, the DND space policy issued in 1987 was the first plug in a very large hole that had existed in Canadian defence policy for almost two decades.

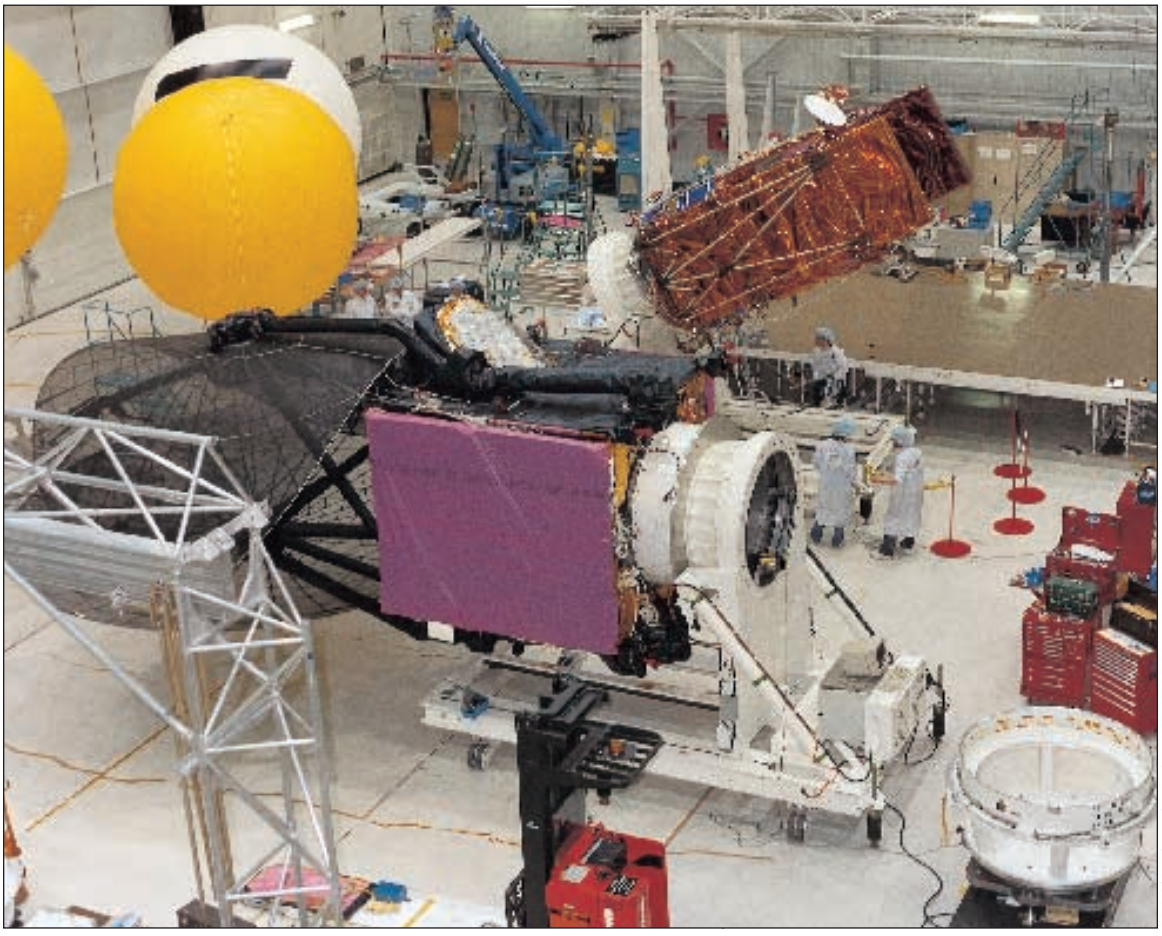
The destruction of the American space shuttle *Challenger* in January 1986 also had serious implications for Canada's space programme. After the maiden flight of the Space Transportation System (STS) in 1981, shuttles increasingly became the staple means of United States access to space. In 1982, President Ronald Reagan officially designated the STS as the primary launch vehicle for the American national security programme.[7] In the hopes that the shuttle would fly twenty-five missions a year, the United States halted the production of Expendable Launch Vehicles (ELV) and phased out its remaining stock. When the *Challenger* was destroyed, the US was unable to redirect its payloads to other launch systems. The American military was literally denied access to space for over two years. In turn, Canada, completely dependent on American systems, was also denied the same access to space.

Despite the rapid alteration of the global strategic environment in the late 1980s, and a succession of external conflicts and internal DND strife in the early 1990s, Canada successfully formulated both a DND space policy and an organization with which to implement it. In July 1989, the Chief of Review Services (CRS) tabled a comprehensive report on Canada's defence space programme that initiated a series of policy recommendations over the next several years.[8] A Space Defence Working Group (SDWG) was formed, and in 1992 it tabled its first comprehensive space policy. During the next four years, the SDWG developed plans and planning guidance documents, which among other items highlighted the requirement for an indigenous military space-based capability.[9] In 1996, the management structure was then reviewed which resulted in the creation of the Directorate of Space Development (D Space D) in 1997 under the Deputy Chief of the Defence Staff (DCDS). Since its institution, the Directorate has developed a number of initiatives ranging from CANUS space cooperation to the Joint Space Project (JSP), an omnibus programme including several different space capabilities. Its mandate included the facilitation of space activities in DND and the Canadian Forces, and strategic planning for future development. Though seemingly straightforward, the Directorate has been faced with a number of military and politically sensitive challenges.

CURRENT POLICY FRAMEWORK AT THE CROSSROADS

While the 1994 *White Paper on Defence* clearly identified the necessity for a multi-purpose combat-capable force, it was reluctant to identify that such a force would depend heavily on an active military space policy and force development. While mentioning space as an important factor in the future security environment, the *White Paper* provided little direction on the development of Canada's defence space programme and made no specific commitments towards space-related military projects. The myopic blurring of the militarization and weaponization of space was still evident in Canada's defence policy of the mid-1990s, and it continued to hinder the advancement of, among other things, the very multi-purpose force that it wanted to provide. Only recently has the attitude within the government changed.

The many improvements that were made to Canada's defence space programme between 1987 and 1997 were the result of necessity, not vision. With more deployments to zones of conflict throughout the globe in the last decade than during the entire period from 1954 to 1989, it would have been impossible for Canada to carry out most of those missions without space support of one kind or another. The massive troop deployments of the 1990s highlighted the immediate requirement for adequate indigenous Military Satellite Communications (MILSATCOM). The increased employment of precision guided munitions demonstrated a growing dependence on accurate strategic intelligence, satellite imagery, and satellite navigation and positioning. Also, the general increase in littoral operations by naval forces placed a greater dependence on accurate



CRC Photo by: John Brebner, 95-1612

Canada's RADARSAT has been a critical asset for gathering strategic intelligence in support of DND operations.

meteorological and geodetic capabilities. As the government continued to commit Canadian Forces across the world, more and more space support was necessary. Reluctantly perhaps, the Liberal government accepted that the militarization of space was a long-existing fact that had to be publicly supported if it was to meet other foreign policy goals. The creation of D Space D was a sign of that acceptance.

CRC Photo by: John Brebner, 90-1371

Canada currently has highly developed ground segments at home for recieving satellite data.

Only in the last five years, after the solidification of Canada's defence space infrastructure, has DND been able to look ahead to space 2020 and beyond. A number of challenges have been readily identified, all of which have a serious impact on future policy development. First and foremost, Canada's current defence space policy still requires a great deal of definition and elaboration. The rapidity of evolution and change in space technology requires a policy that reflects this continual change. Canada's defence space policy has been updated only every five or six years, which has often left it outdated and unable to effectively direct defence planning guidance and force development. This has not only affected indigenous space development but also cooperative defence space activities, particularly with the United States. By contrast, American defence space policy has received continual attention and yearly modification to reflect new technology developments.

Second, the constant fiscal pressure placed on the defence space programme has made it necessary to pick and choose carefully in the course of its development, ensuring certain core capabilities while yet trying to meet several objectives. This modest effort has placed Canada in the precarious position of relying heavily on foreign space assistance to meet its defence needs. The majority of that assistance has come from the US, but Canada's limited budget for defence space has put considerable strain on that relationship. The relationship has been further strained from time to time when related defence issues have driven a wedge between the policies of the two countries.

Third, the differences between Canada and the US in defence policy has created many challenges in building the space cooperation on which DND has come to rely. The political divergence has influenced many areas of cooperation; the SDI of the 1980s and its follow-on programmes were but one example. Canada would, of course, never have unfettered access to all American space programmes no matter how aligned its policy were to become. The US has in general pared down Canadian access to American data over the last two decades, and US security interests will undoubtedly continue to deny Canada access to some of its lead systems and certain intelligence, surveillance, and reconnaissance data. Such restrictions may provide the impetus for Canada to develop its own indigenous capabili-

Photo by: Capt. James Matejuk, MCD

RCD troop making use of the INMARSAT Communications System during recent operations in Bosnia. The portable uplink sits atop the rear vehicle.

ties in certain fields, and offer niche capabilities lacking in American programmes as leverage towards obtaining otherwise restricted data.

NATIONAL MISSILE DEFENCE

A recent headline published on the cover of *Jane's Defence Weekly* read, "Forget test failure – it's Canada threatening NMD success".[10] Though the quote was later discredited as having been taken out of context, it was indicative of the perception that Canada's defence space programme has suffered impotency and the inability to participate actively in the space-related defence of North America and Canada-US defence interests. When NMD has been added to NORAD, Canada should be all but useless in North American defence. Such attitudes are not recent phenomena, and often stem from the fact that those making policy decisions often have little or no knowledge of the facts. A recent Senate Committee on Defence and Veterans Affairs (SCONDVA) hearing held on 29 February 2000 clearly demonstrated this point.[11] During his presentation, the senior Canadian officer serving at NORAD, Lieutenant-General George Macdonald, had to explain repeatedly to the committee panel exactly what NMD was capable of doing. General Macdonald received subtle expressions of surprise when he clarified the fact that NMD was only a limited response to attack, and that a hundred intercept missiles may successfully engage only up to twenty targets. The expressions of surprise were not so subtle when he pointed out that under the current command structure, as Deputy Commander-in-Chief NORAD, he would be responsible for firing missiles if the Commander-in-Chief was away from NORAD or incapacitated in any way during a missile attack. He went on to emphasize that NMD was simply an extension of ballistic missile warning (in which Canada actively participates), and that the segregation of Canadian Forces from NMD activities while remaining a member of NORAD was not feasible. If Canada was to choose not to participate, the functionality of NORAD headquarters would have to be fundamentally reconsidered.

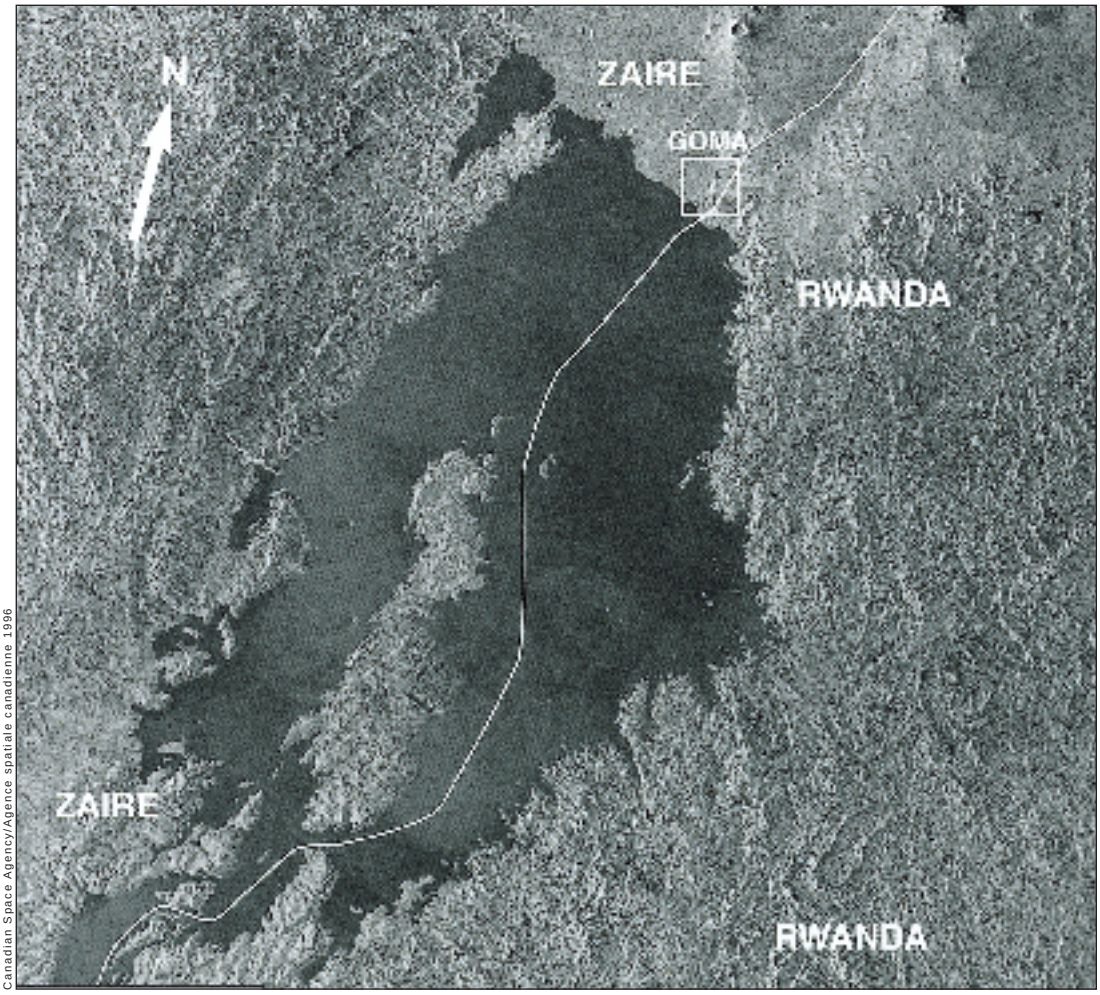
CHOOSING THE RIGHT FORK

Despite any contingency planning, the fate of Canada's defence space programme rests heavily in the hands of the politicians, so it is there that the first match must be won. It is unlikely that the US will make any concession towards Canada concerning the integration of NMD into NORAD. Therefore, Canadian participation, even if symbolic in nature, may be a wise step towards ensuring the longevity of the agreement. At the very least it may assuage American concerns that Canada is simply a dead weight in North American defence that should be left to sink on its own. As future space technologies all but eliminate Canada's traditional geographic situational importance, Ottawa will have to rely on providing a share of the security burden rather than relying on the outdated American involuntary guarantee of protection.

Canada must learn from its space past and respond effectively to its space future. Experience has demonstrated that although unable and unwilling to create a completely autonomous space programme, Canada certainly has the potential for providing certain key space assets in return for status as a junior partner to the US. While the reality of the present situation demands that Canada continue to pursue a cooperative strategy, the CANUS relationship should not subvert our own national efforts to improve various space capabilities. Simply for the sake of sovereignty protection (the number one priority in the *Defence White Paper*), Canada must endeavour to develop some indigenous strategic space assets that will provide unfiltered intelligence products to the decision-makers in Ottawa.

Present and future decisions regarding Canada's defence space programme must keep in mind the aims outlined in the 1994 *White Paper* and the current Canadian foreign policy agenda that has been commonly referred to as the "Axworthy Doctrine". As 'human security' becomes increasingly central to Canada's foreign policy, the Canadian Forces will undoubtedly be tasked to provide ever-increasing numbers of forces around the world. Space support will constitute an adjunct role in these missions, linking forces to their Commander, and the Commander back to decision-makers in Ottawa. Other space assets will be essential to ensure that Canadian troops can continue to live, move and fight in any theatre of conflict.

The civil-military duality of Canada's space programme must also be taken into consideration. Canada currently has no satellites deployed which carry out solely military functions. Rather, Canada uses all of its space assets as a single strategic resource, which, when necessary, may provide support to military operations. For example, both the Search and Rescue Satellite (SARSAT) and Canada's own Radar Satellite (RADARSAT) have provided crucial space support to the military. However, despite this obvious overlap of purpose, Canada has no national space vision or policy, and the existing civilian and defence space policies are anything but complimentary or comprehensive.[12] Most recently, gaps and divisiveness between the defence and civilian policy sectors led to serious difficulties over the development and deployment of RADARSAT-2, and ultimately led to Canada awarding contracts originally intended for Orbital Sciences Corporation in the US to Alenia Aerospazio of Italy. Though the choice was reasonably defended by the Canadian Space Agency, the US saw it as a sleight and, in turn, other space cooperation issues suffered. Defence would do well to remind the civilian sector that such actions have a strategic impact on both programmes, and what effects one will almost always affect the other. With a unified, overarching space policy architecture, decisions should be better coordinated in the best interests of both civil and defence programmes. In return, improvements to defence capabilities will likely result from an equal advance made in Canada's civilian space sector. The two must work together.



Canadian Space Agency/Agence spatiale canadienne 1996

RADARSAT imagery capturing up-to-date information on refugee movements during Operation Assurance, 1996.

LOOKING AHEAD

Despite many challenges and hard choices ahead, Canada still has the opportunity to regain much of the space lost in the last three decades. Decisions must, however, be based on a vision looking ahead twenty years, not just two or three. Second, goals must be clearly defined. The current defence space policy is not sufficiently detailed to provide the necessary guidance, and should be developed more fully to meet selected aims. Third, once a strategy is chosen (and one assumes that strategy will coincide with the aims of the *White Paper*) it must be followed. Too often Canada has chosen a defence policy and force development plan only to have it flounder when it fails to respond flexibly to Canada's evolving foreign and security policy. Space is literally too expensive to make such errors, so projects must reflect the long-term vision of D Space D and DND. Finally, international cooperation is essential to success. Canada simply cannot afford to drive any wedges between itself and its American ally; therefore, future CANUS cooperation must demonstrate Canada's willingness and ability to act with its partner. Canada's defence space programme may be standing at a crossroads, but this time it has a map, GPS, and an American liaison officer to show it the way. There has been no better time to act.

NOTES

1. Canada completely demilitarized its space programme between 1967 and 1971 as a result of the dramatic changes in Canadian foreign and defence policy brought about by the Trudeau government. When SDI became an issue of concern for Canada, the realization was made that the Department of National Defence had no military space expertise or otherwise to even passively monitor the issue, let alone act on it. The result was the rebirth of a military space policy and the inclusion of space as a factor in the 1987 *White Paper on Defence*.

2. For a comprehensive overview of Canada's space programme to 1967, see Chapman, J.H. *Upper Atmosphere and Space Research Programmes in Canada.* (Ottawa: Science Secretariat and Privy Council Office, 1967); for general defence science projects see also Goodspeed, D.J. *A History of the Defence Research Board* (Ottawa: Queen's Printer, 1958).

3. Historically, Canada has been very involved in ballistic missile research. For more on Canada's ballistic missile projects, see Godefroy, A.B. *The Northern Spear: Ballistic Missile Development in Canada 1945-67* (forthcoming); also see Chapman, J.H. *Upper Atmosphere and Space Research Programmes in Canada* (as above); anon. "DRB Pioneers Missile Study", *Canadian Army Journal.* Vol.15.3 (Summer 1961), p. 54; DRB. "Rockets Feature 1958 Experiments", *Canadian Army Journal.* Vol.13.1 (January 1959), pp. 17-21; and DRB. "Defence Research Successful in Rocket Nose Cone Firing", *Canadian Army Journal.* Vol.13.1 (January 1959), pp. 22-24.

4. The publication of a *White Paper* on domestic satellite communications in 1968 by the Canadian Treasury Board President, C. M. "Bud" Drury, simply did not cover the question of construction capability and industry support. The move led to serious operation and maintenance costs during follow-on communication satellite projects. See Drury, C.M. *A White Paper on a Domestic Satellite Communications System for Canada* (Ottawa: Queen's Printer 28 March, 1968).

5. Kirton, J. "A Renewed Opportunity: The Role of Space in Canadian Security Policy", *Canada's International Security Policy* (Scarborough: Prentice Hall Canada, 1995), pp. 113-114.

6. Godefroy, A. B. *From Alliance to Dependence: Canadian-American Defence Cooperation Through Space, 1945-1999.* (Kingston: Royal Military College MA Thesis, n.p., 1999), p. 64.

7. USA. Government NSDD-42 dated 4 July 1982.

8. Canada. DND. *A Canadian Military Space Strategy* (Ottawa: DND CRS, 1989).

9. Canada. DND. *Space Policy* (Ottawa, DND 1992), pp. 1-3.

10. Seigle, G. "US NMD Lacks Approval From Canada, NORAD Deputy Says," *JANEs Defence Weekly,* Vol.33, No.4 (26 January 2000), cover and p. 5.

11. Canada. SCONDVA hearing on National Missile Defence, Hon. Pat O'Brien M.P., Chair of Committee Hearing (Ottawa, 29 Feb 2000).

12. See Canada. DND. *Department of National Defence Space Policy* (Ottawa: DND, 14 September 1998), and Canada. Canadian Space Agency (CSA). *National Paper: The Canadian Space Programme* (Ottawa: CSA, 19 July 1999).