Canadian Arctic Operations, 1941-2015

Lessons Learned, Lost, and Relearned

Edited by Adam Lajeunesse and P. Whitney Lackenbauer

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THE GREGG CENTRE
FOR THE STUDY OF WAR & SOCIETY
UNIVERSITY OF NEW BRUNSWICK

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Acronyms

ACS	Arctic Capabilities Study
AECB	Atomic Energy Control Board
AFB	Air Force Base
AIS	Automatic Identification System
ALCE	Airlift Control Element
AOR	Area of Operation
AOR	Auxiliary Oiler Replenishment Vessel
ARCG	Arctic Response Company Group
ASW	Anti-Submarine Warfare
ATGHQ	Air Transport Group Headquarters
BFDS	Bulk Fuel Delivery System
BSP	Basic Security Plan
CAF	Canadian Armed Forces
CANDISS	Canadian Arctic Night & Day Imaging Surveillance System
CBSA	Customs and Border Service Agency
CCG	Canadian Coast Guard
CFB	Canadian Forces Base
CFNA	Canadian Forces Northern Area
CFS	Canadian Forces Station
CGS	Chief of the General Staff
CIC	Canadian Immigration and Citizenship
CJOC	Canadian Joint Operations Command
CMHQ	Canadian Military Headquarters
CO	Commanding Officer
CRPG	Canadian Ranger Patrol Group
DoD	Department of Defense, United States
DEW	Distant Early Warning
DFATD	Department of Foreign Affairs and International Trade
DHH	Directorate of History and Heritage
DIAND	Indian Affairs and Northern Development
DND	Department of National Defence
DRDC	Defence Research and Development Canada

EO	Electro-Optical
ADS-B	Automatic Dependent Surveillance – Broadcast
DRE	Defence Research Establishment
DREA	Defence Research Establishment - Atlantic
DREP	Defence Research Establishment - Pacific
ECWCS	Extreme Cold Weather Clothing System
EO/IR	Electro-Optic/Infra-Red
FOC	Full Operating Capacity
FWSAR	Fixed-Wing SAR
GNU EMO	Government of Nunavut Emergency Management Office
GSO	General Staff Officer
HF	High Frequency
HQ	Headquarters
ICAO	International Civil Aviation Organization
ICBM	Inter-Continental Ballistic Missile
ICSAR	Interdepartmental Committee on Search and Rescue
IMO	International Maritime Organization
IOC	Initial Operating Capacity
IRU	Immediate Reaction Unit
JAWS	Joint Arctic Weather Station
JTFN	Joint Task Force North
LAC	Library and Archives Canada
LFAS	Land Force Arctic Strategy
LOSV	Light Over Snow Vehicles
MAJAID	Major Air Disaster
MAMS	Mobile Air Movements Sections
MCDV	Maritime Coastal Defence Vessel
MOG	Maritime Operations Group
MoT	Ministry of Transport
MRS	Microwave Ranging System
MSF	Mobile Striking Force
NAST	Nuclear Accident Support Team
NATO	North Atlantic Treaty Organization
NCO	Non-Commissioned Officer
NDHQ	National Defence Headquarters

NORAD	North American Aerospace Defence Command
NORPLOY	Northern Deployment
NSP	National Search and Rescue Program
NSS	National Search and Rescue Secretariat
NWTDP	Northern Watch Technology Demonstration Project
OGD	Other Government Departments
POL	Petroleum, Oil, and Lubricants
PPCLI	Princess Patricia's Canadian Light Infantry
R22eR	Royal 22nd Regiment
RCAF	Royal Canadian Air Force
RCC	Rescue Coordination Centres
RCMP	Royal Canadian Mounted Police
RCN	Royal Canadian Navy
RCR	Royal Canadian Regiment
SAR	Search and Rescue
SARTEC	Search and Rescue Technician
SLBM	Submarine-Launched Ballistic Missiles
SOSUS	Sound Surveillance System
SRR	Search and Rescue Regions
SRU	Search and Rescue Units
STC	Special Training Centre
UN	United Nations
USAF	United States Air Force
USN	United States Navy
VHF	Very High Frequency
WoG	Whole of Government

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Introduction
Lessons Learned, Lost, and Relearned

Adam Lajeunesse and P. Whitney Lackenbauer

The Arctic is back on the Canadian radar. Political, commercial, and strategic interests abound in a region being transformed by climate change, the prospect of expanding resource development, and other global forces. Melting ice and increasing accessibility mean more actual and potential activity, conjuring visions of new transarctic transit routes, new security threats, and new economic opportunities. In light of these changes, the Canadian Armed Forces (CAF) have been tasked with playing a more prominent and visible role in the region.[1]

From one perspective, today's Arctic operations represent an awkward departure for a military that spent the 1990s deploying on peacekeeping/peacemaking missions around the world and the 2000s engaged in combat operations in Afghanistan. When the CAF lightened its Arctic operational footprint during the 1990s, a generation of military personnel lost its appreciation for the unique rigours and requirements of northern operations. Since the mid-2000s, CAF deployments to the Canadian Arctic have rescuscitated capabilities and reacquired requisite skill-sets through a slow, deliberate process.[2]

The Strategic and the Operational

From a strategic perspective, northern deployments appear to be a relatively straightforward requirement for the CAF. Canada needs a northern military presence and adequate capabilities to assist other federal, territorial, and provincial government departments in carrying out their mandates, to monitor emerging threats, and to project power anywhere within sovereign Canadian territory—a form of deterrence to would-be adversaries.[3] At the strategic level, a government defines its national policy and develops a plan to achieve its objectives. By extension, most scholarship on Arctic sovereignty and security seeks to define and analyze these high-level 'strategic' requirements. Within this context, what exactly does, can, or should the military do in the Arctic to enhance Canadian security and assert our sovereignty?

In April 1969, Erik Wang, an international lawyer working for the Department of External Affairs (now Global Affairs Canada), commented that "it is difficult to see what expanded role the Canadian Armed Forces could usefully play in support of Canada's claim to sovereignty over water between the Arctic islands." The problem of sovereignty in the Arctic "is not a military problem," he concluded. "It cannot be solved by any amount of surveillance or patrol activity in the channels by Canadian forces." There had to be a firm military rationale for CAF involvement in the North, not "presence for the sake of presence." To develop a role merely to satisfy the "optical demands" of political sovereignty "would be to build on shifting sands.... It would not be long before somebody noticed that one visit of the Governor General, accompanied by an enthusiastic press corps, can provide a sovereign presence to a remote area much more effectively and much more cheaply than 100 [Canadian Armed Forces] surveillance overflights."[4] In the end, historians have been critical of governments that turned to the CAF as a symbolic instrument simply designed to "show the flag" in support of Canada's sovereignty rather than providing it with meaningful, practical roles.[5]

Canada's Arctic strategy has shifted over the decades and between governments, in part reflecting changes in military technology and simple differences in perceptions. There was a major difference in focus, for example, between Prime Minister Pierre Trudeau's 1971 white paper *Defence in the 70s* and Prime Minister Brian Mulroney's 1987 *Challenge and Commitment: A Defence Policy for Canada*. According to the Liberal government's analysis, the principal threat to the Arctic came from environmental degradation and violations of sovereignty.[6] In the Mulroney era, these concerns were replaced by fears of Soviet bombers and submarines using the Arctic as either a cruise-missile launch position or a thoroughfare to NATO's Atlantic sea lines of communication. Under Trudeau, the Canadian Armed Forces were primarily tools of sovereignty assertion; under

Mulroney they also were envisaged as combat forces that could be called up on to engage an aggressive Soviet adversary.

Although strategic analyses are important, they are only one layer of the CAF's history in the region. This volume addresses high-level policy issues when necessary, but it deliberately focuses on the under-examined *operational* and *tactical* aspects of the CAF's roughly eighty years of Arctic engagement.

Military activity at the operational level involves the actual employment of forces in pursuit of strategic objectives—how forces are trained for deployment to the Arctic, the nature of those deployments, and their sustainment. Accordingly, this level of activity encompasses planning, logistics, and the conduct of missions. The tactical level refers to the decisions and actions taken during operations. How a company chooses to move across certain areas or how a ship maintains a safe watch for ice, for instance, reflect tactical problems and thinking.

The tactical and the operational are closer to one another than either is to the strategic level, since these two lower levels of activity involve the employment of forces, compared to the conceptual nature of strategic thinking. In many circumstances the tactical and operational overlap, making it difficult to separate the two. For instance, a northern exercise involving soldiers deployed onto the land will involve considerable tactical learning as those men practice survival, small-scale movements, and even combat. The organization of the supply services that maintain them are more properly considered as operational—even while the delivery of those supplies may be tactical. Because the two are closely linked, they are treated within this volume as one continuum of activity and learning.

Towards an Operational History

The long history of CAF operations in the Arctic stretches over eight decades and encompasses land, sea, and air activities. Although this volume does not purport to provide a complete history, it offers a robust overview of operational challenges that the CAF have faced, examine how they were addressed, and chart the military's learning (and forgetting) processes over time. Accordingly, we invited academic and military experts to track and analyze the evolution of the CAF's Arctic interests and capabilities, the armed forces' ability to learn from their activities, and to apply this knowledge (where appropriate) to the current context. Ironically, while we intended this volume to chart the military's learning process, it also reveals cycles of gaining and losing institutional knowledge and attendant capabilities as perceived interest in Arctic sovereignty and security has waxed and waned.

The knowledge and experience needed to operate safely and effectively in the Far North are not easily gained and, as the chapters in this volume demonstrate, are easily lost if not practiced or exercised regularly. As strategist Ken Eyre observed, during times when politicians and defence planners perceived the Arctic to be of strategic importance (such as the 1950s and 1980s), or when Canadian sovereignty was seen as threatened (such as during the 1970s and 1980s), governments turned to the CAF to highlight Canada's presence and control in the region. The resulting deployments slowly built up the Forces' comfort level in the Arctic, leading to improved operational capability. Invariably, these surges of activity have been followed by periods of decline and inactivity as the original strategic, economic, or political catalyst that sent the CAF into the region dissipated.

During periods of disinterest and disengagement, the institutional knowledge developed during the previous surge faded while essential skills and equipment for Arctic operations were allowed to atrophy and rust out. When a new catalyst encouraged the federal government to call on the CAF to renew its northern role, the military had to re-learn its lessons and re-build its capabilities. The Canadian military's history in the Arctic is not a straightforward teleological narrative of progress and development, but reflects surges of activity when operational knowledge is gained, periods of decline when that knowledge fades, and subsequent surges when lessons must be re-learned.[7]

Surging (Slowly) into the Arctic[8]

When the young Dominion of Canada acquired the Arctic Islands in 1880, Ottawa officials held little real interest in acquiring these vast, and seemingly unproductive, lands. In 1874, "two apparently innocent requests" for mining concessions on Baffin Island set in motion the deliberations that led to the transfer. The Colonial Office in Britain, which was uncertain about the status of the Arctic islands north of the mainland, simply arranged to transfer "all British territories and possessions in North America, not already included within the Dominion of Canada, and all islands adjacent to any of such territories or possessions . . . (with the exception of the Colony of Newfoundland and its dependencies)."[9] Ottawa accepted its new holdings without much enthusiasm, leaving the details of administration for a later date. Facing no military challenges in the Arctic, and with national interest focused on the Great Plains across which the Canadian Pacific Railroad was laying the steel spine of a transcontinental nation, the federal government had no imperative to take action in its Arctic hinterland.

This Arctic apathy quickly turned to excitement in the final years of the nineteenth century as the Klondike Gold Rush sparked Canada's first sovereignty and security crisis in its northern territories. The small Yukon Field Force, formed in Ottawa in 1898 with 203 members of Canada's paltry Regular Force, went north to Fort Selkirk and Dawson in the Yukon in an "aid to the civil power" capacity, assisting the Northwest Mounted Police in maintaining law and order during the rush. It returned south two years later, and the Dawson Rifles of Canada (a non-permanent militia unit formed in their place) disbanded five years later, leaving the Canadian North without any military presence once again.[10]

In the early twentieth century, official missions explored the Arctic and collected customs duties and licensing fees from whalers—a modest assertion of Canadian legal authority. By the interwar years, Royal Canadian Mounted Police (RCMP) posts dotted the northern landscape, suggesting a continuous (if sparsely sprinkled) state presence.[11] After Canadian negotiators reached agreements with Denmark and Norway to settle terrestrial sovereignty claims, and American explorers fell into line and complied with Canadian regulations, worries about Canada's legal claim to its Far Northern lands and islands dissipated. More importantly, simple frozen geography seemed to preclude any foreign military threat.[12]

Nevertheless, the Canadian military made its first direct contributions to northern development following the First World War. The fledgling Royal Canadian Air Force (RCAF) began the enormous task of taking aerial photographs to support the mapping of the entire North. Military fliers and mapmakers with the Army Survey Establishment (now the Canadian Forces Mapping and Charting Establishment) thus helped to make the North legible for development and for the extension of state control.[13] The RCAF also conducted the first aerial ice reconnaissance in Davis and Hudson Straits in 1927-28, studying ice, weather, and navigation conditions along the new grain route from Churchill on Hudson Bay to the ports of Europe, and establishing elementary navigation aids and flying bases. This new role fit with the RCAF's interwar role as the government's "civil air company," transporting officials into remote regions, blazing new air-mail routes, and flying sick and injured trappers, traders, and Aboriginal people from remote outposts to southern hubs where they could get medical attention.[14] For the Army, however, there was little direct involvement north of 60°.

In 1923, the federal government turned to the military to directly support national development when the Royal Canadian Corps of Signals opened the first stations of the Northwest Territories and Yukon Radio System in the Yukon. The Department of the Interior covered the costs and the Department of National Defence (DND) jumped at the opportunity to play a practical role (and received funding) in an austere budgetary environment. This radiotelegraphy system, using high frequency (HF) and low frequency (LF) radio communications, allowed northerners to send morse code messages down to Edmonton, then into the telegraph system serving all of Canada. "The new outlet provided by radiotelegraph station was immediately utilized by banks, mining and steamship companies and the general public, as well as by Government agencies," the official Signal Corps historian noted. "All were loud in their praise of the rapidity with which they could now transact business with the 'outside' as compared with the weeks and sometimes months it had taken previously."[15] All told, the Signal Corps provided an essential service to the northern economy and civil society, eventually extending the system to Herschel Island, Fort Simpson, Fort Smith, and Baker Lake.

The onset of the Second World War in 1939 disrupted the military's development approach to northern operations while focus naturally shifted to the war overseas. Most importantly, the conflict forced Canada to seriously reconsider the Arctic as a potential military theatre. This process began in the European Arctic, leading to one of Canada's least known military operations: the raid on the Spitsbergen (Svalbard) archipelago in August and September 1941. There, Brigadier A.E. Potts, the officer commanding 2nd Canadian Infantry Brigade, led a force of Canadian, British, and Norwegian troops to destroy the coal mines owned by Norwegian and Soviet interests on the islands. The force then evacuated Russian and Norwegian foreign nationals, taking the former to the Soviet Union and the latter to Britain. In Russia, ships picked up French soldiers who had been held as prisoners of war by the Soviets until the latter joined the Allied cause after the Nazi invasion of Russia. As Ryan Dean and Whitney Lackenbauer reveal in Chapter One, Operation *Gauntlet* represented Canada's first expeditionary operation in the Arctic and the force executed its mission with complete success. It also "yielded general lessons related to the value of specialized training and representation from appropriate functional trades, unity of command, operational secrecy, and deception," while providing "a boost to Canadian morale" at a frustrating time during the war.

The Second World War also marked the emergence of the Canadian North as a military frontier. In his 1940 book on *The Military Problems of*

Canada, historian C.P. Stacey focused on the vulnerability of the Atlantic and Pacific coasts, dismissing the Arctic owing to "those two famous servants of the Czar, Generals January and February, [who] mount guard for the Canadian people all year round."[16] As he and other commentators noted, reciprocal Canadian-American defence pledges in the late 1930s confirmed the unity of Canadian and American continental defence interests. As long as decision-makers considered Canada to be a "fireproof house," insulated from European and Asian conflagrations by distance and isolation, the issue of continental defence remained academic rather than practical. Immediately after the invasion of Pearl Harbor, however, the Americans grew worried about overland and air routes to Alaska and took action to defend their northernmost territory. Geography dictated that they needed to run transportation arteries through the Canadian Northwest to connect Alaska to the lower 48 states by land, and Ottawa quickly acceded to agreements with Washington to build a highway and an oil pipeline in the region. The countries also extended Northwest and Northeast Staging Routes through the Canadian North to provide aerial lifelines to the Soviet Union and the United Kingdom. When American soldiers swept into the Canadian North to complete these tasks, Prime Minister William Lyon Mackenzie King became paranoid that these American-led developments, taken in the name of military security, might undermine Canadian sovereignty. When American plans proceeded ahead of Canadian permissions and activities on the ground seemed to lack sensitivity for Canadian concerns, the King government took political steps to "re-Canadianize" the Arctic. The rationale was not defence, but safeguarding sovereignty from infringements by its wartime ally and continental neighbour. Although the Americans pulled out of the region as promised at the end of the war and transferred ownership of permanent facilities to Canada, senior officials in Ottawa took note of the interdependency between security and sovereignty.[17]

The First Surge: 1945-1960

During the later stages of the Second World War, the Canadian Army began to mount exercises designed to test equipment and capabilities in the Canadian North. As Whitney Lackenbauer, Peter Kikkert, and Ken Eyre explain in Chapter Two, these activities continued through the first decade of the Cold War and yielded valuable "lessons learned" that informed the planning and execution of northern operations by identifying isolation, vast distances, lack of transportation infrastructure, limited mobility, and environmental conditions as key constraints. Furthermore, these historians document the psychological terrain—"intangible" human factors such as morale, fear, and ignorance—that also shaped northern operational experiences, imposing a heightened responsibility on junior officers and NCOs to ensure unit effectiveness. "Over time, the lessons derived from northern training and exercises paid dividends," these authors note, allowing the Canadian Army to make "great strides in preparing to face the challenges of Arctic and Subarctic warfare." In an early Cold War context, these land force capabilities seemed both applicable and necessary.

The Arctic, as the most likely attack route between the strategic bomber forces of the United States and the Soviet Union, came into its own as a strategic theatre during the Cold War. Polar projection maps revealed how Canada's strategic situation had changed when the US and the USSR became geopolitical rivals. Arctic defences were inextricably linked to American security and, almost immediately after the Second World War ended, the US military pushed for access to Canada's Arctic to build airfields and weather stations. Canadian officials grew apprehensive and cautious in authorizing new installations in the Arctic, and journalists began to talk about a looming sovereignty crisis. Several scholars cite this process as evidence of an American willingness to encroach on Canadian sovereignty to achieve US security objectives,[18] while others highlight the close cooperative nature of these joint defence projects.[19]

Bernd Horn discusses in Chapter Three how this shifting strategic situation called for a new Canadian emphasis on the North: not simply to counter the potential Soviet threat, but to ensure that the Canadian state exercised a level of control in a region where the United States was establishing an increasing, and uncomfortably visible, presence. In pursuit of the government's sovereignty and security objectives, the Canadian Army established the Mobile Striking Force (MSF), an air-mobile brigade group designed to deploy quickly and effectively across the North if and when it was needed. This strategy did not translate easily into operational capability, however, and Horn highlights the Army's difficulties in securing adequate resources for this brigade group and the gulf that opened between the government's objectives for the MSF and what it was actually capable of delivering.[20] The challenges inherent in operating along the lines suggested for the Force are well illustrated in Chapter Four, which reproduces an official report prepared in 1947 recounting the details of Operation *Canon*. This Army/Air Force mission to rescue an injured missionary at the northern tip of Baffin Island showed the logistical and environmental problems of deploying and sustaining even a small group of men in the High Arctic.[21]

The difficulties encountered by the Army in the immediate postwar years were mirrored by the slow pace of naval acclimatization. In Chapter Five, Richard Mayne examines Royal Canadian Navy (RCN) and RCAF Maritime Air operations in the early postwar Arctic, when these services attempted to surmount enormous environmental and budgetary challenges to develop a northern capability. These operations were hampered by ice, weather, navigational issues, fuel shortages, and warships that were clearly unprepared for northern conditions.[22] Several challenges that Mayne notes are dramatically revealed in a 1956 article from the *Crowsnest* magazine, reproduced as Chapter Six, which recounts HMCS *Labrador's* operations in the Northwest Passage as it battled ice, weather, and poor infrastructure while supporting the construction of defence projects and charting the emerging northern sea-lanes. The *Labrador* represented a unique foray into icebreaking for the RCN and, during its brief military service, served as the armed forces' primary platform for maritime Arctic research, exploration, and resupply.[23]

Paralleling the Navy's advance into the North was a massive effort by both Canada and the United States to enhance continental defence by harnessing the region's isolation and vastness to provide strategic defence-in-depth. As the Cold War heated up in the 1950s, the Americans led the effort to construct air defence systems to protect the continent's northern frontiers—or, more precisely, to secure advance warning to protect the deterrent and thus the industrial heartland of North America.[24] "The ghastly one aircraft, one bomb, one city algebra of the nuclear age made it inevitable" that resources would have to be dedicated in the North," Eyre has observed. "No longer was the North a strategic barrier." He hastened to add, however, that "neither the United States nor Canada looked on the North as a *place* to be protected because of some intrinsic value. Rather it was seen as a *direction*, as an exposed flank."[25] From the Pinetree Line along the 50th parallel to the Mid-Canada Line, a Canadian-funded radar "fence" along the 55th parallel, the warning network extended progressively northward.[26]

The most northern (and the most famous) was the Distant Early Warning or DEW Line, a mega-project staggering in both its scale and the speed with which it was constructed. "Stretching for 2,500 miles across the Arctic, it required the biggest task-force of ships assembled since the invasion of Europe and the largest air operation since the Berlin airlift to take in the supplies," Department of Northern Affairs and National Resources official Charles Marshall trumpeted in a 1957 magazine article. "More than 7,000 men laboured through two short Arctic construction seasons to complete the work on schedule. Small wonder that many consider the project one of the most dramatic engineering achievements of our time and a milestone in the development of the Arctic."[27] The industrial logistics associated with the DEW Line were unprecedented, proving a tremendous boost to northern transportation and development. "Support and re-supply vitally affect the continuous, reliable, and economical functioning of the line," a 1955 report noted. "Because of the geographical location of the stations, all equipment, materiel, supplies, including POL (petroleum, oil, and lubricants) and sustenance items must be either flown in, delivered during the very short period of the summer by sea, or hauled laterally to a site by cat train operating in the winter season."[28] Convoys of up to 57 vessels and 15,000 men (in the case of the western sealift during the 1955 season) plied the Arctic waters,[29] charting the Arctic coastline and waterways through the southern islands of the Arctic Archipelago. Annual sealift operations established new sea routes, improved knowledge of ice conditions, and resupplied Arctic settlements.[30] As soon as the DEW Line construction was complete, however, the RCN turned HMCS *Labrador* over to the Department of Transport and got out of the icebreaking business, preferring to invest resources in blue water rather than ice water capabilities.

By the end of the 1950s, the military's surge into the North more generally began to peter out. The Soviets successfully tested their first intercontinental ballistic missile (ICBM) in 1957 and, by the mid-1960s, these missiles had replaced the long-range bomber as the USSR's principal delivery vehicle for its nuclear arsenal. While many of these ICBMs would still have flown over the Pole in the event of war, they could not have been intercepted like manned bombers. Instead, they were monitored by the US military's new Ballistic Missile Early Warning System (BMEWS), based outside of Canada. The effect of this shift was to remove the military importance of Canadian Arctic territory.

With the Arctic no longer a front line in a prospective Cold War superpower confrontation, both Canadian and American defence activity declined precipitously. The defence threats that had led to exercises like *Musk Ox* and motivated the establishment of the Mobile Strike Force and the DEW Line in the 1950s were largely gone, as were the political concerns surrounding American activity and Arctic sovereignty. As a result, the Canadian military withdrew nearly all of its forces, save for small groups at the four manned DEW Line posts and the radio stations at Alert and Inuvik.[31] Northern operations were stopped and the operational capabilities that had been developed over the decade began to atrophy.

The Second Surge: 1970-1990

For nearly ten years the region was largely ignored by defence planners—receiving only one passing mention in the 1964 White Paper on Defence.[32] The Arctic, it seemed, existed in a state of splendid isolation from the geopolitical tensions of the broader Cold War during the 1960s. The voyage of the privately-owned, ice-strengthened supertanker SS *Manhattan* and US Coast Guard Cutter *Northwind,* its accompanying icebreaker, through the Northwest Passage in 1969 changed the situation. Originally conceived of (and planned) as a friendly and cooperative voyage, this transit soon turned into a political crisis as Washington, seeking to preserve its position on the freedom of the seas, refused to request Canadian permission to transit.[33] Many Canadian academics and journalists interpreted this refusal as a challenge to Canadian sovereignty.[34]

In the years that followed, Pierre Trudeau's Liberal government sought to buttress Canadian sovereignty and strengthen its control in the region by ordering the military back into the Arctic. This second surge was politically motivated, and the CAF was the only government organization with the assets and expeditionary capability to project power into the region in a highly visible fashion. The Department of National Defence's 1971 White Paper, *Defence in the 70s,* highlighted the need for the Forces to be in the North and to be seen supporting sovereignty—an interpretation of national security requirements that emphasised soft power, environmental protection, and political sovereignty concerns.[35] To enact this vague policy, the CAF was tasked with developing the capabilities and equipment necessary to exercise effective control over the Arctic and to secure Canada's sovereignty over the waters of the Arctic Archipelago, which Canada began calling "historic internal waters," though had not yet explicitly declared to be Canadian through legislation.[36]

Previous scholarship has framed and discussed the larger strategic questions surrounding the use of the armed forces to reinforce what was essentially a political and legal dispute.[37] From an operational standpoint, the Forces' presence in the Arctic skyrocketed in the years following the *Manhattan's* voyage: from a small handful left at CAF facilities in the 1960s, to the annual deployment of thousands of soldiers on northern exercises, coupled with the renewal of naval expeditions, and a roughly 800% increase in air and naval surveillance and training flights.[38] For its part, the Army began its own regular training deployments in the "New Viking" exercises. The headquarters for the project was established at Churchill in facilities loaned to DND by the Department of Public Works. There, a small staff of instructors handled a new group of candidates every two weeks on a year-round basis.[39] Troops were flown into Churchill during the winter and to Resolute during the summer. From there the soldiers spent their first week studying the basics of Arctic proficiency, such as how to handle dangerous wind chills on open tundra and navigation in areas where magnetic compasses were of little use. The following week, the troops redeployed by air to more advanced patrol bases such as Baker Lake, Rankin Inlet, Frobisher Bay (Iqaluit), Coral Harbour, Sachs Harbour, and the weather stations at Mould Bay, Isaachsen, and Eureka. From those remote communities, groups would strike out on their own, traditionally covering 50 km during a week of advanced patrolling.[40] To coordinate much of this new activity, DND established a Northern Region headquartered at Yellowknife in May 1970, thus creating the largest military district in the world.

In the 1970s, the Army invested considerable funds reacquiring and expanding upon the basic survival, movement, and combat skills that it had developed during the 1950s. This process was arduous. In Chapter Eight, Captain Rick Michon (the editor of the military journal *Sentinel*) recounts a week-long deployment around Frobisher Bay (Iqaluit) in 1972. He details the harsh environmental conditions, communications problems, and difficulties encountered with logistics which plagued every Arctic deployment during the period. Michon also offers the reader a fascinating glimpse into the CAF's tactical abilities and operational intent for northern combat at that time. Despite the pronounced combat dimension to northern training exercises through to the 1980s, the CAF still supported a broad assortment of government objectives in the North.

Chapter Nine narrates a lengthy Search and Rescue (SAR) operation in 1972, offering an example of the Forces' humanitarian responsibilities, while providing insights into the logistical and tactical difficulties of small-scale Arctic operations. In Chapter Ten, Major Bill Aikman's details the CAF's extensive search and recovery efforts during Operation Morning Light, the Canadian-American mission to recover the nuclear material from a downed Soviet satellite (COSMOS 954) that had crashed in the Northwest Territories in 1978. This was a major operation, covering an area greater than 124,000 km^2, involving more than two hundred people at its peak, and entailing more than 4,500 hours of flying time. In the end, the CAF (working in concert with American and Atomic Energy Control Board partners) recovered more than 4,000 particles, flakes and pieces of debris from the Russian satellite scattered from the East Arm of Great Slave Lake to the area around Baker Lake, at a cost of nearly fourteen million dollars.[41]

The Navy also engaged in its own Arctic training program during this era. From 1970 to 1990, Maritime Command conducted eleven northern deployments or NORPLOYs. Lajeunesse reveals in Chapter Seven that these deployments of frigates, destroyers, and supply vessels were devised as a means of demonstrating Canadian sovereignty through a highly-visible "presence" while also accomplishing more practical research, training, and defence objectives. Canadian warships, however, had not been built for northern operations and safe navigation through the ice-laden waters of the Northwest Passage and Hudson Bay. Their operations in these areas quickly revealed many of the same problems in equipment and procedures that the RCN had discovered in the 1940s and 1950s but had subsequently forgotten. They also afforded an opportunity to experiment with new technologies and techniques for Arctic operations. Communication technologies were tested and refined while navigation in ice-infested waters improved. Acoustic and magnetic listening systems were also installed at chokepoints in the Arctic Archipelago as part of DND's 20 year program to develop a more comprehensive ability to detect trespassing Soviet submarines, a program that was restarted in the early 21st century.[42]

The Navy's NORPLOYs and the Army's large-scale combat exercises were the face of Canada's (transitory) northern military presence. The Air Force also maintained a low-key but equally vital footprint in the region, providing strategic and tactical air-lift, SAR support, and surveillance platforms. In Chapter Eleven, Daniel Heidt and Richard Goette examine Operation *Boxtop*, the biannual airlift to remote military sites in Greenland and northern Canada that has been conducted since 1956. Routine but essential, *Boxtop* represents the Air Force's long-standing resupply role that has enabled government activity in the Far North since the end of the Second World War. Furthermore, Lieutenant Colonel Dany Poitras examines Canada's SAR requirements north of 60°—a predominantly Air Force responsibility—in Chapter Sixteen. Like resupply, the CAF's SAR responsibility represents an ongoing and vital mission, even though it tends to receive less media attention than less routine naval and ground deployments.

With the end of the Cold War, deep budget cuts, promises of a "peace dividend," and the absence of any urgent military threats seemingly eliminated the military requirement for anything but the smallest northern presence. Likewise, the as the Arctic hydrocarbon boom turned to a bust in the mid-1980s, extractive industries withdrew from the region, thus removing one of the principle motivations for the CAF's presence.

Accordingly, air operations outside the required re-supply runs were reduced to a minimum, northern Army training ceased on all but the smallest scale, and the Navy scuttled its NORPLOY exercises during the 1990s. As had been the case in the 1960s, the CAF's absence during this decade led to an inevitable loss of institutional knowledge, the rust-out of Arctic equipment, and the general fading of the military's general familiarity and comfort with operating in the North.

The Third Surge 2000-Present

Growing concerns about climate change, potential international interest in an increasingly ice-free Northwest Passage, global demands for Arctic resources, and security in the post-9/11 world have since coalesced to put the Arctic back on the national and international agenda.[43] Beginning with the *Arctic Capabilities Study* released in 2000, strategic analysts noted that the CAF must be prepared to respond to safety and security challenges in an increasingly complex region. This study admitted that the CAF would have been "hard pressed to conduct operations in the Arctic" at the dawn of the new millennium. It also recognized that northern security had evolved from defence against bombers and submarines to include environmental, social and economic aspects, arguing that the coming decades would make the North even more vulnerable to "asymmetric" security and sovereignty threats.[44]

Since 2000, National Defence and service-level guidance papers, as well as policy documents produced by the departments of Foreign Affairs (now Global Affairs Canada) and Aboriginal Affairs and Northern Development (now Indigenous and Northern Affairs), have echoed the basic assessments laid down in the *Arctic Capabilities Study*.[45] This new (or renewed) attention to asymmetrical threats fits within the Government of Canada's broader, integrated *Northern Strategy*. The guiding political vision is built around a coordinated and integrated "Whole-of-Government" approach to exercising sovereignty, promoting social and economic development, protecting the environment, and improving northern governance.[46] Achieving these objectives requires significant resources, which puts the military in a position to "lead from behind" given its assets and expertise. Accordingly, the Army, Navy and Air Force began to redeploy forces to the region on a regular basis for increasingly large and complex training exercises.

As Lajeunesse describes in Chapter Twelve, the Army and Navy's practical re-engagement with the Arctic began with the small Operation Narwhal series in 2002 and 2004, in which the Navy and small supporting forces began to test the frigid waters to determine what new capabilities needed to be acquired. Operation *Hudson Sentinel* (2005) and Operation *Lancaster* (2006) represented significantly larger commitments—of men and material, as well as political capital. With *Hudson Sentinel*, other government departments began integrating into northern exercises on the understanding that the CAF would be supporting these agencies in unconventional security scenarios. This integration deepened with the annual Operation *Nanook* series, initiated in 2007 and running every summer since. These major operations normally involve hundreds of CAF and civilian personnel backed by Canadian Coast Guard icebreakers, RCN warships, as well as strategic and tactical air lift and support from the RCAF.

The time, energy, and resources required to run operations of this size have grown over the past decade as the forces have become more invested in honing their northern operational capabilities. This investment was politically motivated to a degree not seen since the military deployments undertaken by the government of Pierre Trudeau. Beginning with the

federal election campaign in late 2005, Prime Minister Stephen Harper and his Conservative government made safeguarding Canadian sovereignty and security in the Arctic a key part of their policy agenda.[47] While this high level sovereignty-security nexus explains much of the political and media attention paid to the CAF's activities in the region, the practical impact of these northern deployments has afforded personnel with opportunities to reacquire Arctic skills and capabilities and to develop new ones.

The CAF was reminded of the difficulties inherent in operating in the Arctic soon after its return to the region in 2002. As had been the case in decades past, problems with communications, logistics, maintenance, and equipment quickly became apparent. While the military had been capable of deploying thousands of troops north of 60° in the 1980s, a company-level deployment during Exercise *Northern Bison* in 2008 proved a taxing ordeal.[48] This exercise was the first test of the Arctic Response Company Groups (ARCGs), the development, purpose, and utility of which Lajeunesse documents in Chapter Thirteen. No longer primarily combat-focused, this 21st century Army capability differs from the MSF of the 1950s or the Canadian Airborne Regiment during the 1970s and 1980s. As Lajeunesse shows, the ARCGs' design and training illustrates the dominance of unconventional security concerns to the modern CAF. In the following chapter, Captain Nathan Fry (Vermont National Guard) offers an assessment of the continuing operational difficulties in the North based on his experience training with an ARCG during Operation *Guerrier Nordique* in 2014. He highlights the paramount importance of supply lines and adaptability to any northern operation—a persistent challenge since Operation *Musk Ox*.[49]

Successfully adapting to northern conditions means living, travelling, and working in the environment rather than simply seeking to pass through or conquer it. The Canadian Rangers, an important "success story" in terms of harnessing the expertise and knowledge of Northern residents, offer a strong example of how unorthodox approaches to providing a military presence in isolated communities bring positive effects.[50] In Chapter Fifteen, historian Peter Kikkert and Canadian Ranger Doug Stern present the operational perspective of a Ranger with extensive experience working with Regular and Reserve Forces in the Arctic. Stern's story details his interactions with southern-based soldiers and highlights difficulties in reconciling traditional military culture with a more nuanced northern approach to operations.

Relationships with circumpolar neighbours and close cooperation between the CAF and other Canadian departments and agencies are essential to support operations pursuant to the federal government's broader Northern Strategy. Although conceptually straightforward, a Whole of Government (WoG) framework (involving the mobilization of government resources across various departments, agencies, and levels to achieve broad national objectives to create a whole greater than the sum of its parts)[51] is difficult to implement effectively in practice.[52] Nevertheless, the CAF has made consistent, substantive efforts to build its concept of Arctic operations within a broader WoG context, to train and equip personnel accordingly, and to plan a leading role in coordinating WoG sovereignty, security, and safety operations over the last decade.[53]

In Chapter Seventeen, Lieutenant-Colonel Deanna Manson offers a first-hand account of Operation *Nanook* 2014, from its inter-departmental planning processes to its execution on several fronts. She notes that while deficiencies remain in the military's WoG approach to Arctic training and operations, the CAF recognizes that it must work with other government departments and agencies to maximize its potential contributions in the region. Arctic sovereignty, security and safety issues are hardly the sole preserve of the military, and the CAF alone cannot answer the myriad challenges associated with the changing Arctic in the 21st century. Accordingly, a WoG or comprehensive approach is essential to respond effectively in a complex, adaptive system, particularly if the emphasis is no longer primarily on traditional military threats. Official assessments consistently emphasize that there is a low probability of state-to-state armed conflict breaking out in the Arctic. Instead, increased activity in the North is expected to bring unconventional security challenges: more illegal fishing, maritime and aerospace accidents, dumping, pollution, trespassing, and criminal activity. [54]

Moving Forward … and Looking Backward

In the 21st century Canada has surged back into the Arctic. The motivations resemble those that lay behind similar surges of interest and activity in the past. Anticipation of new resource development, coupled with the intensifying effects of climate change and decreasing sea ice, has resurrected fears of maritime activity in Canada's Arctic waters and attendant security threats, from oil spills and damaged ships to crime and illegal immigration.[55] As has always been the case in the face of such challenges, the Government of Canada turned to the CAF to demonstrate the nation's presence in the region (generally equated with sovereignty) and to augment its control. Historically, as much as perceived security and sovereignty "crises" have sparked government interest in the North, a diminishing sense of immediate threat has precipitated declining interest. Today, the perception of a conventional military threat to the Canadian Arctic appears lower than it did a decade ago. The prospects of a rapid escalation in resource development, and the unconventional threats which normally accompany such activity, appear to have diminished as well, owing to the collapse in global oil and mineral prices.[56]

The chapters in this book show how the CAF's history in the Arctic has been largely defined by transitory crises and the result has been a spasmodic and inconsistent learning process. When the crisis mentality eased and resources were withdrawn, the CAF lost both its focus and its accumulated store of Arctic knowledge. Consequently, building the necessary skills and tools to operate effectively in the Arctic has been far from a steady evolution since the Second World War. The CAF's learning process reflects a fitful history of operational capabilities gained and lost, of lessons learned and relearned. The military has devoted considerable resources to reacquire Arctic skills and rebuild its northern relationships in the 21st century, and retaining these capabilities means exercising them and then passing down institutional knowledge. We hope that Canada will continue to approach Arctic operations in a sustainable manner, rejecting the boom and bust framework that has long defined its northern engagement. Building more specialized platforms and equipment will enhance military effectiveness in the Arctic, but it must be complemented by a general, long-term commitment to the region. We hope also that this volume helps to disseminate and encourage the retention of institutional knowledge, saving the Canadian military from having to relearn lessons surrounding Arctic operations that it has learned, lost, and relearned in the past.

Notes

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[1] The Canadian Armed Forces have had a number of names over the decades. From separate services (Army, Air Force, Navy) they were unified to become the Canadian Forces (CF) in 1968. As such, the services officially ceased to exist, instead becoming: Land Force Command, Maritime Command, and Air Command of the CF. In 2011, these Commands regained their historic service names as elements of the renamed Canadian Armed Forces (CAF). For consistency, the acronym CAF will be used throughout this book to refer to the combined forces of the Canadian military.

[2] This need is outlined in: Department of National Defence, *Canada First Defence Strategy* (2008), 8.

[3] See: Ryan Dean, P. Whitney Lackenbauer, and Adam Lajeunesse, *Canadian Arctic Defence Policy: A Synthesis of Key Documents, 1970-2013,* Documents on Canadian Arctic Sovereignty and Security, vol. 1 (2014).

[4] E.B. Wang, "The Role of Canadian Armed Forces in Defending Sovereignty," 30 April 1969," edited by P. Whitney Lackenbauer, *Journal of Military and Strategic Studies* 11:3 (2009): 22-23. National Defence's reference to "presence" in its defence objectives seemed to imply that the government's concept of sovereignty was static and symbolic, not functional. Wang insisted that the Canadian government should identify and define specific national interests, such as anti-pollution and safety of navigation, and shape policy to protect them. The military's fixation on presence and surveillance was inconsistent with this approach. In the ensuing years, the Legal Division at External Affairs also took issue with National Defence reports and policy statements that confused "the problematic enforcement of Canada's jurisdictional claims in the Arctic waters with the problem of the legal basis for those claims." In short, a military presence did nothing to establish the "legal validity of Canada's claims" in the Arctic. Memorandum, Department of External Affairs (DEXAF), Legal Division, "National Defence Paper on 'Canadian Defence Policy in the 1970's,'" 5 August 1970, Library and Archives Canada (LAC), Record Group (RG) 25, vol. 10322, file 27-10-2-2, pt.1. For an expanded discussion, see: Lackenbauer and Peter Kikkert eds., *The Canadian Forces & Arctic Sovereignty: Debating Roles, Interests and Requirements, 1968-1974* (Waterloo: Wilfrid Laurier University Press, 2010).

[5] Lackenbauer and Kikkert have supported Wang's assessment, while Kenneth Eyre has pointed out that the impact of military activities on Canadian sovereignty was

"slight." Lackenbauer and Kikkert, *Canadian Forces and Arctic Sovereignty* and Kenneth Eyre, "Custos Borealis: The Military in the Canadian North," unpublished Ph.D. thesis (University of London - King's College, 198), 285-86, 290. Adam Lajeunesse, has offered a qualified apology for the CAF's activities, citing their political utility and the need to prepare for the activity that was expected to come from northern development in the 1970s and 1980s, in: *Lock, Stock, and Icebergs: The Evolution of Canada's Arctic Maritime Sovereignty* (Vancouver: University of British Columbia Press, 2016).

[6] Department of National Defence, *Defence in the 70s* (Ottawa: Queen's Printers, 1971), 8.

[7] The concept of military "surges" into the Arctic comes from Eyre, "Forty Years of Military Activity in the Canadian North, 1947-87," *Arctic* 40:4 (1987): 292-99.

[8] Please note that some paragraphs in this section are drawn from P. Whitney Lackenbauer, "The Military as Nation-Builder: The Case of the Canadian North – the 2013 Ross Ellis Memorial Lecture in Military and Strategic Studies," *Journal of Military and Strategic Studies* 15:1 (Summer 2013): 1-32.

[9] As historian Gordon W. Smith noted in 1961, if taken at face value this would presumably include British Honduras, Bermuda, the Bahamas, and the British West Indies. Gordon Smith, "The Transfer of Arctic Territories from Great Britain to Canada in 1880, and some Related Matters as seen in Official Correspondence," *Arctic* 14:1 (1961), 64. On 23 June, 1870, the territories of the Hudson's Bay Company were formally transferred to the Dominion of Canada by Imperial order-in-council. All remaining British North American Arctic territories were transferred to Canada in 1880.

[10] Edward Lester, Brereton Greenhous, and William Constable, *Guarding the Goldfields: The Story of the Yukon Field Force* (Toronto: Dundurn, 1987).

[11] William R. Morrison, Showing the Flag: The Mounted Police and Canadian Sovereignty in the North, 1894-1925 (Vancouver: UBC Press, 1985).

[12] On this era see: D.H. Dinwoodie, "Arctic Controversy: The 1925 Byrd-MacMillan Expedition Example,"
Canadian Historical Review 53:1 (March 1972): 51-65; Richard Diubaldo, *Stefansson and the Canadian Arctic* (Montreal: McGill-Queen's University Press, 1978); Nancy Fogelson, *Arctic Exploration and International Relations, 1900-1932* (Fairbanks: University of Alaska Press, 1992); Thorleif Tobias Thorleifsson, "'Norway Must Really Drop Their Absurd Claims Such as That to the Otto Sverdrup Islands': The Sverdrup Islands Question, 1902-1930," unpublished MA thesis (Simon Fraser University, 2006); Janice Cavell and Jeff Noakes, *Acts of Occupation: Canada and Arctic Sovereignty, 1918-25* (Vancouver: UBC Press, 2010); P. Whitney Lackenbauer and Peter Kikkert eds., *Legal Appraisals of Canada's Arctic Sovereignty: Key Documents, 1904-58*, Documents on Canadian Arctic Sovereignty and Security, no. 2 (Calgary and Waterloo: Centre for Military and Strategic Studies/Centre on Foreign Policy and Federalism, 2014); and Gordon W.

Smith, *A Historical and Legal Study of Sovereignty in the Canadian North, 1870-1942*, P. Whitney Lackenbauer ed. (Calgary: University of Calgary Press, 2014).
[13] On the idea of legibility see: James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: 1988). On this mapping process see: R.C. McNeill, "Putting Canada on the Map," *Sentinel* 6:3 (March 1970), 16-19, and B.W. Waugh, "Arctic Mapping," *Sentinel* 6:3 (March 1970), 44. Kenneth Eyre observed that "the mapping of the North carried out by the Royal Canadian Air Force and the Royal Canadian Engineers between 1947 and 1967 provides a classic example of the military establishment in peacetime undertaking projects of national development that required skills relative to military operations. When the state of the art developed to the point where a civil branch of government could take over, and when future operations could be carried on as profitable, but still reasonably economic ventures, the military gave up the role and moved on to other fields." Kenneth Eyre, "The Military and Nation Building in the Arctic, 1945-1964," in *Canada and Arctic Sovereignty and Security: Historical Perspectives*, P.Whitney Lackenbauer ed., Calgary Papers in Military and Strategic Studies (Calgary: Centre for Military and Strategic Studies/University of Calgary Press, 2011), 218.
[14] P. Whitney Lackenbauer and Kenneth Eyre, eds., *Unfurling the Air Force Ensign in the Canadian Arctic: The 1922 Eastern Arctic and 1927-28 Hudson Strait Expeditions*, Documents on Canadian Arctic Sovereignty and Security, no. 3 (Calgary and Waterloo: Centre for Military and Strategic Studies/Centre on Foreign Policy and Federalism, 2015). See also: Ernest Cable, "Air Force: Leader in the Arctic," in *De-Icing Required: The Canadian Air Force's Experience in the Arctic*, P. Whitney Lackenbauer and William March eds., Canadian Aerospace Power Studies Series, no.4 (Trenton: Canadian Forces Air Warfare Centre, 2012): 1-16.
[15] WO1 Cal Vince, *A Short History of the Northwest Territories and Yukon Radio System* (self-published, 1960), www.nwtandy.rcsigs.ca/1923_29.htm#1923. The full story of the NWT&YRS remains to be written.
[16] C.P. *Stacey, The Military Problems of Canada* (Toronto: The Ryerson Press, 1940), 5.
[17] See: Shelagh Grant, *Sovereignty or Security?: Government Policy in the Canadian North, 1936-1950* (Vancouver: UBC Press, 1988) and P. Whitney Lackenbauer, "Right and Honourable: Mackenzie King, Canadian-American Bilateral Relations, and Canadian Sovereignty in the Northwest, 1943-1948," in *Mackenzie King: Citizenship and Community*, John English, Kenneth McLaughlin, and P.W. Lackenbauer eds. (Toronto: Robin Brass Studios, 2002), 151-68.
[18] See for example: Donald Creighton, *The Forked Road: Canada 1939-1957* (Toronto: McClelland and Stewart, 1976); Grant, *Sovereignty or Security,* and – in a more subtle manner – *Polar Imperative* (Vancouver: Douglas & McIntyre, 2010); and Bernd Horn, "Gateway to Invasion or the Curse of Geography? The Canadian Arctic and the Question of Security, 1939-1999," in *Forging a Nation: Perspectives*

on the Canadian Military Experience, B. Horn ed. (St. Catharines: Vanwell, 2002), 307-334.
[19] See for example: David Bercuson, "Continental Defense and Arctic Sovereignty, 1945-50: Solving the Canadian Dilemma," in *The Cold War and Defense*, Keith Neilson and Ronald G. Haycock eds. (New York: Praeger Publishers, 1990); Elizabeth Elliot-Meisel, *Arctic Diplomacy: Canada and the United States in the Northwest Passage* (New York: Peter Lang, 1998); Lackenbauer, "Right and Honourable"; Ken Coates, P. Whitney Lackenbauer, Bill Morrison, and Greg Poelzer, *Arctic Front: Defending Canada in the Far North* (Toronto: Thomas Allen, 2008); P. Whitney Lackenbauer and Peter Kikkert, "Setting an Arctic Course: Task Force 80 and Canadian Control in the Arctic, 1948," *The Northern Mariner* 21:4 (October 2011): 327-58; Peter Kikkert, "Constructing a Role: The Royal Canadian Air Force in the Arctic, 1945-1953," in *De-Icing Required*, Lackenbauer and March eds., 17-30; and Daniel Heidt, "Clenched in the JAWS of America? Canadian Sovereignty and the Joint Arctic Weather Stations, 1946-1972," in *Canada and Arctic Sovereignty and Security: Historical Perspectives. Calgary Papers in Military and Strategic Studies*, P. Whitney Lackenbauer ed. (Calgary: Centre for Military and Strategic Studies, 2011), 145-70; and P. Whitney Lackenbauer and Peter Kikkert, "Sovereignty and Security: The Department of External Affairs, the United States, and Arctic Sovereignty, 1945-68," in *In the National Interest: Canadian Foreign Policy and the Department of Foreign Affairs and International Trade, 1909-2009*, Greg Donaghy and Michael Carroll eds. (Calgary: University of Calgary Press, 2011), 101-20.
[20] For more on the MSF, see Bernd Horn, *Bastard Sons: The Canadian Airborne Experience, 1942–1995* (St. Catharines: Vanwell, 2000), and Raymond Stouffer, "Military Culture and the Mobile Striking Force," in *De-Icing Required*, Lackenbauer and March eds., 42-54.
[21] On Operation Canon see also: Maurice Flit, Operation CANON (London: Bible Churchmen's Missionary Society, 1949); Ray Price, *The Howling Arctic* (Toronto: Peter Martin Associates, 1970), 67-77; Hugh Halliday, "Rescue Mission," *The Beaver* 75:2 (April/May 1995): 14-25; and Sandy Babcock, "Operation CANON: A Case Study of Early RCAF Arctic Search and Rescue Capabilities," in *De-Icing Required*, Lackenbauer and March eds., 31-41.
[22] On the RCN and the early Cold War see also: Elizabeth Elliot-Meisel, "Arctic Focus: The Royal Canadian Navy in Arctic Waters," *Northern Mariner* 9:2 (April 1999): 23-39; Jason Delaney and Michael Whitby, "'The Very Image of a Man of the Arctic': Commodore O.C.S. Robertson," *Canadian Naval Review* 4:4 (Winter 2009): 25-29; Richard Mayne, "'An Art of Its Own': Corporate Knowledge, the Canadian Navy and Arctic Operations," *Canadian Naval Review* 5:3 (Fall 2009): 10-16; P. Whitney Lackenbauer and Peter Kikkert, "Setting an Arctic Course"; and Delaney, "'He was Writing the Book' – Lieutenant Commander James P. Croal:

The Royal Canadian Navy's Cold War Arctic Specialist," *Northern Mariner* 25:4 (October 2015): 399-412.

[23] On the history of HMCS *Labrador* see: J.M. Leeming, "HMCS *Labrador* and the Canadian Arctic," in *The RCN in Retrospect, 1910-1968*, James A. Boutilier ed. (Vancouver: UBC Press, 1982), 286-307; and Michael Whitby, "Showing the Flag Across the North: HMCS *Labrador* and the 1954 Transit of the Northwest Passage," *Canadian Naval Review* 2:1 (Spring 2006): 21-24.

[24] The essential study on this process remains Joseph Jockel, *No Boundaries Upstairs* (Vancouver: UBC Press, 1987).

[25] Kenneth Eyre, "Forty Years of Military Activity in the Canadian North, 1947-87," *Arctic* 40:4 (1987), 294.

[26] The best overview of continental defence during this era remains Jockel, *No Boundaries Upstairs.*

[27] C.J. Marshall, "North America's Distant Early Warning Line," *Geographical Magazine* 29:12
(1957), 616.

[28] "Basic Philosophy on the Operation of the DEW Line," c.1955, LAC, RG 24, acc. 1983-84/049, box 105, file 096-100-80/9, pt.4.

[29] Marshall, "North America's Distant Early Warning Line," 626.

[30] John W. Harris, "Northern Development and National Defence: The Establishment of the DEW Line on the Canadian North," unpublished M.A. thesis (Simon Fraser University, 1981), 100. DEW Line work also gave a tremendous boost to the Mackenzie River transportation system, particularly for the Northern Transportation Company (NTCL) which secured long term control of resupply operations along the western Arctic and eastern Alaska coast as a result. See: Robert Bothwell, *Eldorado: Canada's National Uranium Company* (Toronto: University of Toronto Press, 1984), 351-68. On air operations, see P. Whitney Lackenbauer and Daniel Heidt, "Sovereignty for Hire: Civilian Contractors and the Distant Early Warning (DEW) Line" in *The Canadian Air Force's Experience in the Arctic*, William March and P. Whitney Lackenbauer eds.

[31] Eyre, "Forty Years of Military Activity," 296.

[32] Department of National Defence, *White Paper on Defence* (Ottawa: Queen's Printer, 1964), 24.

[33] For the best accounts of this voyage see John Kirton and Don Munton, "The Manhattan Voyages and their Aftermath," *Politics of the Northwest Passage*, Franklyn Griffiths ed. (Kingston: McGill-Queen's University Press, 1987) and Ross Coen, *Breaking Ice for Arctic Oil* (Fairbanks: University of Alaska Press, 2012).

[34] Maxwell Cohen, "The Arctic and the National Interest," *International Journal* 26:1 (1970-71), 72.

[35] DND, Defence in the 70's.

[36] Telegram from External Affairs to Canadian Embassy, Washington, July 5, 1976, LAC, RG 12, vol. 5561, file 8100-15-4-2, pt. 2.

[37] See for example: Lackenbauer and Kikkert, "Sovereignty and Security," and Lajeunesse*, Lock, Stock, and Icebergs*.
[38] Lajeunesse, Lock, Stock, and Icebergs, 189
[39] Eyre, "Forty Years," 297.
[40] Eyre, "Custos Borealis," 268-69.
[41] On this operation see: Leo Heaps, *Operation Morning Light: Terror in Our Skies – The True Story of Cosmos 954* (New York: Paddington Press, 1978) and the C.A. Morrison fonds (79/377) at the Department of National Defence, Directorate of History and Heritage (DHH), Ottawa.
[42] Adam Lajeunesse and Bill Carruthers, "The Ice Has Ears," *Canadian Naval Review* 9:3 (2013): 5-9, and Carruthers, "From SOSUS to Satellites: Sovereignty, Security and Surveillance in the Canadian Arctic," unpublished MSS thesis (University of Calgary, 2015).
[43] On these themes see for example: Rob Huebert, "Climate Change and Canadian Sovereignty in the Northwest Passage," *Isuma* 2:4 (Winter 2001): 86-94; and Franklyn Griffiths, Rob Huebert, and P. Whitney Lackenbauer, *Canada and the Changing Arctic: Sovereignty, Security, and Stewardship* (Waterloo: Wilfrid Laurier University Press, 2011).
[44] Canadian Forces Northern Area (CFNA), *Arctic Capabilities Study* (2000), 8-1, 8-3.
[45] Dean, Lackenbauer, and Lajeunesse, Canadian Arctic Defence and Security Policy.
[46] On the Whole of Government approach and the Arctic see: P. Whitney Lackenbauer, "Towards a Comprehensive Approach: Defence, Security, and Safety," in *North of 60: Toward a Renewed Canadian Arctic Agenda*, John Higginbotham and Jennifer Spence eds. (Waterloo: Centre for International Governance Innovation, 2016), 50-54; and Lackenbauer and Adam Lajeunesse, "The Emerging Arctic Security Environment: Putting the Military in its (Whole of Government) Place" in *Whole of Government through an Arctic Lens,* P. Whitney Lackenbauer and Heather Nicol eds. (Kingston: Canadian Forces Leadership Institute/CDA Press, forthcoming 2017).
[47] See for example: P. Whitney Lackenbauer and Ryan Dean, Canada's Northern Strategy under the Harper Conservatives: Key Speeches and Documents on Sovereignty, Security, and Governance, 2006-15 (Calgary and Waterloo: Centre for Military, Strategic and Security Studies/Centre on Foreign Policy and Federalism/Arctic Institute of North America, 2016).
[48] R.R. Poirier, "Post Exercise Report, Northern Bison 2008," 13 March 2009 and R.R. Poirier, "Arctic Response and 38 Canadian Brigade Group," *Canadian Army Journal* 13:3 (2010), 145
[49] Harriet Critchley, "Defence and Policing in Arctic Canada," in *Politics of the Northwest Passage*, Franklyn Griffiths ed.

[50] For background on the Canadian Rangers see: P. Whitney Lackenbauer, *The Canadian Rangers: A Living History* (Vancouver: UBC Press, 2012) and P. Whitney Lackenbauer, *Vigilans: The 1st Canadian Ranger Patrol Group* (Yellowknife: 1st Canadian Ranger Patrol Group, 2015).
[51] Chief of Force Development, *Arctic Integrating Concept* (Ottawa, 2010), 23-24; Chief of the Defence Staff/Deputy Minister Directive for DND/CF in the North (2011), 10. Federal OGDs include Public Safety Canada (PS); Environment Canada (EC); Royal Canadian Mounted Police (RCMP); Canadian Coast Guard (CCG); the Department of Fisheries and Oceans (DFO); Canadian Security and Intelligence Service (CSIS); Transport Canada (TC); Aboriginal Affairs and Northern Development Canada (AANDC); the Department of Foreign Affairs, Trade and Development (DFATD); and the Canadian Northern Economic Development Agency (CanNor). For an elaboration of this theme, see the chapters in: Lackenbauer and Nicol, *Whole of Government through an Arctic Lens*. For the most part, the CAF fits into this framework by providing transport, ships, and human resources that enable OGDs to enforce Canadian jurisdiction and react to a wide array of contingencies in a rapid, coordinated manner. Canadian Joint Operations Command, *CJOC Plan for the North* (January 2014), 6.
[52] See for example: Jenna Alexander and Dalton Cote, *Leadership in Whole of Government Operations: A Case Study of Security in the Canadian Arctic* (Kingston: Canadian Forces Leadership Institute Monograph 2011 (1 May 2011); Michael Rostek and Peter Gizewski, *Security Operations in the 21st Century: Canadian Perspectives on the Comprehensive Approach* (Kingston: Queen's Centre for International Relations, 2011); and Dave Woycheshin, *The Comprehensive Approach: Perspectives from the Field* (Kingston: CDA Press, 2015).
[53] P. Whitney Lackenbauer and Adam Lajeunesse, "The Canadian Armed Forces in the Arctic: Building Appropriate Capabilities," *Journal of Military and Strategic Studies,* 16:4 (March 2016): 7-66.
[54] For a more detailed examination of this development see: Adam Lajeunesse and P. Whitney Lackenbauer, "The Emerging Arctic Security Environment: Putting the Military in its (Whole of Government) Place," in *Whole of Government through an Arctic Lens*, Heather Nicol and Lackenbauer eds. (Kingston: Canadian Defence Academy Press, forthcoming 2017).
[55] Adam Lajeunesse, "A New Mediterranean? Arctic Shipping Prospects for the 21st Century," *Journal of Maritime Law and Commerce* 43:4 (October 2012). See also, for example: Rob Huebert, "The Shipping News Part II," *International Journal*, 58:3 (Summer 2003); and Michael Byers, "Canada's Arctic Nightmare Just Came True: The Northwest Passage is Commercial," *Globe and Mail* (20 September 2013).
[56] See, for example: Adam Lajeunesse and Whitney Lackenbauer, "Canadian Arctic Security: Russia's Not Coming," OpenCanada/Arctic Deeply (19 April 2016).

Chapter One

"A Particularly Spectacular Piece of Demolition": The Canadian-Led Raid on Spitzbergen, 1941

Ryan Dean and P. Whitney Lackenbauer

> *A particularly spectacular piece of demolition was the destruction by explosives of the overhead conveyor system which brought coal from one of the Longyear mines to the dockside. The great piles of free coal were ignited by the use of petrol and oil, scores of fires being started in each of them; the total amount of coal thus destroyed on the island was in the vicinity of 450,000 tons. In addition, perhaps 275,000 gallons of fuel oil, petrol and grease were done away with either by burning or being poured into the sea. The oil fire at Barentsburg impressed even those who had seen the London fires of 1940. One witness wrote, "exploding barrels were seen to a height of about 250 feet and were thrown from the pile, flaming, to a distance of from 350 to 400 feet."*
>
> – C.P. Stacey (1942)[1]

Operation *Gauntlet*, a successful (but little known) Canadian-led combined operation of British, Canadian, and Norwegian troops in the Spitzbergen (Svalbard) archipelago, was Canada's first expeditionary operation in the Arctic and one of only two operations in 1941 that took Canadian troops beyond the confines of the United Kingdom.[2] Situated on the Arctic Ocean route to Russia's northern ports, Spitzbergen assumed heightened strategic importance after Germany invaded Russia in June 1941. As part of a series of initiatives undertaken by the British at Soviet urging to establish and secure an Arctic convoy route between the newfound allies,[3] *Gauntlet* was a diplomatically-motivated industrial raid that wrecked the valuable coal mines of Spitzbergen and their supporting infrastructure, destroyed the archipelago's wireless and meteorological stations, repatriated the Russian mining population working there to Archangel, and evacuate all the Norwegians on Spitzbergen to Britain. Like the better-known Canadian contribution to the US-led, invasion of Kiska in the Aleutian Islands two years later,[4] the Spitzbergen operation did not involve combat against an enemy force. Consequently, it is generally overlooked in the historiography of the Canadian Army during the Second World War.[5]

This chapter revisits the operational experiences of the Canadian soldiers who took part in Operation *Gauntlet*, exploring how the operation unfolded and the unexpected challenges that the Canadians experienced operating in the European Arctic—an Arctic very different from Canada's own. The interactions between the Canadians and local civilian authorities in Spitzbergen also revealed the challenges associated with civil-military interaction and the need for creative and practical problem-solving to overcome these challenges. Despite minor friction, the Canadians carried out their mission with complete success from a tactical perspective. The enemy did not interfere with the operation, and not a single soldier or sailor was lost. *Gauntlet* gave a few hundred Canadians an adventure and a taste of active deployment after weary months of training and waiting in Britain, boosting morale. Furthermore, *Gauntlet* yielded general lessons related to the value of specialized training and representation from appropriate functional trades, unity of command, operational secrecy, and deception. In the words of Canadian official historian C.P. Stacey, Operation *Gauntlet* "accomplished everything which it set out to do."[6]

From Flaxman to Gauntlet

On the evening of 24 July 1941, Chief of the Imperial General Staff Sir John Dill met with Lieutenant-General A.G.L. McNaughton, the commander of the Canadian Corps, to informally offer an operation to him and his troops.[7] Dill explained that the mission was to the remote Arctic archipelago of Spitzbergen, astride the sea lines of communication between Britain and Northern Russia. Given that "the alliance between Great Britain and Russia has given Spitzbergen a strategical value which it did not previously possess,"[8] McNaughton's soldiers were expected to establish a garrison there to protect a refuelling anchorage for Allied shipping to Murmansk and support Allied aviation in the area. Furthermore, this garrison would cut off the supply of high-quality Spitzbergen coal to occupied Norway, thus hindering the German war effort.[9] McNaughton readily agreed to this request, and the next day the British War Office officially approached the Canadian Army to provide troops to defend the proposed naval anchorage and refuelling base at Spitzbergen.[10]

McNaughton's enthusiasm for Canadian action was unsurprising. His soldiers, eager for active service since their arrival in Britain in December 1939, had "found themselves committed instead to a defensive and largely static role" for the next two years.[11] However vital this anti-invasion role, it was no replacement for actual battle indoctrination. Canadian units had been selected for proposed operations in Norway, the Low Countries, and France earlier in the war, but these plans been cancelled, leaving the Canadian field force "bitterly disappointed."[12] Although the subsequent German invasion of the Soviet Union made an attack against England increasingly unlikely, two restrictions kept the Canadians confined to England. First, McNaughton had insisted that the Canadian Corps remain together so that British commanders did not siphon off units piecemeal. This earned him a wrongful reputation for wanting to keep the Canadians out of fighting when, in the assessment of historian John Rickard, he had demonstrated "a sincere willingness to consider any and all requests from the War Office for Canadian forces to join the fighting" in Europe.[13] Second, Canadian Minister of National Defence J.L. Ralston, having crossed swords with McNaughton about the general's unilateral decision to commit Canadian troops to Norway the previous year, ruled that Canadian troops could not be moved out of England without government consent. Thus, McNaughton was limited to pursuing raiding opportunities so that his men could acquire combat experience. At the end of June 1941 he had sent a representative to the War Office to explore opportunities along these lines.[14] Now, a month later, the War Office was offering one.

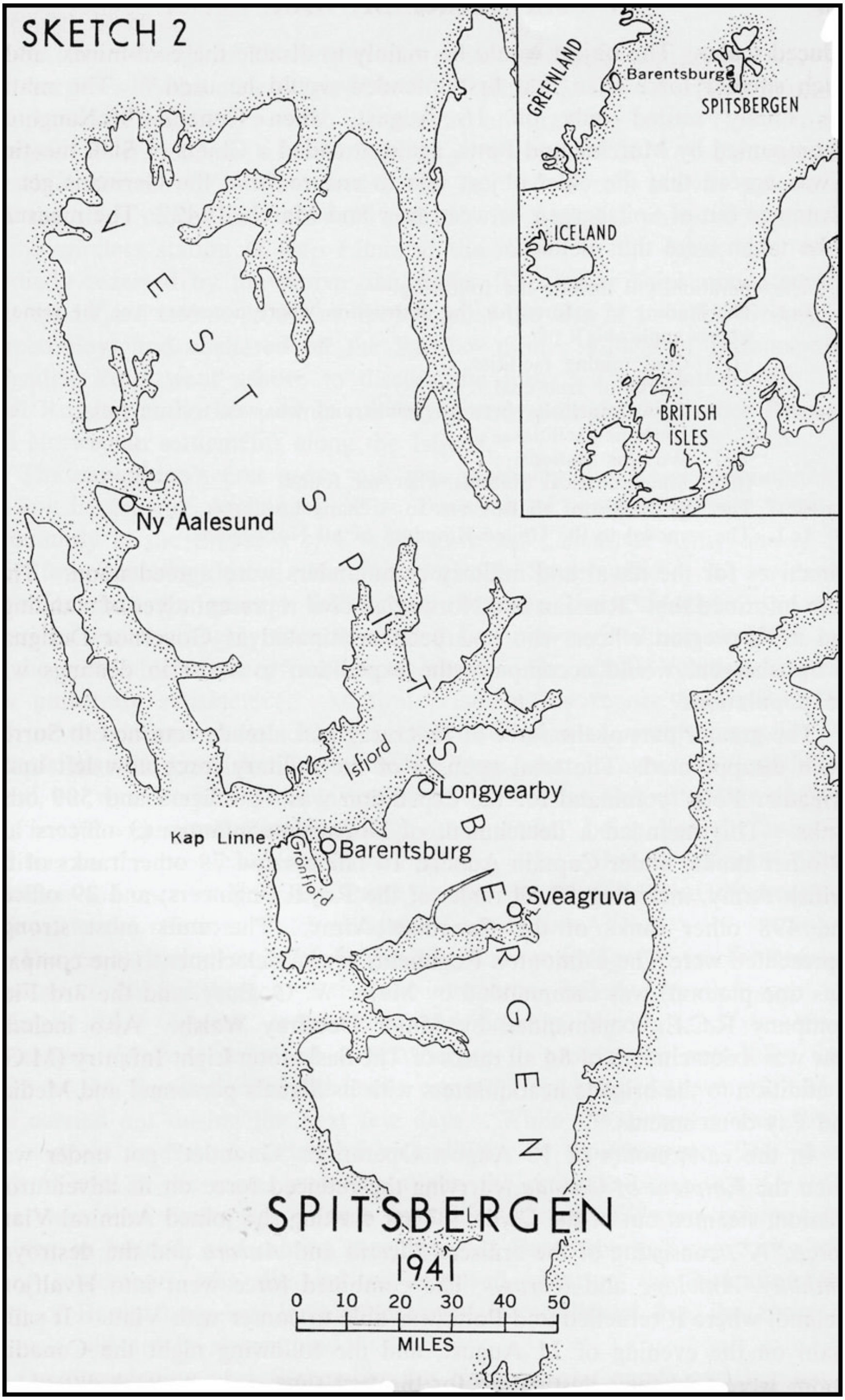
With McNaughton on board, senior Canadian officers met with representatives from several British War Office branches on 26 July to devise a plan for the developing Operation *Flaxman*. "The proposal made at this time was for a considerably more ambitious enterprise than the one finally carried out," Stacey observed.[15] The basic intent was to deploy effectively an infantry brigade, less one battalion, to Spitzbergen to occupy the Islands until the end of October. According to this plan, "Force 111" would primarily comprise an infantry battalion from the Princess Patricia's

Canadian Light Infantry (PPCLI) and an infantry battalion from the Edmonton Regiment (the "Eddies"). The British would provide ancillary units and additional supplies.[16]

The PPCLI and Eddies had been chosen for an operation in Norway the previous year because of their advanced training. According to that earlier plan, the Canadians would have provided 1,300 troops to land outside the Norwegian city of Trondheim in April 1940. After taking a series of fortifications defending the sea approach down the fjord to Trondheim, the Canadians would have taken part in a frontal assault on the city itself. While the Canadians were mobilizing, however, the British had second thoughts. Worried that the Luftwaffe posed too great a threat to the Royal Navy, British strategists scuttled the operation and the disheartened PPCLI and Eddies returned to their barracks having "suffered the first of many disappointments."[17]

According to plans for Operation *Flaxman*, the proposed "Force 111" would garrison a collection of rugged, isolated, and perennially frozen islands, roughly the size of Scotland, 480 miles north of Norway where the Barents Sea (warmed by the Gulf Stream from the south) meets the freezing anti-cyclonic currents of the Arctic Ocean.[18] The coastline of the islands is deeply notched with large fjords that could provide shelter for Allied vessels making the dangerous journey to and from Northern Russia. Steep mountains raise vertically above the fjords, their plateaued peaks crowned by glaciers that descend almost perpendicularly down to the sea below. Among these ice-encrusted walls enclosing the fjords are mountains of shallower incline. Their frost-scared slopes had given way to thick cloaks of scree draping from their summits down to their roots.[19] Spitzbergen is treeless but the lichen and grass that cling to the scree add a crisp brown contrast to Spitzbergen's palette of whites, greys and blues.[20]

The largest of the fjords, Isfjord, runs from the western coast of Spitzbergen deep into the island, widening to over ten miles in some places. Its waters warmed by the Gulf Stream, the Isfjord is ice-free during the summer months. Many of Spitzbergen's small settlements dotted its shores including the primary targets of the proposed Canadian occupation, the main Norwegian and Soviet settlements of Longyearbyen and Barentsburg


SKETCH 2
GREENLAND
Barentsburg
SPITSBERGEN
ICELAND
BRITISH ISLES
WEST SPITSBERGEN
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Isfjord
Longyearby
Kap Linne
Barentsburg
Grønfjord
Sveagruva
SPITSBERGEN
1941
0 10 20 30 40 50
MILES

respectively.[21] A British intelligence report conveyed little additional information to the Canadians beyond the simple observation that Barentsburg was a settlement of some 1,800 people, including 500 women and 120 children. Longyearbyen was listed as substantially smaller, some 500 men and 150 women and children. Both settlements were reported to have limited facilities with which to support a proposed refuelling anchorage for Allied ships, their jetties barely adequate to export the coal central to Spitzebergen's settlements.[22]

The intelligence report went on to explain that Norwegians likely discovered Spitsbergen in 1194, with Norwegian kings claiming all the islands of northern Europe during the Middle Ages. Rediscovered by Dutch explorer William Barents in 1596,[23] the archipelago quickly became a commercial whaling centre. Danish, Dutch, English, and Norwegian whalers clashed and led their respective countries to lay competing claims to the islands in the early seventeenth century, though none colonized it due to the inhospitable climate. After they quickly exterminated the whale population, Spitzbergen fell into relative obscurity until coal mining ramped-up at the turn of the twentieth century. While poor for coking, Spitzbergen coal proved excellent for bunkering and quickly found a receptive international market. In this context, the European Powers recognized that the regime of *terra nullius* that had been applied to the archipelago no longer sufficed. Talks to address the legal status of the islands were interrupted by the outbreak of the First World War, and in the wake of that conflict Norway submitted the Spitzbergen question to the Versailles Peace Conference for resolution. The ensuing 1920 Spitzbergen Treaty recognized Norwegian sovereignty over the islands, albeit with provisions to allow all signatories equal rights to continue to engage in commercial activities and to guarantee that the islands would remain demilitarized.[24] By the outbreak of the Second World War, Spitzbergen's coal industry had been concentrated in Norwegian and Soviet hands.[25] The Norwegian-operated mines were particularly productive,[26] making that country largely self-sufficient in bunker coal. Soviet mine production was largely routed to the Arctic ports of Murmansk and Archangel, where the coal heated the cities and fuelled port installations and supporting railways.[27]

In this context, the Canadian Military Headquarters (CMHQ) eagerly threw itself into planning what was then become known as Operation *Flaxman*. Nevertheless, the British War Office continued to shape the character of the operation—and to raise doubts about whether it should proceed. British intelligence appraisals provided to the Canadians assumed that their landing on Spitzbergen's shores would be unopposed: an important assumption given that all British assault craft were allotted to the pending Operation *Pilgrim* (the proposed British seizure of Portugal's Canary Islands) thereby making it "impossible to equip an expedition to Spitzbergen which will be capable of overcoming anything more than the very slightest opposition."[28] Senior British officers voiced concerns about a possible German air threat to the operation, but McNaughton did not see this as a serious risk. "Any air attack would be limited," a contemporary report noted, "and he was of the opinion that the expedition should not be cancelled on account of the danger of air attack." The Canadians could adopt passive defence (troop dispersion and slit trenches) to withstand a Germany attack, and the Force did have one light anti-aircraft battery. Brigadier Arthur Potts, the commander designate of Force 111, concurred.[29] Besides, McNaughton argued, the threat of air attack was worthwhile if it meant drawing off German bombers from somewhere more important like the Soviet Front.[30]

Having heard McNaughton's appraisal of the risks, the War Office decided to proceed with preparations for *Flaxman* in early August 1941 but delayed launching the operation until it collected more intelligence on the archipelago.[31] Based on the assumption that the project had been approved by the British War Committee, the Canadian War Committee told McNaughton on 31 July that it was:

quite prepared to have you act on your own judgement as to whether to cooperate and to what extent. In arriving at a decision you will no doubt have regard to question as to whether prospects of success are sufficient to warrant risks involved which include not only personnel but possible encouragement to enemy if results negative or worse. We here are not in a position to judge of above and other conflicting factors but prepared to leave decision to your judgement.[32]

The British War Cabinet approved Operation *Flaxman* on the morning of 5 August, setting some 2,000 Canadian troops into motion the following day. The Canadians moved out of their camps outside of Oxted, arriving at the town's train station before noon, finding specialized kit waiting for them. By 12:30 pm the first train had been packed with kit and men and departed for Glasgow. As Oxted disappeared behind them, "the general feeling … was one of relief that the journey had commenced," noted the Saskatoon Light Infantry war diarist, "and many wondered whether or not we should see the village again."[33] Secrecy had been a central element in the preparations of *Flaxman*.[34] There was plenty of speculation amongst the men as to what was going to happen. As far as they knew, they were participating in an exercise called "*Heather*." As the Second Canadian Infantry Brigade war diary notes, the soldiers were told simply "that we were to do a job of extreme importance, a job that had to be done before the enemy could get a chance at it. That this job involved a sea voyage was also given out."[35]

In the meantime, the COS had sent a naval reconnaissance mission to Spitzbergen.[36] On the evening of 5 August this small reconnaissance force, led by Rear-Admiral Philip Vian,[37] signalled the Admiralty to report that there were no Germans in the archipelago. Furthermore, he assessed that "[while] a military occupation of Spitsbergen would no doubt be possible … a naval one was not, because the fiords were iced up for most of the year."[38] Vian determined that the available harbours in Spitzbergen were too large for effective anti-submarine and anti-aircraft defences,[39] and the lack of port facilities made it "doubtful if even the redoubtable American Sea-Bees could have made a base out of those mountainous and ice-covered islands."[40] Accordingly, Vian recommended that the "project should be abandoned."[41]"

The COS met with McNaughton and Potts the following day to review the situation. McNaughton arguing that Admiral Vian "did not appear to have a clear appreciation of the 'object' of the proposed expedition,"[42] and he requested that the Canadians be sent for training at the Combined Training Centre at Inverary, Scotland, until the COS rendered their final decision. "The troops taking part in the expedition were completely untrained in combined operations," McNaughton explained, "and if they could be held at Inverary they could spend their time most usefully in practicing beach landings."[43] The COS agreed to McNaughton's request and postponed the sailing of *Flaxman*. It also ordered Vian to return to London and report to them in person before they decided on the ultimate fate of the operation.

Two thousand Canadian troops, "loaded like a bunch of sardines into the carriages" of trains heading north to Glasgow, were completely unaware of these developments at the War Office. Arriving in the Scottish hub that evening, the Canadian troops quietly boarded the large transport ship *Empress of Canada*. It departed that night, proceeding slowly down the congested Clyde before turning north and heading up Loch Fyne. At noon on 8 August, the ship dropped anchor offshore the Special Training Centre (STC) at Inverary.

Centre staff devised an intense training regime for the Canadians, consisting of two main elements. The first was infantry training: rough country route marches and cross country manoeuvers.[44] The troops were subjected to physical exhaustion, exposed to the harsh highland elements, and then forced to make tactical decisions. They were also taught to read and sketch maps of the terrain, set demolitions, and fight in an urban environment.[45] The second element of training was "boat work" wherein the troops practiced landing operations. This realistic and comprehensive training impressed the officers and troops, although "the complete lack of air support integrated into the combined arms training" reaffirmed what Stacey observed to be "a common army complaint of the period."[46] Canadian Press's lead war correspondent Ross Munro, assigned to cover the Canadians, reported with dark humour:

There was no assault equipment available (since combined-operations developments were only beginning) and practice landings were made in ordinary lifeboats and whalers from *Empress*. Civilian motor-boats, which had seen far better days and now had been taken over by the army, were put in the hands of the Army Service Corps motor-boat companies, to their complete disgust, and were used to land supplies and ammunition… There were comic scenes every day along the beaches of the *loch* as the Canadians tried to handle the awkward lifeboats. It would have been perilous indeed to attempt an opposed landing with such unsuitable craft.[47]

As the Canadians continued their training in Scotland, Vian arrived in London on 9 August to report to the COS in person, reiterating that the proposed anchorages at Spitzbergen were not defendable from air or submarine threat and were unusable during much of the year due to sea ice. Alternative to a permanent anchorage, Spitzbergen's many fjords "could be used as temporary refuelling depots during the summer. During the winter darkness, the convoys can travel closer to Norway using less fuel and be bunkered in Murmansk." In sum, Vian saw "no military advantage in establishing a garrison" in Spitzbergen.[48] Despite losing the rationale of using Spitzbergen as a base to support Arctic convoys to and from Russia, the COS remained cognisant that there were economic advantages to stopping the flow of Spitzbergen coal to Norway. Furthermore, intelligence estimated the Norwegian miners on Spitzbergen had six months of supplies left, while the Soviets only had five weeks' worth (with no prospect of resupply because the Soviets were unwilling to send ships to the archipelago). In this humanitarian and economic context, the COS decided that the Allies would benefit if the miners were evacuated from Spitzbergen.[49]

Having reconsidered *Flaxman*, the COS revised the operation to accomplish the following:

- evacuate the Soviet miners to the Soviet Union;
- bring the Norwegian miners to the UK to mine coal;
- destroy the coal mining facilities in Spitzbergen;
- destroy the wireless and meteorological stations which supplied Germany with weather data.[50]

This called for a much smaller force of about 400 men, built around a company of Canadian infantry from the Edmonton Regiment and a company of Royal Canadian Engineers. The artillery and supporting occupational troops were cut, and a small detachment of Kent Corp Troops, Royal Engineers (specially trained for commando demolitions of machinery and port installations) were added in their place. Designated "Force 111," these troops could still defend themselves against a German air attack during their short stay at Spitzbergen using slit trenches and dispersion. A single ship, the *Empress of Canada* (already allotted to *Flaxman*), could transport the whole force. While this vessel returned the Russian miners to the Soviet Union, Force 111 could carry out the demolitions of the mines on Spitzbergen. "The essence of the operation is speed,"[51] the operational planners emphasized, to minimize the chance of German interference. If the enemy did manage to sink the *Empress*, the Canadians and the Norwegians could be embarked on the escorting British cruisers and destroyers and returned to England from Spitzbergen. Brigadier Potts would command the land operations while overall command of the revised *Flaxman*, now called Operation *Gauntlet*, would fall to Rear Admiral Vian.[52]

The Canadians at Inverary ceased their training late in the afternoon on 13 August. Boarding the *Empress* that evening, they arrived back in Glasgow the following day where the Patricias and the bulk of the Eddies, now superfluous to *Gauntlet*, departed on trains which returned them to their camps at Oxted. The *Empress* was unloaded and then reloaded with kit and supplies specific to *Gauntlet*'s requirements. A small Norwegian contingent of 25 soldiers boarded the ship, along with P.D. Yerzin, a Soviet Embassy official armed with a letter to the Soviet Consul in Spitzbergen from his government to ensure he cooperated with the enterprise.[53] The *Empress* sailed on the morning of 18 August for a still undisclosed destination to the soldiers aboard her—although the involvement of the Norwegians hinted to where they were going.[54] Buoyed with enthusiasm at the prospect of seeing action, the Canadians conducted boat drill as they sailed north beyond Scotland escorted by Vian's cruisers and destroyers.[55]

Operation *Gauntlet*

After a brief call at Iceland to refuel, the *Empress* and her escorting two cruisers and five destroyers continued north for Spitzbergen. As they sailed Brigadier Potts and Rear Admiral Vian drafted the details of the operation order for *Gauntlet*.[56] Due to strict operational secrecy, "only a very few senior officers of the force had the slightest inkling of the real plan." [57] The men cheered when they learned from Potts that they were mounting an industrial raid on Spitzbergen but were disappointed to hear that they were unlikely to engage any German forces. As the officers of Force 111 worked out the details of the plan for their respective units, the soldiers manning the anti-aircraft (AA) guns on the upper decks of the *Empress* donned the leather jerkins and heavy sheepskin coats that they had been specially provided for the mission. "The men were saying it was the first time their feet had been cold in August," the Saskatoon Light Infantry's war diary recorded. "This expedition is proceeding further north than any military expedition in history."[58]

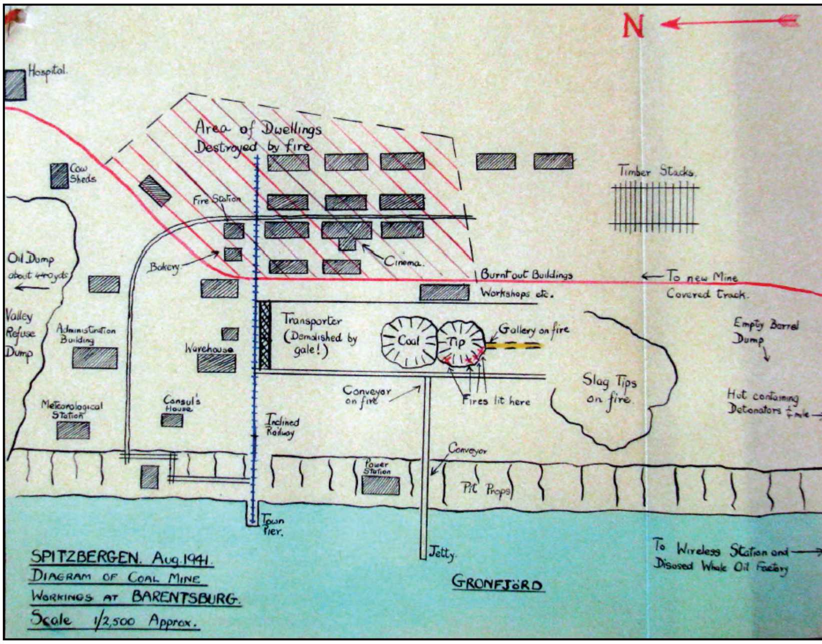
After rendezvousing off the coast of Spitzbergen with a ragtag convoy of fishing trawlers and an oiler sent to support *Gauntlet* on the night of 24-5 August, the small fleet arrived at the mouth of Spitzbergen's Isfjord early the following morning.[59] The ships trailed scouting Walrus aircraft up the Isfjord, with *Empress* dropping anchor five miles offshore the main Soviet settlement of Barentsburg. The troops emerging on deck found themselves "surrounded by barren hills covered at the top with snow and low floating clouds, at water's edge there are neatly piled glacier deposits—look almost like coal heaps—water is a brilliant green—numerous greyish coloured birds flying about called 'Farnos.'"[60] Surveying the surrounding mountains, the Canadians thought that "the land looked very barren … there were no trees or vegetation outside of moss to be seen. The weather was nice but very cool."[61] The Saskatoon Light Infantry war diary noted that "Spitzbergen is actually a bleaker country than Iceland. Clouds smouldered around the tops of the mountains and glaciers nestled in the deep ravines and valleys lead down to the fjord … From the distance, Barentsburg appeared to be a collection of wooden buildings in no semblance of order and rather dirty."[62] As the Canadians took in their first impressions of the archipelago, the destroyers, trawlers, and motorboats accompanying *Empress* came alongside her, picking up detachments of soldiers to be ferried to the other settlements scattered along the western coast of Spitzbergen.

That morning, the first soldiers landed by motorboat at Barentsburg, the Soviet settlement precariously perched on a steep slope along the frigid waters of the Isfjord.[63] Journalist Ross Munro, embedded with Force 111, described the scene:

On the dock stood a dozen scowling, silent Russians, very suspicious and extremely doubtful of our intentions, though they had been advised from Moscow we were coming. They wore dark caps and blue padded tunics with black drill trousers, a sinister-looking group. One came forward sullenly and our Russian liaison man, a thirty-five-year-old persuader, spoke to him. Still there were no smiles of welcome. The miner beckoned to the brigadier and his staff to follow him up the long flight of stairs past the red flag, with its hammer and sickle, to the administration building up the slope.[64]

Arrayed around the officials were many of the townspeople of Barentsburg, silently regarding their visitors. After the brief exchange between Yerzin and the Barentsburg officials, "who seemed anything but pleased at this intrusion and regarded the whole business with suspicion,"[65] Potts and his officers climbed the 301 stairs leading up the steep slope to meet in the administration building with the Soviet Consul.[66]

In contrast to the cool reception from Barentsburg's officials, the Canadians who remained down at the dock found the townspeople to be more friendly and welcoming. The Saskatoon Light Infantry soldiers accompanying the landing party described the Russian miners to be "large, swarthy chaps," the "Russian women broad of chest and broader of beam." Communications were established between the Canadians and Russians through the offering of cigarettes, and relations maintained through the use sign language.[67] The Russians quickly helped the troops unload their supplies for the command post that they intended to establish in the town,



with trawlers landing a procession of additional troops and supplies as the day progressed.[68]

The town certainly tweaked the senses. Canadians who left the dock and headed into town "were assailed by a sweet, sickening smell—the scent of eau de cologne," Munro recounted. "No liquor was permitted on the island for the miners, so they imported great cases of eau de cologne and drank it wholesale. The whole town reeked of the stuff."[69] The troops discovered Barentsburg to be home to just over 1,200 men, women and children,[70] built around "three dreary but surprisingly well-built barracks" totalling 55 wooden buildings in all.[71] The few streets running through Barentsburg were caked in thick mud, the result of glacier runoff from the mountains above and the top layer of the ground's permafrost melting during the summer.[72] Despite the ramshackle appearance of the place, the town hosted "an up-to-date kitchen, laundry, bakery, workshops etc, and a fair sized theatre."[73] The town was also wired with a public announcement system that broadcasted six hours of propaganda a day, as well as radio programming from Russia.[74] Some 35 draft ponies for the mines, 60 cows for diary and beef, and 600 pigs were counted, the livestock appearing to have been "well carried for and housed in clean surroundings."[75] However, Lieutenant Colonel Playfair, the Canadian doctor assigned to Barentsburg, found the sixteen-bed hospital, staffed by one doctor, to be "in a very unsanitary state. Equipment, while adequate, was for the most part of a poor type."[76] An enclosed small gauge electric railway caked in coal dust snaked through town, leading from the 100,000 ton coal pile on the shoreline to the primary "Old Mine" shaft above the town before branching off to the "New Mine" roughly four miles to the north.[77] Much of the railway was enclosed with wooden boarding, with the troops noting "an unlimited supply of lumber" lying about the village,[78] contributing to an overall perception of the village as being "generally… dirty and untidy."[79]

Potts, his delegation, and the Soviet officials met in a large building in the centre of town that housed the communal dining hall, kitchens, and offices of the Soviet Consul and his supporting staff.[80] Described by an accompanying British official as "an unctuous little man with a diverting squint," Consul Wolnuhi was openly apprehensive about being repatriated to the Soviet Union,[81] even after Yerzin gave him the Soviet Embassy's letter directing him to cooperate with the Canadians in evacuating Spitzbergen's Soviet citizens.[82] Potts made clear that the evacuation was to be complete in 24 hours and that each Russian was limited to 100lbs of personnel baggage (200lbs for a family) and that alcohol, animals, and furniture were not to be taken.[83] Potts was surprised to learn from the Wolnuhi that he had already been advised by radio of the proposed evacuation (violating the radio silence and secrecy surrounding the operation) and that his people were quite prepared for it. Abiding by the instructions, Wolnuhi led the delegation outside and into Barentsburg's square where he informed the townspeople that they were being repatriated to Russia and that baggage restrictions being placed on them due to time constraints.[84]

Military guards, who were posted at the Consul's office, the power house, and the wireless station, observed that Barentsburg was coming to life. "The only store in town was doing a roaring business till quite late, outfitting them [the Russians] with new clothes, shoes etc.," the brigade war diary noted. "They were quite a friendly lot and did their best to make everyone comfortable."[85] The Russians operating the wireless station agreed to maintain "business as usual" for the time being, thus ensuring that radio communications did not tip off anyone listening that something was amiss.[86]

Meanwhile other detachments of Force 111 fanned out across Spitzbergen. Although the Canadians' first priority was evacuating the Soviet miners from Barentsburg and their satellite settlements of Grumantby and Pyramiden to the *Empress*, advanced parties also landed at the Norwegian settlements to establish contact.[87] The destroyer *Icarus* had left *Empress* behind, travelling a further 25 miles up the Isfjord to land a party of Canadian and Norwegian officials at Longyearbyen. Here, the Canadians found a "curious crowd on pier, many in picturesque fur costumes."[88] The Norwegians informed the visiting party that they were "very happy to see the arrival of the British forces, as they were very fearful of German invasion" after Vian's reconnaissance of Spitzbergen some three weeks earlier.[89] The landing party was taken to see Governor Sysselman Marlow and his officials, including the director of the mines at Longyearbyen Einer Sverdrup.[90] The Canadians duly presented the governor with a proclamation, provided by the Norwegian government in exile in London, calling for the evacuation of all Norwegians on Spitzbergen to the United Kingdom. The Norwegian officials "were very astonished and upset on learning of evacuation scheme," the war diary of the Edmonton Regiment observed. "It was anticipated that we [the Canadians] were going to hold the island. However, after first shock was over, they co-operated fully with us." [91] Marlow promptly posted the proclamation and then he and his officials joined the Canadians in conference to discuss the sabotaging of the Norwegian mines.[92]

Longyearbyen's citizens also had been expecting a permanent Allied military occupation which would allow them to remain in their community and, therefore, were upset to learn that they were to be evacuated.[93] Their situation was materially different from that of the Russians, with whom the relatively self-contained Norwegian community living in Longyearbyen had few interactions. "Life was not unkind to them there on Spitsbergen," Munro described of the Norwegians. "They had their own community centres ... their houses were comfortable and they had their own church and stores, with plenty of food. Cigarettes and semi-luxuries came from Norway every few months." After appropriate explanations from the Norwegian officials and soldiers of Force 111, however, the townspeople accepted the evacuation order. "The great majority [of Norwegians at Longyearbyen] hated the Germans and spoke heatedly of the German occupation of their homeland," Munro recalled. "They talked over the whole question of evacuation in their meetings and agreed to the plan to go back to Britain with the raid force as soon as the *Empress* returned from Russia. Methodically they began to pack their things." [94]

The initial landing party of 20 Canadian troops were quickly joined by 70 more, jumping from the bow of the *Icarus* directly onto the pier.[95] The soldiers immediately fanned out across Longyearbyen, setting up Vickers AA guns and Bren guns for ground defence, supplemented by a roving piquet for security. The Canadians elected to place their command post at the Hotel Nesse, adjacent to where coal was loaded onto awaiting ships, but elected to billet most of their enlisted men deeper in town at Longyearbyen's cinema.[96] The troops also made contact with the wireless operators who shared their logs with the signals detachment, agreeing to broadcast false weather reports (this time of heavy and persistent fog) to discourage any German reconnaissance flights over the Islands during the operation.[97] In the end, this deception worked—a key element in ensuring that the Germans did not obstruct the efficient evacuation and demolition operations.

The Canadians drew sharp contrasts between the town of Longyearbyen and Barentsburg. The glacier-fed water source was of good quality and was pumped into town to meet the needs of Longyearbyen's 700 inhabitants, including a swimming pool, steam baths and showers. The town's plumbing was limited, provided by chamber pots and outhouses, with waste water from houses running into open drains. In contrast to Barentsburg's hospital, Lt. Col. Playfair found Longyearbyen's sixteen-bed hospital "clean and well equipped with an operating theatre, consulting room, dispensary, X-Ray, dental equipment, ultra violet lamp, lights and steam heating." It was staffed by one doctor (who was also a dentist), a medical student, and three nursing sisters, all of whom Playfair found kind and cooperative.[98] The Norwegians maintained significantly less livestock than their Russian neighbours, keeping only six horses, seven cows, 60 pigs, and 22 huskies.[99] All things considered, this "clean and neat Norwegian town" appealed to the Canadians much more than the Russian settlements.[100]

The infrastructure at Longyearbyen's three coal mines also impressed the military engineers. Touring the mining facilities with Sverdrup, Force 111's head engineer Major G. Walsh learned that mine No. 1 had been producing some 200,000 tons of coal per year. This coal was transported by an aerial tramway in large buckets some 2.5 miles down to the coal dump along the pier. This pile approximated some 160,000 tons of coal. The No. 2 mine yielded half this production, while the No. 3 mine was new and had not yet achieved full production. All of the mines were modern, driven by a power house containing three turbines. Some 50,000 gallons of fuel oil and gasoline were in storage.[101] A frustrated Sverdrup explained that production had suffered greatly since Vian's earlier reconnaissance had placed the miners on edge, fearing German reprisals. Morale was low at No. 1, and production had ceased at No. 2 and No. 3 due to miners not showing up for work.[102]

By early the next morning of 26 August, Barentsburg's pier had become a hub of activity. Some 50 tons of Russian communal supplies, including sensitive equipment from their meteorological and wireless stations had been loaded aboard *Empress* during the night.[103] As the brigade war diary recounted, "a score or so of RUSSIANS [assisted the Canadians] ... with the unloading of the Trawlers and reloading the stores and supplies in mine coal cars and towing them up the steep bank to the town above, where they were again unloaded, and the cars filled with Russian supplies and let down the bank again to the pier, where they were piled ready to be taken to the troop ship and back to RUSSIA."[104] Although the Russians had "certainly wanted to take a conglomeration of stuff," they had been particularly upset to learn that their livestock were to be left behind and destroyed as "even their horses followed them around like dogs."[105] As the magnitude of the evacuation settled in, and people reflected on what they were being asked to give up and return to in the Soviet Union, Munro observed how Barentsburg became an increasingly dejected place:

The evacuation was a weird affair. All night long, Russian men, women and children packed suitcases, bags and boxes. Women wore kerchiefs over their heads, peasant style, and men were in their dark miners'

peasant clothes or their best suits, with clean shirts and collars. Children wailed, parents cajoled and dogs howled. The babble of the evacuating horde echoed over the still *fjord*. It was a dismal and dejected community that was leaving its barren home at the foot of snow-capped mountains on this forbidding, treeless island. They had no idea what the future held. They were not optimistic. They always listened to the Moscow radio and its grim news of the Russian front and they knew their country was in deadly peril. The young men wanted to get back to join the army at beleaguered Leningrad. They alone seemed anxious to leave.[106]

Individual Russians began to stretch the baggage restrictions when it was their turn to begin departing at 06:00. They carried large bundles, packed with "large quantities of bulk stores and personal baggage far in excess of the amount agreed upon." They had "broke open many of their own communal stores and distributed goods to individuals who packed them in their own luggage or carried them on the person."[107] The Canadians did their best to accommodate them and the miners and their families seemed to appreciate these efforts, appearing "quite happy" to the Saskatoon Light Infantry soldier on the scene. "The Canadians troops were making a big hit with them—carrying their luggage and showing them to their proper quarters" when they arrived aboard *Empress*.[108] As the morning wore on, however, the evacuation began to fall behind schedule, with a mountain of luggage growing on the pier, unloaded from the cars while troops helped the families down the steep bank from the town above.[109] It was no time for further delays, but the Soviet Consul's obstructionism nearly put a halt to the evacuation completely.

Wolnuhi had turned to drinking at his cottage on the edge of town after meeting with Potts and Yezin.[110] Fortified with large quantities of champagne by mid-afternoon, he suddenly demanded that the heavy machinery and mining equipment of Barentsburg also be loaded aboard *Empress*, despite already having agreed to restrictions imposed by the tight operational schedule and the limited space aboard the ship.[111] In light of these demands, Soviet officials stopped cooperating with the Canadians, throwing the tight schedule of *Gauntlet* into jeopardy. Despite the best persuasive efforts of military liaison officer Major Blake Bruce, Wolnuhi would not budge.[112] His demands could not have come at a worst time. Dead in the water and loading civilians, *Empress* was a sitting duck for a potential German air attack.[113]

Potts was quickly summoned to Barentsburg to deal with the troublesome Consul. Wolnuhi continued to be obstinate, declaring to the brigadier that he would only drop his demands if ordered to do so by Vian, the overall operational commander. Potts left to signal Vian aboard *Nigeria* to delegate authority to him to settle the matter, while Major Bruce stayed behind to ensure that two additional bottles of champagne and a bottle of Madeira made their way into the Consul's hands. Before word from Vian reached Potts, however, Wolnhi had degraded to a drunken stupor and fallen asleep on the floor.[114] "A half-dozen of his henchmen carried him, like a bag of potatoes, down the long flight of stairs to the wharf," Munro documented. "Dead drunk, he was taken aboard the *Empress* under a blanket and the rest of the dissenters followed without further protest."[115] With the Consul out of commission, his officials again proved cooperative in helping the Canadians finish the evacuation of Soviet citizens. Just after midnight, the *Empress* was underway for Archangel, escorted by Vian's *Nigeria* and two of his destroyers.[116]

Relations between the Canadians and the Norwegians proved overwhelming cordial, as ultimately had been the case with the Russians, but they were not without challenges as well. "The Norwegians became very friendly and there was only one small group on which the Canadians had to keep their eye," Munro recounted.[117] A group of local elites, known as "the Managers' Club," had created in Longyearbyen "all the atmosphere of a pleasant ski resort, with good claret to drink and excellent conversation with it."[118] They were not pleased to learn they would be evacuating Spitzbergen, and the day after their first meeting with Force 111 mounted a forceful case to stay and protect their investments.[119]

Norwegian mining engineer Einer Sverdrup, director of the Store Norske Spitsbergen Kulkompani (the mining company) at Longyearbyen,[120] argued fervently with Potts over the proposed destruction of his mines and their supporting infrastructure. "Einar, with his proud, erect stance, hawk-nosed thin face, and penetrating blue eyes, was not to be trifled with," observed Royal Navy Lieutenant Alexander (Sandy) Glen, an intelligence officer sent to Spitzbergen to liaise with Norwegian officials whom he had met there during expeditions in the 1930s. "He had made Store Norske. His was the leadership, the skill and the tenacity."[121] With such a strong vested interest in preserving his mines intact, Sverdrup wished to remain in Spitzbergen with a small caretaker party. Although the Canadian and British engineers repeatedly assured him that the demolitions would be done to allow for their restart in a reasonable period of time, Sverdrup rejected their logic. Frustrated, he threatened Potts that he would protest to his government.[122] Glen, a friend of Sverdrup, contextualized that "Einar ... never suffered fools gladly and he made no secret of that fact that those commanding this whole operation were not to be suffered either."[123] Potts, likely harbouring reciprocal opinions of Einar, assured him he would have every chance to protest when he arrived in Britain in a few days' time.[124] Marlow put on the pressure, asking Potts for his decision to refuse to leave a caretaker party behind in writing. Potts refused because "he did not consider it necessary to give anything in writing to the Governor who could doubtless obtain the report on the operation which would be rendered to H.M. Government, through his."[125] On this sour note, the meeting ended.

While the Canadians faced the threat of a looming diplomatic incident with Norway when they return to Britain, the delivery of the Russians to their homeland saw the earlier international relations incident with Consul

Wolnuhi definitively diffused. After an uneventful voyage, the *Empress of Canada* and her escorts arrived in the White Sea on 29 August. During his altercation with the officers of Force 111, the Consul had broken radio silence and dispatched a message to his superiors in Leningrad alleging that the Canadians had mistreated him and the miners. The following day the Soviet Embassy took up the matter with the British Foreign Office.[126] Word of this reached Vian aboard *Nigeria*, who simply replied to the Admiralty that the Consul's allegations were "quite untrue."[127] When Wolnuhi was confronted on the subject by Soviet officials, the Barentsburg Consul conceded that the evacuation and the passage to Archangel had been satisfactory.[128] That afternoon 1,969 Soviet miners and 250 tons of their baggage and stores were offloaded at Archangel, thus completing that part of the mission.[129] The following morning the *Empress*, after picking up 192 Free French soldiers who had been held in custody by the Soviets,[130] and her naval escorts made way for Spitzbergen to complete the mission as a whole.

The demolitions at Barentsburg started on 27 August. First, engineers set alight Barentburg's gasoline depot, located near the hospital, which "burned with most spectacular blaze."[131] A sub-section of sappers were also dispatched by motor boat to a nearby radio station to fell two radio towers, blasting the footings of both radio towers with charges equivalent to 40

blocks of gun cotton. Despite remotely firing the charges a substantial distance away, the tangible shockwave from the blast knocked the sappers off their feet but was unable to wipe the look of glee off their faces as they watched each 300 foot high tower crash to the ground.[132]

The engineers next turned to Barentsburg's large coal pile, estimated at some 150,000 tons, pouring fuel oil onto it before setting it alight. The Engineers followed up burning Barentsburg's oil dump in the afternoon.[133] The spectacle of 75,000 gallons of fuel oil igniting "impressed even those who had seen the London fires of 1940," Stacey recounted. "Exploding barrels were seen to a height of about 250 feet and were thrown from the pile, flaming, to a distance of from 350 to 400 feet."[134] The "large cloud of black smoke [that] hung over the town"[135] in the wake of the oil dump fire concealed the sight but not the sounds of the "thunderous explosions throughout the day signaling the destruction of mine equipment."[136] Nor did the smoke rising from Barentsburg obscure the 24 hours of continuous daylight that the troops worked through. At first the soldiers found the "weather exhilarating" due to the constant daylight and were "reluctant to go to bed,"[137] allowing them "to work long hours."[138] The lack of darkness soon shifted the troop's reluctance to sleep into an inability to sleep, placing "a large strain … on all the personnel as there was no let-up in the hours of alertness."[139] Working with explosives under tight deadlines while increasingly fatigued and surrounded by coal dust, fuel oil, gasoline, and dry timber was a recipe for disaster.

The first accident that the Canadians experienced was the outbreak of a fire on the evening of 28 August as they demolished mining equipment. It was quickly managed.[140] Another fire broke out the next day by the tipple house, used to offload the coal from their rail cars for deposit onto the coal pile, caused by demolitions that took 24 hours to finally extinguish.[141] The timber-constructed tipple house was again the scene of another fire the following day, when the use of its machinery caused a coal dust explosion, reigniting the fire. Caked in coal dust, the rafters and beans of the tipple house quickly burst into flames. Engineers had to tear down the building's roof and walls to ensure that the fire was fully extinguished.[142] A serious accident occurred on 29 August when Sapper B.H. Rilley of 3rd Canadian Field Company RCE was hit by shrapnel from demolitions of mining equipment late in the afternoon. Rilley, pierced through his chest and suffering a broken arm, was immediately attended to by Lt. Col. Playfair for shock and was quickly taken to the hospital at Longyearbyen which was still in operation.[143]

Despite these challenges the Canadians continued to make headway with their demolitions at Barentsburg. They rendered the town's powerhouse with charges and the machining shops useless by removing essential parts. This caused the New Mine, which was mostly below sea level, to flood. Major Walsh expecting it would freeze solid during the coming winter and remain frozen. The entrance to the Old Mine was collapsed with explosives, and Walsh's engineers also blew up a heavy crane that the Russians had used to load coal onto ships. Other hoisting machinery was destroyed by the firing of the coal pile. The narrow gauge railway was disabled by blasting its frogs and switches, used to allow cars to change tracks, and dismantling its trestles, the bridges used to overcome abrupt dips from the mines into Barentsburg. Lastly, four Russian motorboats were blown up using explosives.[144]

Demolitions began at Longyearbyen on 28 August, with the Canadian Engineers inspecting the coal mines, (including a defunct mine that had been on fire for 20 years).[145] Additional props were placed within the mines to reinforce and prevent their deterioration and vital components removed from the mines' supporting infrastructure.[146] Following this, the mine adits were collapsed with small charges.[147] Demolition crews paid particular attention to the powerhouse[148] but, unlike at Barentsburg, Longyearbyen's was simply disabled by removing the motors from the turbines[149] and cutting the transmission lines.[150] Furthermore, Lonyearbyen's fuel oil was not burned but poured into the sea.[151] The coal piles of some 150,000 tons were set ablaze.[152] A resigned Sverdrup touring the town took grim pleasure in observing the sappers attempting to destroy his company's aerial tramway that transported the coal from the mines to Longyearbyen's pier, noting how unimpressed he was with their repeated failures to do so.[153] The sappers succeeded on their third attempt, however, simultaneously shattering the three branches of the extensive tramway in a "particularly spectacular piece of demolition."[154]

The Canadians also made it a point to interact with the Norwegians, who were now being concentrated at Longyearbyen from their satellite communities as they awaiting the return of the *Empress*. On 28 August, members of the Eddies nailed up a sign advertising "CANADA CONTRA SVALBARD o.g. 6.30hrs" on Longyearbyen's main street. The Norwegian miners showed up on time and in force, defeating the hapless Eddies 7 to 1.[155] Overall, the Norwegians became increasingly sociable as the shock of evacuation wore off.[156] There were several weddings and the Canadians were invited by Governor Marlow to participate in the twentieth anniversary celebration of the church at Longyearbyen and in the final service held on 31 August.[157] Major Welsh led a detachment of soldiers and Royal Navy sailors, accompanied by a naval band, from the pier to the church, where Brigadier Potts and Royal Navy Captain Agnew of the cruiser HMS *Aurora* took the salute. After attending service, the band held a concert for the Norwegians while the officers accepted an invitation to the Governor's house for drinks while they awaited the *Empress*'s arrival.[158]

The *Empress* and her escorts cruised into the Isfjord on the evening of 1 September. The evening's entertainment, a performance by the newly liberated Free French soldiers, was interrupted when the ship's company noticed a fire raging off their port side where Barentsburg was located and sounded the alarm.[159] After observing the blaze from the bridge of the *Nigeria*, Vian dryly noted in his subsequent report that "it was evident that the demolition scheme had gone awry."[160] At 06:00 that morning, the soldiers in Barentsburg woke to a start to find "the south end of the town was ablaze." Strong southeast winds quickly spread the fire giving "D" Company of the Eddies mere minutes to evacuate their billets in the cinema.[161] Some of their kit was lost, including a Bren gun, three rifles, ammunition,[162] and cook Lance Corporal A.J. Dowdell's false teeth.[163] Piles of lumber quickly caught fire, and the spreading blaze exploding the oxygen tanks of the acetylene torches at the various machine shops, filling the air with steel and hampering firefighting efforts.[164] The fire continued to spread into the covered light railway, clad in lumber and saturated in coal dust. A steady 18-knot wind channeled by the shape of the cover railway acting as a flu, quickly whipped the fire into a raging inferno that threatened to overtake the town. Firefighting equipment was limited and a

Russian pump, fed by seawater to keep the flames at bay, broke down after a few hours of use. The soldiers did everything they could to stem the blaze but at times they could not get within 300ft of the inferno due to the intense heat.[165] Potts, observing the blaze from a Walrus aircraft circling above, saw the situation at Barentsburg was hopeless and ordered the troops to evacuate for Longyearbyen.[166]

The demolitions elsewhere on Spitzbergen went off as planned. All of Spitzbergen's free coal (approximately 450,000 tons), was burned along with 225,000 gallons of oil and gasoline and another 50,000 gallons poured into the sea. Motor boats and barges, once their roles in facilitating the evacuation were complete, were sunk. Summarizing his handiwork, Major Walsh estimated it would take six months of work to put the mines of Spitzbergen back into production.[167] In short, if the primary mission was to deny the Germans access to this source of coal, it was a resounding success.

At this juncture, the final evacuation of Spitzbergen began. The process started in earnest early on 2 September and consumed the entire day: all 799 Norwegians were not aboard *Empress* until midnight.[168] Work crews also loaded 500 tons of supplies for the Norwegian military aboard *Empress*, as well as an additional 200 tons of personal effects.[169] Many of the soldiers joined the Norwegians aboard the *Empress*, with only small shore parties remaining in Longyearbyen during the day to man the last wireless station and complete the demolition work.[170] The following day, the troops made their final sweep of Longyearbyen, checking for stragglers and ensuring that all the fires were out.[171] They took down the Norwegian flag flying in town so that it could be delivered to King Haakon, who would keep it until Norwegians returned to Spitzbergen.[172] At 18:00, troops sent the last radio transmissions from Longyearbyen and removed the valuable communications equipment for future Norwegian use, smashing the magneto and obsolete receiver.[173] The evacuation was complete at 21:00, and the *Empress of Canada* and her escorts set sail for Scotland.

When the *Empress of Canada* berthed back in Glasgow on the morning of 9 September, and immigrant officer onshore to greet her noted that "her deck rails were lined with uniformed and un-uniformed figures curiously surveying all around them, probably wondering what their new surroundings and temporary home were like, and prospecting on what it

held for them in their immediate days ahead."[174] The French were taken off the ship first and almost immediately entrained for London to join General Charles De Gaulle's nascent Free French Forces.[175] By noon the bulk of the Canadians began to disembark, eventually making their way by truck and train to their barracks in Oxted.[176] The Norwegians were the last to leave. Billeted in a nearby school for a few days as British immigration and security forces vetted them, most of the Norwegians who did not volunteer for service with Free Norwegian Forces were eventually sent to work the coal mines of the remote Orkney Islands.[177]

When the Canadians arrived back at Oxted the following morning, they were granted a well earned 24-hour leave. Looking back on *Gauntlet*, the Saskatoon Light Infantry's war diarist summarized that "the expedition was a wonderful experience." The soldiers' only real complaint that "they had no Bosche to shoot," but were newly confident they would one day get a chance to do so. In the meantime, the Canadians were determined to make the most of the short leave granted to them as a reward for their hard work. After all, while Spitzbergen was a small event from the perspective of the overall war, "five weeks away from their lady friends seemed a long time to them."[178] They also knew that a long path to victory lay ahead.

Taking Stock of *Gauntlet*

Taking stock of *Gauntlet*, official Army historian C.P. Stacey concluded that "the force employed was small and its object limited; this was, in fact, a minor operation whose importance could easily be exaggerated; but it achieved to the full all the results whose prospect had led the Chiefs of Staff to regard it as a valuable undertaking."[179] Indeed, while historians might be predisposed to dismiss or downplay the importance of *Gauntlet*[180] compared to more dramatic operations conducted by the Canadians and other Allied forces, the Spitzbergen raid did yield some useful lessons not only for Arctic operations but for small-scale, joint operations more generally. A report on British commando operations produced by the US military intelligence branch in August 1942 drew seven core lessons from the Spitzbergen raid which, when subjected to critical analysis, help to situate the operational experiences and command issues in context.

First, the report noted that the raid had modest but strategic significance, but was incorrect in its conclusions regarding the nature of this strategic significance. The report attributed the primary significance of *Gauntlet* to its destruction of "the facilities of a potential air and naval base from which Germany could have attacked British and American shipping along the Arctic Ocean supply route to Russia's northern ports."[181] While this strain of thought was present in the conceptual documents for *Flaxman*, such pretense had been stripped away in the plans for *Gauntlet* following Vian's reconnaissance mission to Spitzbergen. Ultimately, the Soviet geostrategic premise that Germany would use the High Arctic archipelago as a base from which to threaten the sea lane from the West to Archangel and Murmansk proved false. While Germany's occupation of Norway made these Arctic waters strategically significant, Germany was logistically stretched in the North without extending hundreds of miles further across the Barents Sea.[182] Furthermore, the German military believed that its bases in Northern Norway were sufficient for attacking the Arctic convoys to the Soviet Union.[183] The primary military objective of *Gauntlet*, as stated in the actual planning documents, was to deprive Germany of the use of any coal from the archipelago while also returning Soviet and Norwegian nationals to support their respective governments' war efforts.[184] This also missed the primary strategic significance of Spitzbergen to the German war effort.

Subsequent wartime experiences demonstrated that Spitzbergen's foremost strategic significance was the weather reports that its inhabitants provided to Germany. Reliable weather data was crucial in planning military campaigns. In the case of Germany, Arctic weather data was critical in timing its invasion of France, in shaping the German bombing raids during the Battle of Britain, in setting the date for the invasion of the Soviet Union, and in timing the Ardennes Offensive (when poor weather kept Allied air forces grounded).[185] Because the weather that affects much of Europe comes from its north and west, weather reports from Spitzbergen played an important role in Germany's compilation of continental weather forecasts.[186]

British Commandos mentions that the *Gauntlet* "expedition also deprived the Germans of a source of coal and of a radio meteorological station which, through the Nazi-dominated radio station at Tromso, Norway, had furnished the German Air Force with valuable weather data for bombing raids against the British Isles."[187] The loss of this weather information immediately prompted Germany to set up various manned and automated weather stations across Spitzbergen (and across the Arctic, even extending to the Labrador coast) which they would operate until the end of the Second World War.[188] It was not until later in the war that the Allies came to fully appreciate the value of this weather data to the Germans. While a small Allied presence would later be re-established in Spitzbergen in part to counter these weather stations, the size, isolation and ruggedness of the archipelago dictated that the Allies could do little more than reactively shutdown these stations when discovered rather than proactively prevent their establishment.[189]

Second, the US military intelligence branch report stressed the importance of security at sea. *Gauntlet* was a joint Arctic operation that relied upon sea power for transport and force protection. As Donald Bittner noted in a later study, "the Spitsbergen raid illustrated the advantages of sea power and the options available to the nation which possesses it."[190] Given their control of the sea, the British were able to dispatch the force with appropriate naval assets to mitigate the risks if the Germans opposed the landing and to ensure that the soldiers arrived safely:

During the most dangerous part of the voyage the troop transport was safeguarded by an aircraft carrier and land-based aircraft patrols, as well as by the three destroyers, so that it could have maximum protection against air attack. When distance had reduced the danger from German bombers, the aircraft carrier left the expedition and two cruisers joined the destroyer escort as replacements. The cruisers and the destroyers were the best type of vessels to deal with a possible opposed landing and to safeguard the transport in evacuating the Russians to Archangel.[191]

Equally important, the Royal Navy had the capacity to actually carry the Russian miners and their families to Russia and also to move the Norwegians at Spitzbergen to the United Kingdom. These nationals, in turn, could then support the Allied war efforts.

Third, *Gauntlet*'s tactical success can also be attributed to the unity of its command. The British Chiefs of Staff assigned supreme command of the expedition while at sea to the naval commander because of the vulnerability of the naval units to air attack. "This assignment of authority placed the greatest responsibility for the safety of the expedition and its ships on the individual—the naval commander—who alone controlled the means of evacuating the comparatively small force of soldiers," the report noted.[192] Nevertheless, Brigadier Potts was given command of all operations ashore. "In selecting Brigadier Potts for the command of this detachment of the Canadian Corps," General A.G.L. McNaughton wrote, "both General Pearkes and I had every confidence that he would discharge his responsibilities to the satisfaction of all concerned and I am very happy that this has been so."[193]

The main challenge facing Potts was not military command relationship, however, but in managing the civilian dimension of the operation at Spitzbergen. "Civil-Military Cooperation is a military function that supports the commander's mission by establishing and maintaining coordination and cooperation between the military force and civilian actors in the commander's area of operation," Major Graham Longhurst explains.[194] Because local stakeholders were not involved in the planning of the operation and were even taken aback by the proposed activities, Potts had to effectively communicate and negotiate with civilian officials, allay their concerns, and even overcome resistance from some local stakeholders before he could provide humanitarian assistance to allied populations and complete demolitions in compliance with the mission mandate. As the primary link between the military and the local civilian organizations, Potts used his command authority and skills of persuasion—aided by clever tactics such as plying the Russian counsel with alcohol—to secure cooperation or acquiescence from civil authorities. Although questions would later arise about whether the conduct of the mission met legal and moral obligations to the local population, the accusations launched at the Canadian soldiers for discourteousness, misbehaviour, or malfeasance in the burning of Barentsburg proved unfounded. Instead, the interactions between the military force and the allied populations on Spitzbergen proved overwhelming friendly and cooperative.

Fourth, the special training provided to the Canadian soldiers who participated in the raid was both appropriate and effective given the scope of the operation. Although planners did not anticipate that the force would engage the enemy and the troops assigned to *Gauntlet* were not commando troops, the mixed task force "received typical commando training for a combined amphibious operation" and prepared for an opposed landing. The intensive course provided at the Combined Training Center in Inverary provided the ground troops and naval units with ample opportunities to rehearse their roles and practice close coordination, thus allowing them to execute their assigned tasks at Spitzbergen efficiently. While the soldiers did not ultimately have to apply the "battle drill" that they learned in a combat scenario, in this particular case "the physical hardening of the men enabled them to endure the extremely strenuous labor necessary in carrying out demolitions, and in loading and unloading ships."[195] Brigadier Potts reported that everyone under his command "worked with the greatest energy and that the spirit shown was excellent."[196] Accordingly, advanced training and preparations allowed the task force to accomplish its mission objectives through concentrated, concerted action without adding unnecessary civil hardships or compromising civil objectives.

Fifth, the composition of the task force showed the effectiveness of integrating a balanced group of individuals with appropriate skills and expertise to handle all phases of the mission. Infantry formed the largest element of the force, which reflected the possibility of an opposed landing and the need for a critical mass of soldiers to oversee the evacuation efforts. Engineers, who were charged with carrying out the main object of the task-demolitions, formed the next largest group, led by a highly qualified mining engineer. An appropriate number of signal troops also succeeded in seizing, operating deceptively, and ultimately destroying the radio stations on Spitzbergen in cooperation with local civilians. Furthermore, the inclusion of a small detachment of 25 Free Norwegian troops also proved beneficial to this alliance operation, lending "greater validity to the mission in the eyes of the Norwegian residents, who had to stand by and see their property destroyed at a time when it was not under control of the enemy nor facing direct threat of attack."[197] In turn, this helped to ensure favourable civilian perceptions of the military force and indicated its determination to act in the civil interest.

Sixth, Operation *Gauntlet* was conducted with the utmost secrecy from conception through its execution. During the early stages, the expedition was treated as a training exercise, and senior officers withheld information on the nature and destination of the expedition from junior officers until the task force was well out to sea (and, in the case of the soldiers themselves, until the evening before the landing). "This circumspection precluded any possibility of a leakage by gossip that might have imperiled the whole task force," the American report noted.[198] This secrecy avoided notifying the enemy of the activities and thus precluded German interference in the operation.[199]

Seventh (and connected to secrecy), successful signals operations contributed to the security and success of the mission in denying the enemy access to intelligence and furnishing false weather information to deceive the enemy. The naval units maintained radio silence during the voyage to Spitzbergen, thus depriving the Germans of potential communications that might have revealed the location of the vessels or the intent of the mission. Furthermore, the ongoing transmission of deceptive weather reports from Spitzbergen by local Norwegian operators concealed from the enemy that anything unusual was taking place on the islands and discouraged German aerial reconnaissance.[200] In short, the operation made effective use of local civilian resources to collect information for intelligence production and as a means of propagating disinformation.

Potts also showed flexibility in his approach, recognizing the need to carry out assessments of the local civilian environment and to adapt plans (where possible) to meet local needs. Although the original plans provided for a small maintenance party of Norwegians to remain on Spitzbergen, a spokesperson for the resident community explained that leaving anyone behind would be a "breach of faith" and requested on behalf of the Norwegian inhabitants that everyone be evacuated to Britain. Fear of reprisals against anyone who remained, or against their families back in Norway, justified this argument. Potts considered this request in an impartial manner and, after consulting with Vian, agreed. This display of pragmatism and sensitivity helped to make the mission successful.

The US military intelligence report on commando operations noted that the value of a raid comes with assuring contact with enemy troops. Furthermore, proper publicity is key to exploiting the moral value of any raid.[201] *Gauntlet* failed on the first count by deliberate design and, by extension, it also failed on the latter. By avoiding enemy contact, the mission did not achieve its unstated political objective of heartening the Soviets—a consideration exacerbated by enthusiastic British and Canadian media coverage that seemed to inflate the risk and significance of the operation. Sir Stafford Cripps, the British ambassador in Moscow, reported to the Foreign Office on 9 September 1941:

> The account of the Spitzbergen operation by the B.B.C. today … was disastrous as far as this country is concerned. It was apparently an attempt to make out that this operation was a dangerous and important one … In view of their recent pressure on us to do something big in the West, this will be taken as an elaborate and stupid attempt to magnify a simple and safe operation into something large and important and will either be resented or laughed at.[202]

In the eyes of the Russians, Operation *Gauntlet* (like the other minor operations undertaken along the Norwegian and French coasts) was no substitute for the demanded Second Front.[203]

Nevertheless, the operation brought additional lessons and benefits for the Canadian Army. Stacey observed that this "adventurous enterprise" had a "useful effect upon morale," providing expectations of future employment against the enemy.[204] Furthermore, "the successful outcome of this minor operation" meant that "McNaughton's powers were widened: he was now permitted to take immediate action to commit his troops to raids or similar operations," his biographer John Swettenham explained.[205] None of these operations would take the Canadians back to the European Arctic, however. Instead, subsequent wartime developments would encourage Canadian decision-makers to reconceptualize their country's own northern expanses as a potential theatre of operation. Given the frozen waters of Canada's Arctic Archipelago (which precluded using them as reliable sea lanes), the different topographical and climatic conditions in the North American Arctic, and the presence of Inuit and other northern Indigenous peoples in Canada's North, the Canadian Army's training and operational experiences in its own northland would bear little resemblance to what they had experienced in the European Arctic during *Gauntlet*. Effectively operating in the Canadian Arctic and Subarctic would only come after learning a distinct set of lessons about how to prepare, live, and operate in northern conditions.

Appendix 1: Composition of Force 111[206]

Unit	Officers	Enlisted Men
Canadian:		
Headquarters, 2 Canadian Infantry Brigade	5*	12
Signals Section, 2 Canadian Infantry Brigade	2	32
3 Field Company, Royal Canadian Engineers	5	191
D Company, plus one platoon C Company, Edmonton Regiment	6	153
Saskatoon Light Infantry (Machine Gun) (Composite detachment)	4	80
Detachment, Royal Canadian Army Medical Corps (from 5 Canadian Field Ambulance)	3	23
"X" Canadian Field Cash Office,	1	2
Royal Canadian Army Pay Corps *Empress of Canada* Ship's Staff (from Edmonton Regiment)	2	5
	29	**498**
British:		
Detachment, Kent Corps Troops, Royal Engineers	4	31
Detachment, 992 Docks Operations Company, Royal Engineers	1	18
Detachment, "B" Section 1 Motor Boat Company, Royal Army Service Corps	1	19
Detachment, 60 Detail Issue Depot, Royal Army Service Corps	-	6
"D" Field Cash Office, Royal Army Pay Corps	1	2
Royal Engineers (Movement Control),	-	3
Attached 2 Canadian Brigade Headquarters		
Intelligence Corps	3	-
Army Film Unit	1	-
Major H.C. Smith, Liaison Officer**	1	-
Captain E.W. Proctor, Royal Engineers	1	1
Major A.W. Salmon, Royal Army Service Corps	1	-
	14	**79**
Norwegian:		
Detachment, Norwegian Infantry	3	22
TOTAL:	46	599

*This figure includes civilian journalist Ross Munro (Canadian Press).

** Canadian serving with British forces.

Notes

[1] C.P. Stacey, "The Canadians at Spitsbergen," *Canadian Geographical Journal* (1942): 62.
[2] The other operation involved the deployment of Canadian sappers to the fortresses of Gibraltar. C.P. Stacey, *Six Years of War* (Ottawa: Queen's Printer, 1955), 299.
[3] For more on the strategic background and planning that led to Operation *Gauntlet* see: Ryan Dean and P. Whitney Lackenbauer, "Conceiving and Executing Operation *Gauntlet*: The Canadian-Led Raid on Spitzbergen, 1941," *Canadian Military History* (forthcoming, Fall 2017) and Éric Coutu, "Le quartier général des opérations combinées et l'expédition canado-britannique au Spitzberg (août 1941)," *Guerre mondiale et des conflits contemporains* 220:5 (2004): 45-69.
[4] On Canadian contributions to Operation *Cottage*, see Stacey, *Six Years of War,* 492-505; Brian Garfield, *The Thousand Mile War* (Fairbanks: University of Alaska Press, 1995), and Galen Perras, *Stepping Stones to Nowhere: The Aleutian Islands, Alaska, and American Military Strategy, 1867-1945* (Vancouver: UBC Press, 2003). As a result of a friendly-fire incident, Japanese booby-traps, and ammunition incidents, four Canadians and 28 Americans were killed during the Kiska operation.
[5] Official Army historian C.P. Stacey wrote a short wartime article on *Gauntlet*, "The Canadians at Spitsbergen," highlighting some of the soldiers' experiences for the public and dedicated a few pages in *Six Years of War* (301-307) to outlining the operation from a Canadian perspective. Donald Bittner elaborated on the operational experiences covered in Stacey's original article some twenty-five years later. See: Donald F. Bittner, "Descent in the North - The 1941 Canadian Raid on Spitsbergen," *Canadian Defence Quarterly* 11:4 (1982): 28-34. In a broader context, nesting *Gauntlet* within the Allied occupation of Iceland see: Bittner, "The British Occupation of Iceland, 1940-1942," unpublished Ph.D. dissertation (University of Missouri – Colombia, 1974). A relatively recent article by French historian Éric Coutu also addresses the raid. See: Coutu, "Le quartier général des opérations combinées et l'expédition canado-britannique au Spitzberg," 45-69. Coutu situates the raid in the early wartime development of Britain's Combined Operations Headquarters. See: Coutu, "Les missions effectuées par le Quartier général des opérations combinées de 1940 à 1942" (Université de la Sorbonne Nouvelle - Paris 3, unpublished Ph.D. dissertation, 2005). Beyond these sources and a handful of memoirs, for example, Ross Munro, *Gauntlet to Overlord: The Story of the Canadian Army* (Toronto: Macmillan Company of Canada Limited, 1946); Sir Philip Vian, *Action This Day: A War Memoir* (London: Frederick Muller Ltd., 1960); and Alexander Glen, *Footholds Against a Whirlwind* (London: Hutchinson of London, 1975), few commentators seem to consider this relatively minor Arctic operation worthy of serious consideration.
[6] Stacey, "The Canadians at Spitsbergen," 71.
[7] Instructions for the Preparation of Force 111, 25 July 1941, LAC, RG 24-C-2, vol. 12298.

[8] Joint Planning Staff to the War Cabinet, "Operations in the North," 17 July 1941, The National Archives (TNA), file CAB 121/442
[9] Ibid and Chiefs of Staff Committee Meeting, 17 July 1941, TNA, file CAB 121/442.
[10] Instructions for the Preparation of Force 111, 25 July 1941, LAC, file RG 24 C-2, vol. 12298.
[11] Stacey, The Canadians in Britain, 11–12.
[12] Ibid, 22-6. On earlier aborted plans for Canadians to engage in combat and the resulting frustration of Canadian soldiers, see: Authority of the Minister of National Defence, *The Canadians in Britain 1939-1944* (Ottawa: The King's Printer, 1944), 22-6 and David Bercuson, *Maple Leaf Against the Axis* (Toronto: Stoddart, 1995), 62-5.
[13] John N. Rickard, The Politics of Command: Lieutenant-General A.G.L. McNaughton and the Canadian Army (Toronto: University of Toronto Press, 2010), 40-41, 52-53.
[14] Bercuson, *Maple Leaf Against the Axis*, 65; John Swettenham, *McNaughton 1887-1943*, vol. 2 (Toronto: The Ryerson Press, 1969), 181; and Rickard, *Politics of Command*, 41-43.
[15] C.P. Stacey, "The Spitzbergen Operation, August-September, 1941," Canadian Military Headquarters Report No.56 (1942), 2.
[16] Minutes of meeting attended at the War Office, 26 July 1941, LAC, RG 24-C-2, vol. 12298.
[17] Stacey, *Six Years of War: The Army in Canada, Britain and the Pacific,* 9, 60, 257 and G.R. Stevens, *A City Goes to War: History of the Loyal Edmonton Regiment (3 PPCLI)* (Edmonton: Edmonton Regiment Association, 1964), 211.
[18] Willy Østreng, *Politics in High Latitudes: The Svalbard Archipelago* (Montreal: McGill-Queen's University Press, 1978), 2-3
[19] Intelligence: Spitsbergen, 26 July 1941, TNA, file WO 106/1999.
[20] Jean Brilhac, *The Road to Liberty: The Story of One Hundred and Eight-Six Men Who Escaped* (London: Peter Davies, 1945), 201.
[21] Ernest Schofield and Roy Conyers Nesbit, *Arctic Airmen: The RAF in Spitsbergen and North Russia, 1942*, 2nd edition (Staplehurst, Kent: Spellmount, 2005), 61.
[22] Intelligence: Spitsbergen, 26 July 1941, TNA, file WO 106/1999.
[23] Ibid.
[24] Østreng, 2-3; Singh, *The Spitsbergen (Svalbard) Question*, 7 and Tryge Mathisen, *Svalbard in the Changing Arctic* (Oslo: Gyldendal, 1954), 31–2.
[25] Mathisen, *Svalbard in the Changing Arctic*, 21-22.
[26] P.J. Capelotti, *The Svalbard Archipelago: American Military and Political Geographies of Spitsbergen and Other Norwegian Polar Territories, 1941-1950* (Jefferson, North Carolina: McFarland & Company, 2000), 52.
[27] Ibid. 52, and Singh, *The Spitsbergen (Svalbard) Question: United States Foreign Policy, 1907-1935* (Oslo: Universitetsforlaget, 1980), 135.

[28] Joint Planning Staff, "Spitzbergen," 23 July 1941, TNA, file CAB 84/33.
[29] Memorandum by Brigadier Murchie, 6 August 1941, LAC, RG 24-C-2, vol. 12298.
[30] Chiefs of Staff Committee Meeting, 6 August 1941, TNA, file DEFE 2/228.
[31] Chiefs of Staff Committee Meeting, 6 August 1941, TNA, file CAB 79/13/0/1.
[32] DEFENSOR to CANMILITARY telegram G.S. 203, 31 July 1941, LAC RG 25-A-2, vol. 829.
[33] War Diary Saskatoon Light Infantry, Exercise Heather, 27 July 1941, LAC, RG 24-C-3, vol. 17489.
[34] Bittner, "Descent in the North," 30.
[35] Special War Diary 2 CDN INF BDE, Spitzbergen Expedition, 6 August 1941, LAC, RG 24-C-3, vol. 17489.
[36] Joint Planning Staff (41) 584, "Spitzbergen," 23 July 1941, TNA, file CAB 84/33.
[37] Vian had obtained fame early in the war due to his seizure of the German tanker *Altmark*, consort to the pocket-battleship *Graf Spee*, in Norwegian waters on 16 February 1940. In doing so, Vian had liberated 299 prisoners captured in commerce raiding across the South Atlantic by the *Graf Spee*. Vian, *Action this Day*, 24–9.
[38] Ibid, 70.
[39] The most suitable anchorage was a harbour five miles wide at its mouth, much too wide for an effective anti-submarine warfare (ASW) defence. The alternative anchorage suffered from poor anti-aircraft (AA) gun firing positions. Soldiers would not be able to get from their garrison to their guns fast enough to respond effectively to a sudden air attack. Regardless, the harbour was so large that the Bofors guns available had insufficient range to protect the anchorage. Chiefs of Staff Committee, Spitzbergen Report, 11 August 1941, TNA, file PREM 3/410.
[40] Schofield, *The Russian Convoys*, 23.
[41] Naval Cypher from S.O. Force A to CinC Home Fleet, 5 August 1941, TNA, file PREM 3/410.
[42] Chiefs of Staff Committee Meeting, 6 August 1941, TNA, file WO 106/1995A.
[43] Ibid.
[44] Canadian Military Headquarters (CMHQ), Historical Report, no. 56, "The Spitzbergen Operation, August-September 1941 (Special Expedition 111; Exercise 'HEATHER'; OPERATION '*Gauntlet*'" (20 December 1941), 6, www.cmp-cpm.forces.gc.ca/DHH, -dhp/his/rep-rap/cmhqrd-drqgmc-eng.asp?txtType=2&RfId=56.
[45] Military Intelligence Service, *British Commandos* (Washington DC, US War Department, 1942), 29, 100.
[46] CMHQ Historical Report, no. 56, "The Spitzbergen Operation," 6.
[47] Munro, *Gauntlet to Overlord*, 280-1.

[48] Chiefs of Staff Committee, Spitzbergen Draft Report, 9 August 1941, TNA, file CAB/80/59/0/1.
[49] Ibid. See also: Chiefs of Staff Committee Meeting, 6 August 1941, TNA, file WO 106/1995A.
[50] Chiefs of Staff Committee Meeting, 9 August 1941, TNA, file CAN/79/13/0/1.
[51] Joint Planning Committee Meeting, Operation "*Gauntlet*", 11 August 1941, TNA, CAB 84/34.
[52] Ibid.
[53] War Office for Foreign Office, Operation "*Gauntlet*", 17 August 1941, TNA, file WO 106/1998.
[54] Bittner, "Descent in the North," 29.
[55] War Diary "X" Canadian Field Cash, R.C.A.P.C. Force 111, 18 August 1941, LAC, RG 24-C-3, vol. 17489.
[56] Stacey, "The Canadians at Spitsbergen," 60.
[57] Ibid, 53.
[58] War Diary of Saskatoon Light Infantry, Exercise Heather, 23 August 1941, LAC, RG 24-C-3, vol. 17489.
[59] Diary of Ross Munro, 24 August 1941, LAC, RG-24-C-3, vol. 12298.
[60] War Diary No. 5 Fd. Amb. R.C.A.M.C, Force 111, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[61] Special War Diary 2 CDN INF BDE, Spitzbergen Expedition, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[62] War Diary of Saskatoon Light Infantry, Exercise Heather, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[63] Stacey, "The Canadians at Spitsbergen," 60-1.
[64] Munro, *Gauntlet to Overlord*, 284.
[65] Fred Whitcombe, *A Pictorial History of Canada's Army Overseas 1939-1945* (Montreal: Whitcombe, Gilmour & Company, 1947), 20.
[66] Army Film Unit, Secret Dope Sheet, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[67] War Diary of Saskatoon Light Infantry, Exercise Heather, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[68] Army Film Unit, Secret Dope Sheet, 9 September 1941, LAC, RG 24-C-3, vol. 17489.
[69] Munro, *Gauntlet* to Overlord, 284.
[70] Report on Barentsburg Party by Major Bruce Blake, 4 September 1941, LAC, file RG 24-C-3, vol. 17489.
[71] Glen, *Footholds Against a Whirlwind*, 81-2.
[72] Capelotti, *The Svalbard Archipelago*, 44.
[73] Special War Diary 2 CDN INF BDE, Spitzbergen Expedition, 25 August 1941, LAC, RG 24-C-3, vol. 17489.

[74] Operations at Spitzbergen "Signals Report" Capt. W.H.T. Wilson, 25 August 1941, TNA, file DEFE 2/228.
[75] War Diary No. 5 Fd. Amb. R.C.A.M.C, Force 111, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[76] Operations at Spitzbergen "S.M.O. Report" Lt. Col. Playfair (dated 6 September 1941), 25 August 1941, TNA, file WO 106/1942.
[77] Special War Diary 2 CDN INF BDE, Spitzbergen Expedition, 25 August 1941, LAC, RG 24-C-3, vol. 17489; Major G. Walsh, C.R.E. Report, Force 111, 25 August 1941, LAC, RG 24-C-3, vol 17489. The cars were not driven by a locomotive but were pulled by a steel cable down the centre of the railway, driven by motor connected to the town's power station. "Spitzbergen Expedition - OC Troops HMT Empress of Canada." 25 August 1941, War Diary of Saskatoon Light Infantry "Heather" Exercise.
[78] Special War Diary 2 CDN INF BDE, Spitzbergen Expedition, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[79] War Diary No. 5 Fd. Amb. R.C.A.M.C, Force 111, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[80] Special War Diary 2 CDN INF BDE, Spitzbergen Expedition, 26 August 1941, LAC, RG 24-C-3, vol. 17489.
[81] Glen, *Footholds Against a Whirlwind*, 82.
[82] Special War Diary 2 CDN INF BDE, Spitzbergen Expedition, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[83] Report by Major Bruce Blake in "EMPRESS OF CANADA" on Embarkation of Russians at Barentsburg, 28 August 1941, TNA, file WO 106/1942.
[84] Special War Diary HQ 2 CDN INF BDE, Spitzbergen Expedition, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[85] Ibid.
[86] Operations at Spitzbergen "Signals Report" W.H.T. Wilson, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[87] Stevens, *A City Goes to War*, 211.
[88] War Diary No. 5 Fd. Amb. R.C.A.M.C, Force 111, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[89] Operations at Spitzbergen "Signals Report" W.H.T. Wilson, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[90] Einer was the nephew of arctic explorer Otto Sverdrup who rose to fame while captaining the *Fram* on her voyages to chart what became known as the Sverdrup Islands in the Canadian Arctic archipelago from 1898 to 1902. Glen, *Footholds Against a Whirlwind*, 82.
[91] War Diary of Edmonton Regiment, Longyearby Force, "25 August 1941, LAC, LAC, RG 24-C-3, vol. 17489.
[92] War Diary no. 5 Fd. Amb. R.C.A.M.C, Force 111, 25 August 1941, LAC, RG 24-C-3, vol. 17489 and Longyearby Report (Force 111) by Captain Thompson,

Saskatchewan Light Infantry, for War Diaries, 26 August 1941 LAC, RG 24-C-3, vol. 17489.
[93] Bittner, "Descent in the North," 30.
[94] Munro, *Gauntlet to Overlord*, 289.
[95] War Diary No. 5 Fd. Amb. R.C.A.M.C, Force 111, 25 August 1941, LAC, file RG 24 C-3, vol. 17489 and Longyearby Report (Force 111) by Captain Thompson, Saskatchewan Light Infantry, for War Diaries, 26 August 1941, LAC, file RG 24 C-3, vol. 17489.
[96] Longyearby Report (Force 111) by Captain Thompson, Saskatchewan Light Infantry, for War Diaries, 26 August 1941, LAC, RG 24-C-3, vol. 17489 and War Diary of Edmonton Regiment, Longyearby Force, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[97] Stacey, "The Canadians at Spitsbergen," 62.
[98] Operations at Spitzbergen "S.M.O. Report" Lt. Col. Playfair, 25 August 1941, TNA, file WO/32/10090.
[99] War Diary No. 5 Fd. Amb. R.C.A.M.C, Force 111, 25 August 1941, LAC, RG 24-C-3, vol. 17489
[100] CMHQ, "The Spitzbergen Operation."
[101] Major G. Walsh, C.R.E. Report, Force 111, 25 August 1941, LAC, RG 24-C-3, vol. 17489 and War Diary No. 5 Fd. Amb. R.C.A.M.C, Force 111, 25 August 1941, LAC, RG 24-C-3, vol. 17489
[102] From Sverdrup's account, p.19.
[103] Operations at Spitzbergen, "Report on Barentsburg Party" Major M.I.LO, 25 August 1941, TNA, file DEFE 2/228.
[104] War Diary HQ 2 CDN INF BDE, Spitzbergen Expedition, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[105] War Diary of Saskatoon Light Infantry, Exercise Heather, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[106] Munro, *Gauntlet to Overlord*, 285.
[107] Operations at Spitzbergen, "Report on Barentsburg Party" Major M.I.LO, 25 August 1941, TNA, file DEFE 2/228.
[108] War Diary of Saskatoon Light Infantry, Exercise Heather, 26 August 1941, LAC, RG 24-C-3, vol. 17489.
[109] Army Film Unit, Secret Dope Sheet, 9 September 1941, LAC, RG 24-C-3, vol. 17489.
[110] Glen, *Footholds Against a Whirlwind*, 82.
[111] Bittner, "Descent in the North," 31.
[112] Report by Major Bruce Blake in "EMPRESS OF CANADA" on Embarkation of Russians at Barentsburg, 28 August 1941, TNA, file WO 106/1942 and Mann, *British Policy and Strategy towards Norway*, 49.
[113] Operations at Spitzbergen, Report of Military Commander Force 111, 26 August 1941, TNA, file DEFE 2/228.

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[114] Mann, *British Policy and Strategy towards Norway,* 49.
[115] Munro, *Gauntlet to Overlord*, 286-7.
[116] Bittner, "Descent in the North," 31, and Stacey, "The Canadians at Spitsbergen," 61.
[117] Munro, *Gauntlet to Overlord*, 289-90.
[118] Glen, *Footholds Against a Whirlwind*, 82.
[119] Mathisen, *Svalbard in the Changing Arctic*, 38.
[120] On Sverdrup's role in Store Norske Kulkompani see: Sigurd Westby, *Store Norske Spitsbergen Kulkompani 1916-1945* (Longyearbyen-Sveagruva: Store Norske, 2003).
[121] Glen, Footholds Against a Whirlwind, 82.
[122] Report by Major A.S.T. Godfrey, Operation "*Gauntlet*", 4 September 1941, TNA, file WO 32/10090 and J.G. Elbo, "The War in Svalbard, 1939-45" *Polar Record* 6:44 (1952): 486.
[123] Glen, Footholds Against a Whirlwind, 82.
[124] Report by Major A.S.T. Godfrey, Operation "*Gauntlet*", 4 September 1941, TNA, file WO 32/10090 and Elbo, "The War in Svalbard," 486.
[125] Major Godfrey APPENDIX II, Operation *Gauntlet*, 26 August 1941, TNA, file WO/32/10090.
[126] F.O. Minute, Mr. Strang, 27 August 1941, TNA, file FO 371-29489.
[127] Naval Cypher from S. O. Force "A" to Admiralty, 28 August, TNA, file FO 371/29489.
[128] Mr. Sargent to Mr. Maisky, 5 September 1941, TNA, file FO 371/29489.
[129] Quartermaster's Report Force 111, 26 August 1941, LAC, RG 24-C-3, vol. 12298.
[130] Following the Fall of France, these soldiers had been interned in German prisoner of war camps. Their repatriation continuously pushed off by their captors, they had escaped into the Soviet Union only to find themselves in worse conditions. *Gauntlet* afforded the various parties involved in this uncomfortable reality to return these soldiers to Britain where they could join the Free French Forces. For an eye-witness account of their ordeal, see Brilhac, *The Road to Liberty.*
[131] War Diary no. 5 Fd. Amb. R.C.A.M.C, Force 111, 27 August 1941, LAC, RG 24-C-3, vol. 17489.
[132] Diary of Ross Munro, 27 August 1941, LAC, LAC, RG 24-C-3, vol. 12298, and the wartime film "The Spitzbergen Raid (1941)," *World News*, www.youtube.com/watch?v=XXH_9crYM24.
[133] Diary of Ross Munro, 28 August 1941, LAC, RG 24-C-3, vol 12298.
[134] Stacy, "The Canadians at Spitsbergen," 62.
[135] War Diary HQ 2 CDN INF BDE, Spitzbergen Expedition, 27 August 1941, LAC, RG 24-C-3, vol. 17489.
[136] War Diary HQ 2 CDN INF BDE, Spitzbergen Expedition, 28 August 1941, LAC, RG 24-C-3, vol. 17489.

[137] Special War Diary 2 CDN INF BDE, Spitzbergen Expedition, 26 August 1941, LAC, RG 24-C-3, vol. 17489
[138] Special War Diary 2 CDN INF BDE, Spitzbergen Expedition, 27 August 1941, LAC, RG 24-C-3, vol. 17489
[139] War Diary of Edmonton Regiment, Longyearby Force, 25 August 1941, LAC, RG 24-C-3, vol. 17489.
[140] War Diary HQ 2 CDN INF BDE, Spitzbergen Expedition, 28 August 1941, LAC, RG 24-C-3, vol. 17489.
[141] War Diary of Edmonton Regiment, 29 August 1941, LAC, file LAC, RG 24-C-3, vol. 17489.
[142] Operations at Spitzbergen, "Report on Barentsburg Party" Major M.I.LO, 29 August 1941, TNA, file DEFE 2/228 and War Diary HQ 2 CDN INF BDE, Spitzbergen Expedition, 29 August 1941, LAC, RG 24-C-3. vol 17489.
[143] War Diary No. 5 Fd. Amb. R.C.A.M.C, Force 111, 29 August 1941, LAC, RG 24-C-3, vol. 17489.
[144] Major G. Walsh, C.R.E. Report, Force 111, 1 September 1941, LAC, RG 24-C-3, vol. 17489.
[145] War Diary No. 5 Fd. Amb. R.C.A.M.C, Force 111, 28 August 1941, LAC, RG 24-C-3, vol. 17489 and Operations at Spitzbergen "Longyearby Report" R.B.I. Thompson, 28 August 1941, LAC, RG 24-C-3, vol. 17489.
[146] Elbo, "The War in Svalbard, 1939-45," 486.
[147] Glen, *Footholds Against a Whirlwind*, 83.
[148] Stacey, "The Canadians at Spitsbergen," 61.
[149] Major G. Walsh, C.R.E. Report, Force 111, 3 September 1941, LAC, RG 24-C-3, vol. 17489.
[150] Glen, *Footholds Against a Whirlwind*, 83.
[151] Major G. Walsh, C.R.E. Report, Force 111, 3 September 1941, LAC, RG 24-C-3, vol. 17489.
[152] Elbo, "The War in Svalbard, 1939-45," 486.
[153] Sverdrup's account from Svalbard, 32.
[154] Stacey, "The Canadians at Spitsbergen," 62.
[155] War Diary of Edmonton Regiment, Longyearby Force, 28 August 1941, LAC, RG 24-C-3, vol. 17489.
[156] A telling indicator of this change was the petitioning of both Norwegian officials and Potts by a committee of miners and radio operators requesting that all Norwegian nationals be evacuated from Spitzbergen. See Notes on subsequent Meeting held at Longyearby, 31 August 1941, TNA, file WO/32/10090.
[157] War Diary, no. 5 Fd. Amb. R.C.A.M.C, Force 111, 31 August 1941, LAC, RG 24-C-3, vol. 17489.
[158] Operations at Spitzbergen "Longyearby Report" Capt. R.B.I. Thompson, 31 August 1941, LAC, RG 24-C-3, vol. 17489 and Longyearby Report (Force 111) by

Captain Thompson, Saskatchewan Light Infantry, for War Diaries, 31 August 1941, LAC, RG 24-C-3, vol. 17489.
[159] War Diary No. 5 Fd. Amb. R.C.A.M.C, Force 111, 1 September 1941, LAC, RG 24-C-3, vol. 17489.
[160] Operation *Gauntlet* Report of Proceedings, Vian, 1 September 1941, TNA, file "DEFE 2/228."
[161] War Diary of Edmonton Regiment, Spitzbergen Force, 1 September 1941, LAC, RG 24-C-3, vol. 17489.
[162] 1 September 1941, War Diary HQ 2 CDN INF BDE, Spitzbergen Expedition:
[163] The Eddies' war diary duly notes that despite the loss of his teeth, Dowdell "kept cooking and the men were supplied with hot food during the firefight." War Diary of Edmonton Regiment, Longyearby Force, 1 September 1941, LAC, RG 24-C-3, vol. 17489.
[164] War Diary HQ 2 CDN INF BDE, Spitzbergen Expedition, 1 September 1941, LAC, RG 24-C-3, vol. 17489.
[165] Bittner, "Descent in the North," 33.
[166] War Diary HQ 2 CDN INF BDE, Spitzbergen Expedition, 1 September 1941, LAC, RG 24-C-3, vol. 17489.
[167] Major G. Walsh, C.R.E. Report, Force 111, 6 September 1941, LAC, RG 24-C-3, vol. 17489 and Bittner, "Descent in the North," 33.
[168] War Diary "X" Canadian Field Cash, R.C.A.P.C. Force 111, 2 September 1941 LAC, RG 24-C-3, vol. 17489.
[169] Operations at Spitzbergen "Longyearby Report" Capt. R.B.I. Thompson, 3 September 1941, LAC, RG 24-C-3, vol. 17489.
[170] War Diary "X" Canadian Field Cash, R.C.A.P.C. Force 111, 2 September 1941, LAC, RG 24-C-3, vol. 17489.
[171] Ibid.
[172] War Diary of Edmonton Regiment, Longyearby Force, 2 September 1941, LAC, RG 24-C-3, vol. 17489.
[173] Operations at Spitzbergen "Signals Report" W.H.T. Wilson, 3 September 1941, LAC, RG 24-C-3, vol. 17489.
[174] Immigration Officer's Report, Norwegian Refugees & Company from Spitzbergen, 17 September 1941, TNA, file HO 213/1759.
[175] Immigration Officer's Report, Volunteers for the Allied Forces, 28 September 1941, TNA, file HO 213/1759.
[176] Special War Diary 2 CDN INF BDE, Spitzbergen Expedition, 10 September 1941, LAC, RG 24-C-3, vol. 17489.
[177] Immigration Officer's Report, Norwegian Refugees & Company from Spitzbergen, 17 September 1941, TNA, file HO 213/1759 and Orkney Constabulary to the Under Secretary of State, Home Office, Aliens Department, 10 November 1941, TNA, file HO 213/1759.

[178] War Diary Saskatoon Light Infantry, Exercise Heather, 9 September 1941, LAC, RG 24-C-3, vol. 17489.
[179] Stacey, *Six Years of War*, 306.
[180] See for example: Mann, *British Policy and Strategy towards Norway*, 50.
[181] MIS, British Commandos, 114.
[182] Ernest Schofield and Roy Conyers Nesbit, *Arctic Airmen: The RAF in Spitsbergen and North Russia, 1942* (Staplehurst, Kent: Spellmount, 2005), 14.
[183] Ibid., 63; Mathisen, *Svalbard in the Changing Arctic*, 102.
[184] Chiefs of Staff Committee Meeting, 9 August 1941, TNA, file CAN/79/13/0/1.
[185] Gerhard L. Weinberg, *A World At Arms: A Global History of World War II* (Cambridge: Cambridge University Press, 1994): 122, 204, 764; MIS, *British Commandos*, 114; and Franz Selinger and Alexander Glen, "Arctic Meteorological Operations and Counter-Operations During World War II," *Polar Record* 21:135 (1983), 563.
[186] William Dege, *War North of 80: The Last German Arctic Weather Station of World War II* (Calgary: University of Calgary Press, 2004); Selinger and Glen, "Arctic Meteorological Operations," 563; and Schofield and Nesbit, *Arctic Airmen*, 63.
[187] MIS, British Commandos, 114.
[188] For a history of Germany's Second World War weather stations, scattered across the Arctic from Canada to the Soviet Union, see: Dege, *War North of 80.*
[189] Selinger and Glen, "Arctic Meteorological Operations," 564.
[190] Bittner, "Descent in the North," 33.
[191] MIS, British Commandos, 116.
[192] Ibid., 115.
[193] 11 September 1941, A.G.L. McNaughton to General Sir John Dill, Chief of the Imperial General Staff, LAC, RG 24, vol. 12298, file "3 CDN CORPS-3 SPECIAL EXPEDITION No.111."
[194] Major Graham M. Longhurst, "The Evolution of Canadian Civil-Military Cooperation (CIMIC)," *Canadian Military Journal* (Winter 2006/07): 55-64.
[195] MIS, British Commandos, 114.
[196] Memorandum by the Chief of the Imperial General Staff, "Spitzbergen Operation," 10 September 1941, TNA, file PREM 3-410.
[197] MIS, British Commandos, 115.
[198] Ibid., 115-6.
[199] Capelotti, *The Svalbard Archipelago*, 59–60; Stacey, "The Canadians at Spitsbergen," 71.
[200] MIS, British Commandos, 116.
[201] Ibid, 120, 138.
[202] Sir S. Cripps to Foreign Office, 9 September 1941, TNA, file WO 106/2001.

[203] Christopher Mann notes that this argument for coastal raids as a surrogate Second Front was taken to its logical conclusion with the tragic Dieppe Raid. Mann, *British Policy and Strategy towards Norway*, 50, 92–3.
[204] Stacey, CMHQ Historical Report No.56, "The Spitzbergen Operation," para. 112.
[205] Swettenham, *McNaughton*, 182. The War Committee of Cabinet discussed the new powers that McNaughton was granted specifically for Spitzbergen operation and agreed to generalize this authority to cover future, similar projects of a temporary nature similar. "While suggesting McNaughton should use his own judgement whether to set in such cases," the committed noted, "he would notify Minister of National Defence in general terms prior to event where practicable." Secretary of State for External Affairs to Canadian High Commission, 10 November 1941, LAC, RG 25-A-2, vol. 829. In April 1942, a small party of Canadians participated in a British raid on the French coast near Boulogne but, failing to get ashore, they took no active part in engaging the Germans.
[206] See *Gauntlet-Flaxman*, Appendix VI - Order of Battle, 22 December 1943, TNA, file DEFE 2/228.

Chapter Two

Lessons in Arctic Warfare: The Army Experience, 1945-55

P. Whitney Lackenbauer, Peter Kikkert, and Kenneth C. Eyre

In the fall of 1949, the scenario imagined, armed forces of a powerful aggressor nation successfully struck and secured the Hawaiian Islands. As Washington concentrated its forces to re-take Hawaii, the enemy found a weak point in the defences of the United States: Alaska, the relatively undefended attic to the North American continent. On 1 December, in a series of lightning strikes, the enemy forces seized Anchorage and drove through light American resistance to capture Fairbanks, Northway (southeastern Alaska), and other strategic points. After consolidating their position, they prepared to move southwards along the Alaska Highway towards the undefended Canadian border. Like the tip of a spear, the Highway could carry these units all the way to the heartland of North America.

The invaders, however, remained in a weakened and vulnerable state until they solved the problems of supply and build-up that afflicted any force operating in the northern environment. With this in mind, the Canadians and Americans hastily organized a counterattack, codenamed *Sweetbriar*, to drive the weak aggressor forces off the continent. By the end of December, a joint Canadian-U.S. force had been mobilized, airlifted, and concentrated in the small Yukon town of Whitehorse. Their mission was simple: drive the aggressors north-westward and seize and hold the airfield at Northway. From this base, future air, airborne and ground forces could launch a counteroffensive on the Fairbanks area. The first step was to halt the enemy's advance south along the Alaska Highway.

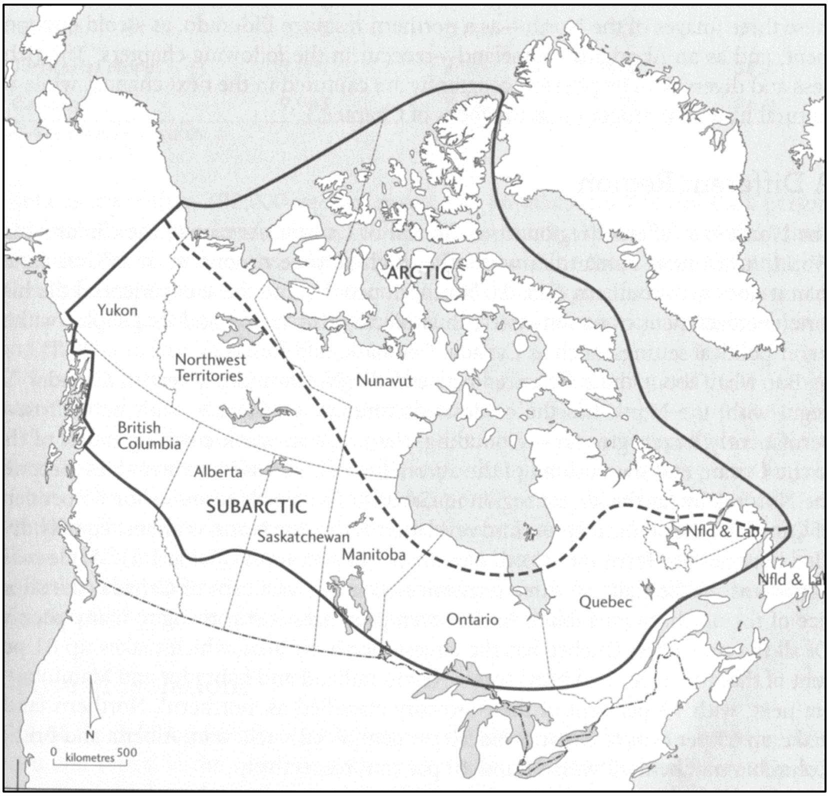
On 13 February 1950, with the temperature dropping below -30° degrees Celsius and winds gusting to 20 miles an hour, Companies A, B, and D of the Princess Patricia's Canadian Light Infantry (PPCLI) moved out of Whitehorse in the first allied move against the aggressor force. In the vanguard were dozens of white-camouflaged Penguins (armoured snowmobiles) and trucks, led by winterized reconnaissance jeeps. While poor visibility kept air elements grounded, the Canadians saw no sign of the enemy as they plunged northwards on the highway. Contact was finally made at 0100 hours on 14 February when a PPCLI patrol ran into a small reconnaissance unit manning a roadblock on the north side of the Donjek River. At 1100 hours, the PPCLI rolled across the river expecting some kind of resistance, but they saw little sign of the enemy. The next day, fearing he had overextended his force, the Canadian commander, Lt. Colonel Donald Cameron, pulled his men back across the river and established a defensive perimeter, only to face heavy air attacks and observe the aggressor forces massing for an attack on his position.

At this critical juncture an American combat team moved out on a 200-mile, all-night march to reinforce the Canadians. They arrived in the early hours of the morning. Both sides sent out patrols to probe enemy positions and frequent firefights erupted along the line. On 17 February, the allied force launched a heavy assault on the enemy's position. Led by the PPCLI, the allies pushed across the Donjek and forced the enemy to withdraw—sustaining heavy casualties in the process. Pushing the enemy back and installing defensive positions on the north bank of the White River, the allied forces attacked across the river two days later and rolled up the enemy line with the help of an aerial attack. With the aggressor forces retreating in disarray, the allies liberated Snag Junction without resistance. On 23 February, assisted by an airborne drop of a company-sized assault force from the PPCLI, they retook the strategic Northway airfield.[1] In the ensuing days, the enemy was on the run and observers noted that Alaska would soon be back in American hands.

This scenario was staged, of course. Nonetheless, Exercise *Sweetbriar* was a success in demonstrating the joint capabilities of Canadian and American army and air units to respond to a Soviet incursion in northern North America.[2] Historians have debated the perceived threat to the North American Arctic in the early Cold War and its strategic implications for political, diplomatic, and military considerations of sovereignty and security. While some Canadians tended to worry less about a ground attack in the Arctic than their American counterparts in the early postwar era, planners still recognized some degree of threat and noted that "prudence necessitated caution."[3] Dr. Omond Solandt, the head of the Canadian Defence Research Board, noted in 1948 that "everybody knows it's impossible to fight a war in the Arctic, but we have to prepare for the man who doesn't know it's impossible."[4] After all, the Americans insisted upon some form of effective ground response in the North to secure the continent. While historian Bernd Horn depicts the Mobile Striking Force (MSF) as a "paper tiger" and a "marriage of convenience" borne of Canadian austerity and paranoia about sovereignty (rather than security),[5] our intention is to assess the lessons that the Army *did learn* in the late 1940s and 1950s rather than debate the forces' practical utility as an instrument for kinetic operations. After all, a land-based, Cold War adversary never attacked the Canadian North, so the plans and preparations were never tested in practice.

The Canadian Army had developed equipment and tactics for Arctic and Subarctic operations since the Second World War and, supplemented by joint exercises like *Sweetbriar*, contemplated and practiced how to live and operate in northern conditions. Unlike *Sweetbriar*, most northern exercises were small-scale with short durations and limited aims, often "more in the nature of trials than tactical manoeuvres."[6] Nevertheless, from these activities the Army gleaned valuable "lessons learned" that informed the planning and execution of subsequent northern exercises and operations.

While lessons were often grouped under the general banner of "northern" operations, the Army also recognized an important distinction between the Arctic and Subarctic regions. These zones can be delineated in several ways,[7] but a summary of lessons learned produced in the 1950s simply explained that, "for military purposes, it is more convenient to use the tree line as the dividing line between the two." The Arctic—the barren region north of the tree line—"skirts the north coast of Labrador, crosses Northern Quebec, and stretches northwest from the coast of Hudson Bay, in the neighbourhood of Churchill, [Manitoba,] to near the mouth of the Mackenzie River." The Subarctic—the wooded, scrub-covered region below



the treeline—encompassed northern Manitoba and Saskatchewan, parts of the Northwest Territories, the mountains of northern British Columbia, and Yukon. Within these general ecozones, tremendous topographical diversity shaped operational possibilities.[8]

The exercises also revealed the critical distinction between *winter* warfare and *Arctic* warfare: concepts that commentators frequently conflated at the time (and often continue to conflate today). During the Second World War, the Canadian Army was extensively engaged in the study of the techniques of winter warfare, often in or on the fringes of the Subarctic. In the face of an emerging Soviet threat immediately after the war, the tendency for some analysts to simply equate winter operations to northern operations represented a fundamental analytic flaw.[9] Ignoring the other seasons neglected an important range of problems that had to be identified and solved before the Army could claim to have a fully operational capability in the North. Furthermore, one could not appreciate the full range of challenges associated with operating beyond the treeline, or even in remote Subarctic areas, without actually spending time in those areas. As practitioners discovered, preparing for winter warfare at military training areas in the provincial norths or near major transportation arteries did not readily translate into successful operations in Arctic or isolated Subarctic settings. The challenges of geography, environmental conditions, and limited infrastructure all had to be experienced first-hand, and evolving concepts and doctrine tested on the ground.[10]

While this chapter cannot cover the full breadth of operational lessons learned between 1945 and 1955, it explores the Canadian Army's attempts to secure a better knowledge of the characteristics of northern warfare through training exercises designed to "improve army tactics, techniques, and procedures for living and fighting in the North."[11] Although participants in northern exercises in the winter fixated on the extreme cold, high level planners began to recognize that the most significant military characteristics of the North for operations in all seasons were isolation, the vast distances involved, the lack of transportation infrastructure, and the limits these variables imposed on military mobility. Post-exercise reports highlighted the importance of strategic and tactical mobility as a technical problem that had to be resolved to facilitate combat manoeuvre and logistic support, and the search for solutions constituted much of the work done at the Joint Services Experimental Testing Station at Fort Churchill.

As the northern exercises continued, it became apparent to the Army that adequate training and the preparation of troops for "hard living" were essential elements in the maintenance of mobility and effective operations during deployments in the Arctic and Subarctic. Regardless of the level of training acquired by soldiers prior to northern deployments, the Army recognized that, far more so than in temperate zones, success in the North depended on the most careful and detailed planning possible. Oversights that could be rectified in southern contexts could have disastrous consequences on northern operations.

Even the most careful planning, however, could not fully resolve one of the central problems that afflicted northern operations: morale. Perhaps the most threatening enemy that the Army had to face on every northern deployment was what the Americans labelled the "Arctic goblin"[12]—the fears and misconceptions that soldiers had about the northern environment and the hardships they would face there—which damaged morale, reduced motivation and diminished performance. Although training, correct information, general familiarization, and a soldier's faith in his clothing and equipment could weaken the "goblin," the Army concluded that the key to its defeat was superior leadership in the field. In northern operations, junior officers and NCOs had to take on more responsibility than usual to ensure that the morale and performance of their soldiers remained at a high level.

Over time, the lessons derived from northern training and exercises paid dividends. By the mid-1950s, the Canadian Army had made great strides in preparing to face the challenges of Arctic and Subarctic warfare. Nevertheless, the Army still recognized the need for more regular, consistent and applied experience on the ground to achieve full operational effectiveness.

Setting the Stage: The Second World War

The global nature of the Second World War generated a growing awareness in Canada that winter and northern warfare was no longer something that could be overlooked. In his landmark 1940 study on *The Military Problems of Canada*, historian C.P. Stacey dismissed any threat to the dominion from the north, thanks to "those two famous servants of the Czar, Generals January and February, mount guard for the Canadian people all year round."[13] Within a year, however, the Russo-Finnish War and the German campaigns in Russia prompted professional soldiers to seriously consider the challenges of mounting military operations in winter.[14] Canada leapt into the winter warfare ring in 1941 with a training pamphlet on *Instructions for Winter and Ski Training*, focused mainly on the problems of cold and mobility. This quaint, even naive publication suggested that "the object to be achieved in winter ... training is to enable the soldier to remain as effective in winter as in summer." It purported that the solution simply lay in using skis to maintain mobility, and clothing and shelter to protect against the weather. Amongst a host of problematic insights, it directed soldiers to briskly rub frostbitten limbs with snow to restore circulation. "If after 12 hours there is no result," it noted in classic military understatement, "it is a sure sign of gangrene and that is a case for the doctor."[15]

Worries over the capability of the Canadians and Americans to respond to an enemy attack in the North emerged during the Second World War, and Canada led her western allies in the development of specialized equipment and techniques for winter warfare.[16] The Canadian Army opened a winter warfare school in Petawawa, Ontario during the winter of 1941-42, where it conducted experiments on the effect of snow and cold. Researchers tested power-driven toboggans and adopted adaptor kits to "arcticize" vehicles so that they could continue to operate at temperatures as low as -40°C. In 1942, the genesis of Operation *Plough* kindled Allied interest in winter operations,[17] and Canada continued to press on with various experiments even after that plan was scuttled. At Shilo, Manitoba, the Army experimented with vehicles and weapons in extreme cold, tested transportation capabilities across ice and snow and developed special clothing for both dry and wet cold. By the end of winter 1944, the Canadian military had developed a substantial body of technical knowledge and special equipment related to winter warfare.[18]

By the winter of 1944-1945, the Western Allies realized that no special winter warfare skills would be required in order to win the wars in Europe or the Pacific. Accordingly, the U.S. Army's interest in northern operations diminished. Nevertheless, Canada pressed on with developmental work and the Canadian General Staff proposed "collective and tactical winter warfare tests with skeletonized formations of all arms and services."[19] Britain and the U.S. agreed, and committed a handful of observers to the three exercises that Canada conducted that winter: *Eskimo, Polar Bear,* and *Lemming.*[20] Through these wartime exercises the Canadian Army conducted tactical manoeuvres in the North for the first time.

Conducted in January and February 1945, Exercise *Eskimo* involved 1,750 men manoeuvring in frigid temperatures in northern Saskatchewan to counter a hypothetical Japanese incursion into northwestern Canada. Army planners hoped the exercise would test for "variations from the accepted tactical doctrine which will be caused by the winter conditions of snow and extreme cold," while determining the limits of mobility of a skeleton brigade group moving in the boreal forest beyond a railhead or staging base.[21] Observers found that the dry cold and terrain of northern Saskatchewan produced no particular problems that could not be coped with "given adequate equipment and training," but never specified what this actually entailed. To maintain mobility in the kind of environment in which *Eskimo* occurred, observers stressed that road building plant and personnel would be required, along with sufficient transport capacity to move all the survival paraphernalia required for winter warfare.[22]

In February and March, a comparable exercise, codenamed *Polar Bear*, was held in the wet-cold conditions of northern British Columbia, with 1,150 Canadian soldiers struggling through the deep snow and rugged terrain to counter a hypothetical Japanese force that had landed at Bella Coola.[23] *Polar Bear* represented the most challenging of the three exercises in that it encompassed a wider variety of terrain and temperature than did the other two. The forces involved experienced temperatures ranging from -3.1°F to -54°F, snow conditions that went from none on the coast to over six feet in the interior, and terrain that varied from rolling plateau with a limited road grid to mountains where passable routes were limited to austere trails. These varying conditions imposed an additional strain on the participating troops in that the different terrain and climates involved all demanded different equipment, clothing, and techniques.

The lessons learned and the doctrinal points established after *Polar Bear* emphasized the heightened importance of logistical support, mobility, and specialist training compared to conventional operations. Although observers found no need to modify tactical doctrine because of the terrain and climate, they argued for the adoption of special measures so that troops were in a position and a physical condition to fight at the appropriate time. The exercise analysis emphasized that the strain imposed on troops by deep snow, rough terrain, and cold necessitated an extensive reliance upon transport. Troops simply could not haul their own equipment and survival gear and still be expected to fight. Problematically, combat operations in isolated cold areas of the coast would be dependent upon a single road at best and on a mountain track at worst. Post exercise studies highlighted that where mechanical transport could not go, horses often could, hence horse transport (particularly in artillery units) was deemed essential. Nevertheless, observers realized that reliance upon a single line of communication,

particularly when that line was subjected to the extreme stress of break-up season, might spell disaster to a force in contact with the enemy. Reliance upon air resupply proved to be both practical and essential. Observers concluded that it was a comparatively simple task for troops to build advanced air strips on frozen lakes along the line of march. Nevertheless, for the Canadian Army's leadership, *Polar Bear* underlined the full magnitude of the problems of movement and supply involved in remote northern operations, and the realization grew that troops engaged in winter operations would inevitably spend the vast majority of their time and energy simply surviving.

Named after the diminutive Arctic mouse, Exercise *Lemming* lived up to its name in that it was by far the smallest and most northerly of the three exercises. Between 22 March and 6 April 1945, a party of twelve men, equipped with two Canadian armoured snowmobiles, two American Weasels, and two American M7 half tracks penetrated into the barrens from Churchill to Eskimo Point, NWT (now Arviat, Nunavut), turned inland to the half limit of their fuel, and then returned to Churchill. *Lemming* was unique in its execution in that, unlike the others, the moving force operated entirely self-contained and did not rely upon a line of communication for daily resupply. The exercise planners hoped that the expedition would provide "non-tactical" information that would help round out the winter doctrine that the Army was developing from its other wartime exercises. The terrain encountered over sea ice and the barrens was radically different from that met by the other formations farther to the west. The exercise provided a means of evaluating the utility and reliability of over-snow vehicles in the Arctic and gave an opportunity for the Army to examine the barren grounds with a view to holding a major exercise there the following winter.[24] While the requirements of maintenance and rest meant the force only moved for a total of ten days, the participants found movement to be surprisingly easy, with the force covering a total distance of 653 miles—including an impressive 113 miles on its best day.[25]

The post-exercise mobility analysis developed what could be called "the North African analogy." Observers concluded that military operations in the barrens were as feasible as they had proven to be in the Libyan desert during the war. The study made the important point that operational conditions on the barrens were as different from operations in the boreal forest as was the variance between operations in the North African desert and sub-Saharan jungle. Given the virtual unfettered scope for manoeuvre on the winter barrens, the report concluded that "it would therefore seem desirable that for defence purposes Canada should develop further over-snow vehicle types and train personnel to operate in these regions."[26] The report on *Lemming* further noted that the training and equipping of men to operate in the Arctic presented a different set of requirements from those encountered in winter operations within the tree line. Key personnel had to be trained in route-finding and navigation in the poorly mapped and featureless Arctic. Special clothing, training, and life support equipment had to be provided to permit troops to cope with the Arctic wind. The matter of vehicular mobility was given close attention in the exercise report, which concluded that a 700-mile unsupported range was a reasonable capability for Arctic operations. Neither the Canadian armoured snowmobile nor the American Weasel was found to be completely acceptable, but a series of recommendations were made to improve their overall capability.[27]

By the end of the winter of 1944-1945, the Canadian Army had taken major steps forward in consolidating its knowledge and capability for operations in the winter. The wet and dry colds of the boreal forest had been met and survived. Troops had ventured into the formerly forbidding barren lands. Although these exercises were tough on men and equipment, the Army had derived significant lessons about the feasibility of northern operations. These exercises, coupled with technological developments, led defence planners to claim "that the inaccessibility of the Arctic is just another myth, and, providing supplies are ensured, operations on the barren grounds … can be as unhindered as operations on the Libyan Desert."[28] The Exercise *Eskimo* report noted that 83% of Canadian territory was classed as Arctic or Subarctic, and suggested that any time invested in cold weather operations was well spent. All of the Canadian efforts to this point, however, had been devoted to the mastery of *winter warfare* and the notion of northern operations had been only peripherally addressed. Importantly, the wartime exercises had not exposed personnel to the extremes of climate that were to be expected during deployments in the Far North. As a result, the Army concluded that none of the exercises could be considered "a final test of efficiency of the fighting man under arctic and sub-arctic conditions."[29]

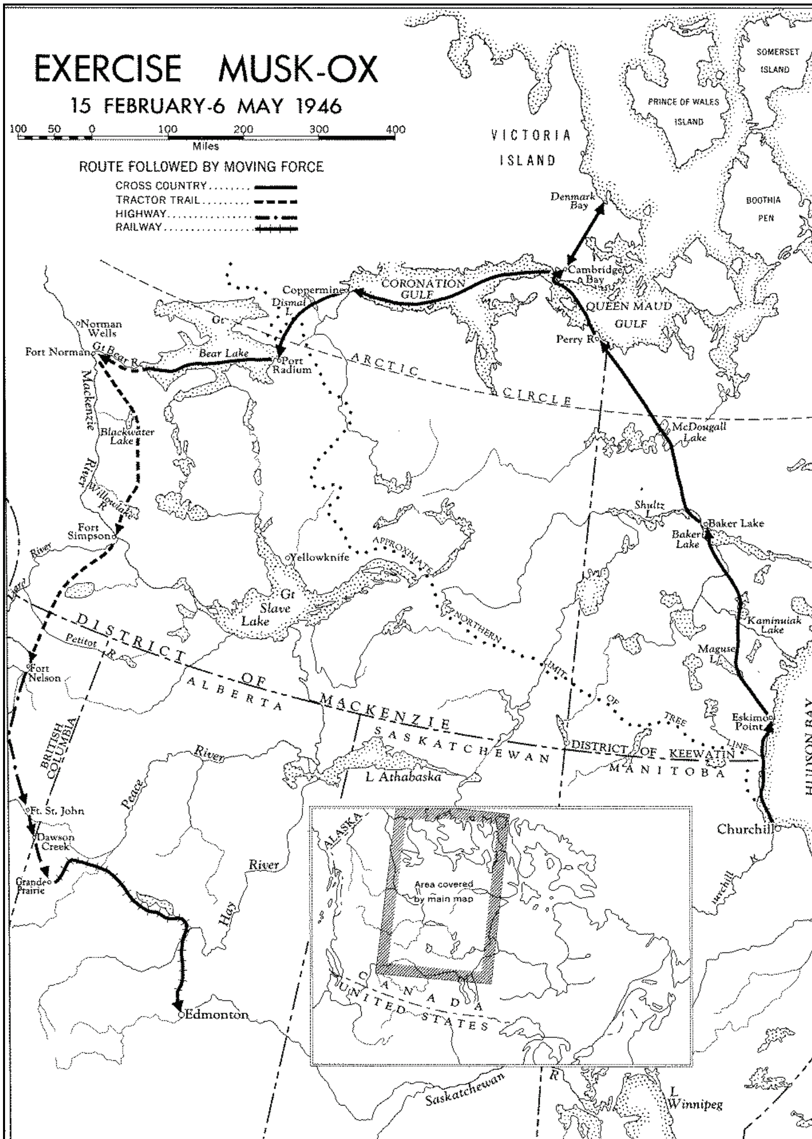
The 3,200 Mile Test: Exercise *Musk Ox*

Exercise *Musk Ox* straddles the hazy temporal boundary that marks the beginning of the Cold War. Historically, the exercise should be viewed as the final phase of the winter exercises conducted by Canada during the war.

Eskimo, Polar Bear and *Lemming*, however, occurred as world-shaping events played to their ultimate conclusions in Europe and Asia, and they received little publicity. The following winter the world was at peace and *Musk Ox* unfolded in the full glare of national and international press coverage.[30] Although the primary goals of the exercise (to "study movement and maintenance in differing cold weather conditions") were modest, the proposed plan to move a mechanized force over 3,000 miles across northern Canada, relying chiefly on air resupply, caught the attention of Canada and the international defence community.[31]

In essence, the Canadian military conceived of *Musk Ox* as a "non-tactical exercise" and the government, when questioned in the House of Commons, emphasized the non-military, scientific aspects of the expedition. Douglas Abbott, the Minister of National Defence, explained that "the benefits derived from it may well be of greater civilian value than military value, although it is hoped that they will be both."[32] The specific subjects to be studied during the trip included techniques of army-air force cooperation under varying conditions of terrain and weather. The exercise members were also to look into several aspects of northern movement including the use of LORAN (Long Range Aid to Navigation) and the astro-compass for ground navigation. In the realm of pure science, the Canadian government asked the participating troops to make magnetic and auroral observations, collect snow and ice data, and record the flora and fauna they encountered.

From its onset, the exercise revealed the low tooth-to-tail ratio of northern operations, with a great disparity in size between the small group that made the voyage and the large support elements that made it possible. The Moving Force numbered only 40 souls (including British and American observers and Canadian civilian scientists) operating a dozen over-snow vehicles. A special Royal Canadian Air Force (RCAF) squadron operating nine aircraft was formed and trained for the unique task of providing aerial re-supply to the Moving Force. The exercise required over two hundred additional soldiers to man a base camp exclusively dedicated to providing support for a platoon-sized force operating in a non-tactical setting.



Preliminary winter training for the exercise began with a month long concentration at Shilo, Manitoba, followed by an additional six weeks at Churchill (the starting point for the expedition). During this portion of the work-up phase, all members of the Moving Force qualified as snowmobile drivers, while undertaking supplementary training in navigation, shelter building, and a host of other Arctic skills. Short patrols into the barrens served to confirm newly acquired skills and unite the group into an efficient team. On 15 February 1946 the Moving Force began its 3,200-mile journey. Their route took them north to Eskimo Point and then west and north via Baker Lake and Perry River to Cambridge Bay. Here the force rested and explored for ten days before continuing on the Coppermine and thence south through Port Radium, Tulita (Fort Norman), and Fort Simpson to the Alaska Highway at Fort Nelson. From Nelson, the Moving Force intended to press south along roads to the final destination at Edmonton. Dust, however, did what cold, snow, forest and river could not – stop the snowmobiles. The vehicles were loaded onto rail flat cars and the convoy rolled into Alberta's capital after 81 days on the trail.[33]

The public and military reaction to *Musk Ox* blew the solid research accomplishments of the exercise beyond reasonable proportions. Commentators in Canada and abroad persisted in ignoring the often repeated Canadian government claims that *Musk Ox* was a small non-tactical exercise designed to work out several technical problems related to military operations in the winter and to support certain limited scientific experiments. One French military writer even went so far as to claim that "since World War II two events have held the interest of military circles--Bimini (referring to the American nuclear tests in the Pacific) and Operation Musk Ox in the Canadian Far North."[34] American newspapers

gave extensive coverage to *Musk Ox* and headlines such as "U.S., Canada Plot Far North Defence"; "U.S., Canada to Prepare A-Bomb Defence in Arctic"; and "U.S. and Canada Join to Guard Polar Area" were common. While articles noted that the expedition had scientific as well as military objectives, the former were given scant attention in newspaper articles and editorials. The basic theme was that the development of long-range bombers had made North America vulnerable to an attack over polar regions, and that the development of an army combat capability in the North would in some way allow the North American allies to defend against such attack.[35]

An Arctic Battleground?

For American defence planners, *Musk Ox* proved that military operations in the Far North were possible—albeit unlikely.[36] Furthermore, the Americans understood that if they were slightly behind the Canadians in terms of Arctic capability, they were miles behind the Soviets, who had fought extensively in northern conditions during the Second World War. Given these considerations, strategists deduced that Soviet ground forces posed a limited threat to the Arctic approaches of North America in 1946. The problem of resupply in the Arctic environment made it unlikely that any formidable or sizeable force would attempt to operate in the region. While American planners worried about possible small scale incursions into the region, they did not consider it a "gateway to invasion." Many areas in the Arctic were suitable for lodgement by specially-trained enemy units, however, which could be used to base long range weapons and airborne forces for strikes on the North American heartland. Soviet Tu-4 bombers, which lacked the range to strike at the United States on anything but a one-way mission, could use these bridgeheads as forward bases to refuel and rearm. Furthermore, the Soviets had the airborne forces, Arctic-trained troops, and transport aircraft required to make this theoretical scenario at least possible,[37] and continental air defences were minimal before the Distant Early Warning (DEW) Line and the creation of the North American Air Defence Command (NORAD).[38] As a result, American defence planners concluded that Soviet air-transported forces posed a possible threat and the continent needed to be defended against them. This required immediate training, for the Americans still knew little about Arctic and Subarctic warfare despite having invested millions of dollars on wartime programs.[39]

By contrast, historian Bernd Horn has argued that many Canadian officials considered the threat of a Soviet ground attack in the Arctic to be unrealistic. Canadian intelligence estimates often disagreed with the American assertion that the Soviets could seize objectives in Alaska, Canada, or Labrador from which they could launch strikes against targets in North America.[40] Army appreciations noted that the chance of enemy airborne attacks were slight because of the problems with resupply and re-embarkation, as well as lack of fighter support. On the other hand, *Musk Ox* and the wartime exercises in the Canadian North convinced some government officials that the northern approaches could become the focus of an attack by hostile ground forces. Even if the enemy launched a land assault as a diversion, the Canadians would need to mount some kind of response, requiring an Arctic operational capability. In May 1946, the Canadian Chiefs of Staff created the Inter-Service Committee on Winter Warfare and the Arctic Research Advisory Committee, and the Defence Research Board made Arctic warfare a major area of focus and effort.[41] Furthermore, the 1946 "Appreciation of the Requirements for Canadian-United States Security" and the "Joint Canadian-United States Basic Security Plan" called for mobile strike forces to counter any possible enemy incursion into the North.[42]

The Canadians, however, did not act immediately to implement the mobile striking force concept (the subject of the following chapter by Horn), preferring to analyze and define the types of threat to which such a force would have to respond. In addition, before any specific role could be discussed for a mobile striking force, the Canadian and American militaries needed to evaluate their capabilities and requirements in the northern regions.[43] Defence planners understood the *environment* of the Canadian North could be as much an enemy as any Soviet paratrooper and wanted to find ways to minimize the non-battle casualties that so often occurred in northern operations. If a mobile striking force was to ever take flight, military equipment had to be modified for northern conditions, operational and tactical doctrines worked out, and Canadian troops taught to live,

work, and fight in the Arctic. The chief component of this effort was the Joint Experimental Testing Station at Fort Churchill.

The idea for a joint station began to bounce around Ottawa in the spring of 1946, spurred on by an American request for such a facility. Both the Canadians and Americans agreed that the technical services required a space where they could test equipment in Arctic conditions, and planners decided upon Churchill, Manitoba, which was surrounded by a barren landscape and accessible year round by plane and rail.[44] It boasted ideal terrain and climate to mimic the Arctic conditions in which the Army would have to operate. To the north of the town was the tundra of the Arctic, while to its south lay the kind of wooded areas troops would have to operate in if deployed to the Subarctic.[45]

The Joint Experimental Testing Station focused on land operations, with Canadian and American personnel conducting independent experiments until 1950-1951.[46] Exercise *Musk Ox* provided them with a long list of problems to address. The first couple of winters were spent seeing if soldiers could live for long periods in the Arctic and if their equipment could withstand the cold. These studies highlighted that in the Arctic the soldier needed almost 90% of his time just to stay alive and could devote only 10% to fighting.[47] A main goal of the staff at Fort Churchill was to even out these percentages. The first step was improving winter clothing and personal equipment, which was deemed very poor. The researchers struggled to find clothing that would keep the body warm while at rest, but not cause overheating during action.[48] A long-term program was initiated to determine the best type of clothing for troops operating in Arctic and Subarctic conditions. Furthermore, researchers prioritized finding ways to lighten the load of soldiers. The normal maintenance requirement for a Canadian Armoured Division in the field during the 1944-45 northwest Europe campaign was 45.7 pounds per man and increased to 90 pounds per day during fighting. On *Musk Ox*, where no ammunition was used, the figure was 115 pounds per man per day.[49] Men were far too bogged down by the equipment needed to stay alive in the Arctic to operative effectively, and the facility at Fort Churchill grappled with this constraint—albeit with limited success.

In the winter of 1946 and 1947, the Canadian Army used the lessons learned from the four previous northern exercises, as well as the findings of the first months of work at Fort Churchill, to create a two-week indoctrination course to familiarize personnel with operating in Arctic conditions. Only one captain and a sergeant could be found with sufficient northern experience to lead the course.[50] Participants in the first course spent nearly 90% of their time indoors acquiring theoretical instead of practical knowledge, and only ventured outdoors for a few short marches.

Concluding that the initial course failed to prepare troops for the rigours of outdoor activity in the North, the Army revised the syllabus to allow for the equivalent of 3.5 days or 84 hours on the land. Soldiers spent 64 of these hours on exercises which required them to remain in the open for two days and two nights, providing them with an opportunity to apply the theoretical instructions given them in the classroom. Subjects covered in the revised course included bushcraft, clothing, shelter building, sanitation, cooking, equipment maintenance, load lashing, first aid, and the use of sleds and stoves. While it seemed an impressive list, the Army's report on the indoctrination program concluded that a two-week course was inadequate to equip a soldier with sufficient knowledge and capability to survive in the Arctic. The course had allotted only 2.5 hours, for instance, to navigation, a major source of difficulty for those inexperienced in northern travel.[51] Trainees required far more experience with practical outdoor work and the Army lengthened the Arctic indoctrination course to four weeks.[52]

As the work at Fort Churchill slowly started to build momentum, strategists and media commentators continued to devote considerable attention to the probable scale of conflict in the North. With the enunciation of the Truman Doctrine in the President's speech to Congress in March 1947, the "Cold War" (as it was labelled by American journalist Walter Lippmann) became an accepted reality, prompting open projections of a massive Soviet invasion of North America. An American officer, writing in 1949, commented that if an enemy force (obviously Russian) could succeed in overrunning Alaska, they would be in a "splendid position to invade the mainland of the United States."[53] Sensibly, military and political leaders in Canada and the United States never accepted this extreme position.

Most who considered the massive invasion scenario argued that it was a most unlikely occurrence. When asked in July 1947 "about Alberta's probable role in the event of an enemy attack across the Arctic," Lt. General Charles Foulkes "decried all the poppycock that has been given out regarding such a possibility." He went on to highlight: "fifty-seven pounds of freight to maintain a single man. Can you imagine how many aircraft would be needed to keep an enemy force going in the Arctic. The Arctic wastes are our strongest defence."[54] Similarly, George Pearkes, a future Minister of National Defence, later told the House of Commons that "it is fantastic to think that large armies could be landed on the Arctic shores of Canada and advanced through the barren lands of the great north."[55] Considering that the distances involved are measured in thousands of kilometres, these represented sound conclusions. Even in the northwest, which boasted the Alaska Highway, the thought of an adversary invading the most powerful nation in the world by relying on a single road for supply and advance was ridiculous. Credible fears of a massive invasion were laid to rest when military planners of Canada and the United States became familiar with the realities of northern terrain and climate, and its effect upon military manoeuvre. A newspaper article written in 1949 was accurate when it said that "military planners appear to have abandoned thought of a full scale invasion of North American across the Polar region. On the basis of experience at Fort Churchill and elsewhere, they do not think it could be done."[56]

If the threat of a full-scale invasion could be ruled out, the possibility of a Soviet lodgement in the North could not be so easily dismissed. An Albertan Member of Parliament observed in 1951 that if the Soviets secured a foothold in the Canadian North, "the object in doing this would be to create confusion and alarm, in the hope that it would prevent us from sending troops and material abroad."[57] This same theme had been developed in an earlier newspaper article, which observed that "an enemy could establish a token foothold on any of the thousands of islands in the Canadian Arctic, or anywhere in the sparsely populated area of northern Canada. Thus a diversion would be created that might keep large bodies of Canadian and United States forces pre-occupied, cutting down the forces available for action in more active theatres."[58] But what would be the object of such an operation, one American officer queried? In the North at the time there were no population centers, no industrial areas, no ports, no communications network, and no developed deposits of natural resources.[59] A Soviet lodgement "in the middle of nowhere" could not, in itself, threaten the security of North America and could have been left *in situ* indefinitely. Rather than diverting masses of Canadian and American troops from the main theatres of war, such a deployment could have had the exact opposite effect—that of diverting Soviet resources to support the lodgement. The logistic requirements of any lodgement would have been heavy, particularly in view of the transpolar distances involved. Thus, in reality, the occupation of a piece of barren land was not a likely or reasonable objective.

The possibility of an enemy airborne force seizing an *airbase* in the Canadian North seemed more plausible. While most of the airbases constructed in the region during the Second World War did not have the capacity to accept long range bombers, a few did. In particular, Whitehorse, Churchill, Frobisher Bay, and Goose Bay were attractive targets. The popular war scenario related to the Canadian North envisaged Soviet bombers striking over the pole at the heart of the United States. Airborne troops would follow in their wake, seizing bases in the Canadian North where the bombers could land, refuel, and re-arm for further attacks or for their return to Soviet bases.[60] As technology advanced and intercontinental bombers improved in the 1950s, the Canadian military envisioned new scenarios where enemy airborne forces assaulted radar stations to disrupt Canadian-American early warning systems. In theory, at least, these threat assessments provided a pretext for scenarios upon which northern exercises could be designed. Thus, while discussions about the likelihood of northern ground combat operations, and their scale, rumbled in political speeches, staff colleges, professional military journals, and letters to the editor columns of newspapers, the Canadian Army quietly went about the business of learning and practicing how to live and fight in the Arctic and Subarctic.

Learning Lessons from Early Cold War Northern Exercises

The training, experiences and experiments conducted at Fort Churchill between 1946 and 1947 assisted in the development of tactical doctrine for northern operations, which the Army soon put to the test through a series of small-scale exercises. Between 21 January and 31 March 1947, for instance, a company from the PPCLI conducted Exercise *Haines*, a winter training exercise in the Whitehorse area in which 50 men of all ranks tested equipment, trained on snowshoes and practiced patrols in the harsh conditions.[61] A year later, *Haines II* had 150 men conducting training patrols in the same area. Meanwhile, the barren lands surrounding Fort Churchill hosted Exercises *Moccasin* (1947-1948), which tested vehicles in extreme cold conditions, and *Sigloo* (1948-1949), during which signals personnel evaluated communications and associated equipment.[62]

The Canadian Army also sent observers to some of the American exercises held in Alaska (particularly to Big Delta, where the U.S. Army set up its Arctic indoctrination school). For example, eleven Canadian observers attended Exercise *Yukon* in the winter of 1947-1948, and their reports assisted in the formation of tactical doctrine and in the planning of new exercises in Canada.[63] The U.S. military held other large-scale exercises in Alaska and the Aleutian Islands, involving up to 1,500 soldiers, and provided the Canadian military with access to their post-exercise reports.[64] The lessons learned from these early Canadian and American postwar exercises highlighted that indoctrination training had to be provided to every individual selected for service in the Arctic.

By 1949 very few Canadian personnel had received any indoctrination training or had any on-the-ground experience in the Arctic or Subarctic. Looking back on the situation, Dr. J.A. Easterbrook, a scientist posted to Fort Churchill, reflected that "both individually and institutionally, Canadians were ignorant about the North country and how to conduct military operations in it."[65] By this point, the three regular infantry battalions of the peacetime Canadian Army had been trained as parachutists and the Army had styled the three, along with supporting arms and services, the Mobile Striking Force (MSF). While in theory the MSF was a brigade group ready to defend northern Canada, in reality the "brigade" had no designated headquarters and never trained together. Battalion groups exercised independently although a shortage of transport aircraft usually limited parachute training to company-level operations.[66] The steady stream of exercises initiated by the military to start preparing the MSF for northern operations often reflected these limitations.

In the winter of 1950 the U.S. and Canadian militaries conducted Exercise *Sweetbriar*, a large-scale tactical exercise along the northern part of the Alaska Highway. Over 5,000 Army and Air Force personnel participated in the exercise, designed to test doctrine, clothing, equipment, vehicles, aircraft, and weapons and to serve as a means of developing a standard operating procedure between the two nations.[67] Although the scenario created for *Sweetbriar* involved an enemy invasion of Alaska, subsequent exercises featured MSF units responding to small groups of "enemy" landing in northern Canada to set up navigational beacons for bombers, to seize airheads to support sustained operations against southern targets, or to destroy radar and radio stations. These exercises often involved parachute assaults, aerial resupply, airfield building, and called for close Army-Air Force cooperation.

As *Sweetbriar* unfolded along the Alaska Highway, Exercise *Sun Dog I* tested an infantry company group as it carried out a series of tactical movements and patrols along the edge of the treeline and into the barrens close to Fort Churchill, while harassed by a small enemy force. The Army concluded that *Sun Dog* represented the "first exercise of any size, of a tactical nature, to be held in the Eastern Arctic under conditions which are truly Arctic from the climatic and geographic viewpoint."[68] That July, Exercises *Shoo Fly I* and *Cross Country* explored the problems faced by small infantry and engineer units operating on the snowless tundra outside Fort Churchill. Northern summer exercises continued on much smaller scales than their winter counterparts, usually involving platoons and companies, as opposed to reinforced company and battalion groups.[69]

In 1951, the Army and the RCAF conducted another *Sun Dog* exercise in the barrens northwest of Fort Churchill during winter, while *Shoo Fly II* tested a platoon in summer conditions. During the winter of 1951-1952, reinforced company groups of the MSF circulated through Churchill on Exercise *Polestar*, a four-week period of intensive Arctic training that centred around various enemy lodgement scenarios. In February 1952, *Sun Dog III* tested the skills acquired by several of these units in a situation that had them assaulting an enemy force that had seized an airfield at Kuujjuaq (Fort Chimo).[70] That summer, three *Deer Fly* exercises allowed small MSF units to conduct summer training around Fort Churchill and Christmas Lake. Meanwhile, between January and July 1952, Canadian and American army engineers at Kluane Lake in Yukon undertook Exercise *Eager Beaver*. Over the six-month period about 300 Americans and 135 Canadians trained in building emergency airstrips on frozen lakes in winter and on muskeg after the snow had gone.[71] The importance of air mobility in northern operations had long been a point of theoretical discussion. With Exercise *Eager Beaver*, the U.S. and Canadian militaries finally got down to the actual practicalities of training troops in the construction of the field expedient facilities that would be necessary adjuncts to air combat support.

During the winter of 1952-1953, Exercise *Prairie Tundra* provided Arctic indoctrination training to two reinforced company groups of the MSF in scenarios that had the soldiers responding to enemy lodgements in "diversified terrain" above the treeline north of Fort Churchill.[72] A large-scale exercise called *Bull Dog I* took place in February and March 1953 in the area around Norman Wells and Tulita (then called Fort Norman). After an enemy force captured the airfield at Norman Wells, two reinforced companies of the 2PPCLI, with the support of the RCAF and the Canadian Rangers, deployed to counter them.[73]

In December 1954, *Bull Dog II* envisioned an enemy lodgement at an isolated radio station at Baker Lake and a parachute jump by the Royal Canadian Regiment into the barrens to recapture the station and destroy the enemy. Temperatures below -40°C and winds gusting from 20 to 40 miles per hour, however, eliminated any possibility of a parachute assault. As a result, the exercise petered out with the "enemy" still ensconced on the objective. [74] In *Loup Garou*, the MSF successfully responded to a scenario that had an enemy force operating in the area around Sept Îles, Quebec.

Finally, the Canadian military conducted Exercise *Bull Dog III* in the vicinity of Yellowknife between 23 February and 8 March 1955. The exercise simulated the enemy capture of the airfield at Yellowknife, with elements of the PPCLI and Canadian Rangers tasked with wiping out the lodgement. The Army hailed the exercise as clear proof of the workability of the MSF concept, even though many of the issues related to Arctic and Subarctic operations still needed to be adequately addressed.[75] After *Bull Dog III*, the tempo of northern exercises and training rapidly decreased.

The results of all these northern exercises led the Canadian Army to conclude that "no radical changes from accepted combat principles or tactical doctrine are imposed by conditions of snow and extreme cold." Just as it had after the wartime exercises, the Army continued to maintain that "in the barren lands, desert tactical principles apply virtually without change, while in the Yukon and Alaska, jungle and mountain warfare tactics applied."[76] Although postwar exercises proved that there would be no major changes to tactical doctrine during deployments in the North, Army planners still crafted what they termed a "special technique of operation" for the region. These techniques included greater initial reconnaissance than in temperate zones and emphasized careful timing, shorter assault phases, the adoption of limited objectives, and the provision of speedy and effective front line relief to active troops. The Army developed almost all of these special techniques to limit the exposure of soldiers to the northern elements.[77] The northern exercises had established, for instance, that troops "heated in the attack will be more liable to the effects of cold," heightening the importance of immediate post-attack consolidation and front line relief.[78] The Army recognized that this "special technique of operation" would be subject to the tremendous diversity within the general Arctic and Subarctic ecozones, and would involve considerable modification depending on specific topographical, climatological and environmental conditions in specific areas. The northern exercises conducted between 1945 and 1955 had made it abundantly clear that there existed no "one size fits all" type model for Arctic and Subarctic operations.

The Canadian Army accepted that there would be no major changes to tactical doctrine during northern deployments only if a force could be sufficiently trained and equipped to function effectively and retain its mobility in the North.[79] The post exercise report on *Sweetbriar* noted that,

> Arctic or sub-arctic manoeuvres differ from ordinary training exercises in that the soldier is opposed by an enemy, who is not only capable of inflicting injury and undermining morale, but who will take advantage of every opportunity to do so. This enemy is winter at its worst. Temperatures sink to 60 and 70 degrees below zero, blizzards spring up from nowhere without warning, the wind-chill factor can change in five minutes and a man can become lost so easily in the wastes of the arctic. If troops are sent to fight in such temperatures without sufficient training, unnecessary casualties in both men and equipment will be incurred.[80]

Without proper training and equipment, soldiers would be injured, their morale would drop, and any force's mobility would be severely curtailed.

The attainment of adequate mobility in the North remained one of the Army's chief priorities during the early Cold War and the northern exercises generated many lessons on the problems of force movement. Canadian defence planners quickly realized that "the different types of terrain, muskeg, bush, tundra and exposed rock all raised their own problems."[81] In the Subarctic, the relative immobility of ground forces in remote forest areas remained the chief constraint on operations. The Army concluded that in the Subarctic "there are usually sufficient roads and tracks to warrant the use of wheeled supply convoys after the expenditure of considerable engineering effort." Wheeled forces remained road-bound, however, and in a region with such a limited transportation grid the Army discussed the practicality of deploying bulldozers to carve roads out of the northern bush. Even over-snow vehicles struggled to operate in the paucity of open areas and dense bush that characterized space within the treeline. Above the treeline, however, a moving force had to rely entirely on over-snow vehicles or on supply by air. For a force operating in the Arctic, the Army concluded, dependence on an engineer "road-making tail … would so limit his mobility as to almost deprive him of it altogether."[82]

The Army also realized that the oft-forgotten northern summer, and the other two northern seasons—break-up and freeze-up, presented obstacles to mobility that were infinitely greater than those of winter. As one American officer wrote, "you can walk on water only if it's frozen."[83] Surface water in the form of rivers, streams, lakes, and muskegs was a major feature of most northern areas and severely impeded cross-country movement. Foot movement across muskegs and poorly drained ground proved to be exhausting in a remarkably short time. The Canadian Army (as well as its American counterpart) accepted that military operations were simply not feasible during the periods of break-up and freeze-up. The individual soldier could not even begin to carry the range of clothing that was required to survive during these critical seasons. Experts also realized that the logistic back-up required to support combat operations during these periods would have been out of all proportions to the size of combat force that could have been maintained. Defence planners concluded that any enemy would be confronted with the same insurmountable problems of mobility as the North American forces. The Canadian and U.S. militaries accepted, therefore, that should war ever come to the North, there would be a pause in operations during spring and fall.[84]

Given the problems of mobility encountered during northern exercises, the Canadian Army came to view the idea of going over the terrain rather than across it as the best solution to the problem of tactical manoeuvre in the Arctic and Subarctic. As a result, along with the analogies to desert, jungle and mountain warfare, the Canadian Army soon started to compare northern operations to the island-hopping campaigns of the Pacific Front during the Second World War. In the aftermath of *Sweetbriar*, Major General Matthew Penhale noted, "in my opinion, support of operations anywhere in the north could not well be sustained by a long line of communications (even by air) extending as far back as Edmonton. Establishment of forward or advanced bases would therefore be a necessity."[85] The Army accepted that any force operating in the Arctic or Subarctic would have to move from advanced base to advanced base if it hoped to retain its mobility and effectiveness.[86] *Sweetbriar*, for instance, used sixteen camps that the Army manned and stocked with supplies of rations, petrol, spare parts and stores.[87]

Even with extensive air support and the use of sufficient advanced bases, any force operating in the Arctic and Subarctic would still have to cover considerable distances on foot, which always proved to be slow and fatiguing no matter the season. Although the staff at Fort Churchill had been working on the problem since the end of *Musk Ox*, by the 1950s the amount of living equipment a soldier had to haul on his back or drag by sled continued to pose difficulties for all northern exercises. In 1951, the Army clocked the average speed of movement of a company encumbered with 120 pounds per man at 1.24 miles per hour over an average distance of six miles. During a comparable period in 1952, a group with similar training, but encumbered with only 95 pounds per man, moved over 9.6 miles at 1.34 miles per hour.[88] Even in summer operations, the burden of additional equipment became a major factor. When the participants in *Shoo Fly II* travelled over diversified terrain there was a "marked drop in distance covered, rate of march, fitness to fight and morale, when weights above fifty pounds were carried."[89] Not only the speed and distance covered concerned the Army, but the number of troops required to carry living equipment, as opposed to tactical or operational requirements. As historian Matthew Wiseman has observed, reports from *Sun Dog I* noted that three out of every five men were required to haul the group living equipment, leaving only 40% manpower to transport weapons, extra ammunition and other supplies.[90] While soldiers required this living equipment to defeat their primary enemy in the North (the climate), its weight and unwieldiness imposed serious limitations on northern operations.

Along with the burdensome equipment required by soldiers on northern deployments, the basic task of survival in the Arctic and Subarctic also imposed severe constraints on the mobility and effectiveness of a force. In these regions, survival demanded more "time, energy and skill than under temperate conditions." [91] The U.S. military created a rough rule that for men in the Arctic efficiency dropped by 2% for every degree below zero Fahrenheit. At 40 or 50 below zero, the "average man may become concerned solely with the business of keeping alive, and if possible, warm."[92] The Canadian Army's northern exercises revealed that inexperienced troops required up to ten hours a day just to make and break

camp, and complete the survival tasks that the military termed "the business of living."[93]

In the late 1940s and early 1950s, the Army hoped that it could identify personnel who had greater immunity to the cold, and who could easily and expediently accomplish the "business of living" in the North, thus allowing a force to retain its mobility and effectiveness. The military initiated psychiatric and psychological tests of its personnel to determine ideal candidates for cold weather soldierly. Wiseman has observed that scientists tested the physical and mental qualities of troops operating under severe cold-weather conditions, even conducting urinalysis, blood pressure measurements, and blood analysis on them.[94] Despite these efforts, post-exercise reports consistently concluded that it was not essential for men to be specially selected for northern operations, but that any physically fit soldier could function in the Arctic and Subarctic with the proper training and equipment.[95]

The Canadian Army's *Guide to Planning and Execution of Operations in the North* stressed that "the key to mobility in the North is fitness and endurance on the part of troops and knowledge of northern conditions, so that survival tasks (the business of living) require the minimum of time and effort."[96] Properly equipped soldiers, trained intensively in winter craft and movement, and armed with sufficient experience in the North, could reduce the time required for survival tasks to three hours.[97] After discussions with senior officers involved in *Sweetbriar*, reporter Hanson Baldwin concluded that "the idea, once prevalent, that nearly any troops can be taught quickly to fight in the Arctic after a short indoctrination course must be abandoned. Extensive and thorough training is essential in the special techniques of Arctic warfare if excessive casualties are to be avoided."[98] Before northern deployments, the Army decided, every soldier involved had to be taught the proper care of personal clothing and equipment, first aid, camp routine, bushcraft, navigation, march discipline, sanitation, food, hygiene, and regular unit discipline. Through training and time outdoors, the Army hoped that soldiers would feel comfortable working in the cold and would accept that they were "carrying around a portable heater" in their "belly and privates" which, if used properly, would allow them to extend the time they worked bare-handed—thus increasing their efficiency dramatically.[99] Even though much of this information and training represented an adaptation of normal techniques to new conditions, some of the skills were new and demanded time and much repetition before they could be mastered.[100]

In particular, post-exercise reports often emphasized the need to teach soldiers that would be deployed to the Arctic and Subarctic the necessity of "hard living" and how to eliminate the "non-essential."[101] After *Sweetbriar*, the Canadian Army concluded that "the need for artificial shelter by civilized man is probably the greatest factor in the loss of mobility of troops in the Arctic." The problems of mobility would be greatly simplified if infantry could live out in the open even in the most severe weather, as trappers and members of the Royal Canadian Mounted Police had done for decades in the North. To prepare troops for "hard living," training had to imbue a sense of "self-reliance in the mental attitude of the individual." [102] Soldiers had to be taught to use strips of light-weight windproof material that they could carry with them to make shelter, or even assemble one using snow or branches. "Although tentage can never be dispensed with entirely, it could then be done without for longer periods," the Army hoped. "This is the real key to the re-establishment of dismounted infantry mobility" in northern operations.[103] While the weight and awkwardness of hauling tents reduced mobility, so too did the rations carried by troops. One of the lessons that emanated from Exercise *Loup Garou* suggested that the Army teach soldiers that "for short periods a reduction of caloric intake may be accepted without ill effect or drop in efficiency."[104] Despite efforts to limit the bulk and weight of food and shelter through "hard living," they remained significant impediments to effective mobility.

Although the Army accepted that any soldiers going on a northern deployment required extensive training, no clear conclusion emerged on the amount of time required to prepare a soldier for Arctic duty. Timelines ranged from six months to two years. The after action report from *Sun Dog I* argued that ten weeks was the bare minimum of training required for northern operations at the battalion level: three weeks of basic indoctrination, two weeks of trade training, three weeks of familiarization and two weeks of collective training.[105] While opinions on the amount of time required to prepare a soldier for a northern deployment varied, the

Army understood that for a force to achieve optimal effectiveness in Arctic and Subarctic conditions, certain groups required more extensive training, particularly navigators, engineers, medical and signals personnel.

Once on the ground in the North, particularly when deployed to the treeless barrens, soldiers struggled with the basic skills of navigation, one of the keys to retaining effective mobility. Many parts of the North had not been properly mapped, while existing maps often lacked detail or had errors, such as failing to include small lakes, ponds and muskeg. The dearth of landmarks on the barrens upon which to take a bearing (which only worsened in the winter with snow covered ground), the inefficiency of the magnetic compass in northern latitudes, magnetic disturbances that made readings impossible, the difficulty in judging distance due to lack of perspective, and the detours that units had to take to get around bush, creeks and streams, all required a high degree of navigational skill to overcome. In the winter, the short days and long nights, the fogs, snowfall, blizzards and blowing snow, especially in the barrens, limited visibility, and exacerbated all other navigation problems. During Exercise *Polestar*, observers noted a major problem in "distance judging" when the troops were on the land above the tree line. "Those distinguishing features which give the observer an indication of his distance from a specified object in other areas are either not present, or are dwarved to such a degree that in nearly all cases, distance will be over-estimated," *Polestar*'s after action report concluded.[106] Even on flat terrain, marches often suffered from frequent curves, disrupting time schedules and demoralizing the men.[107]

Given the problems associated with navigation, a central lesson learned from northern exercises insisted that everyone involved, but especially officers and NCOs, should become experts at dead reckoning. The skill involved calculating a unit's position by using a previously determined starting point and a plotted course, and then advancing that position based on known or estimated speeds, accounting for elapsed time and course.[108] Dead reckoning proved a difficult skill to acquire, but through it those navigating in the North could experience at least a degree of recurring success.

Experience during northern exercises also emphasized the problems that engineers encountered supporting the Army's quest to attain mobility. In addition to all the tasks normally required of engineering units in more temperate theatres, operations in the Subarctic placed "special emphasis on road construction and clearing, and an added responsibility on the engineers."[109] During northern deployments, engineers constructed and maintained all of the main supply routes, clearing snow from roads and preparing landing strips on frozen lakes and river. During break-up and freeze-up, engineers faced the difficult challenge of "almost continuous maintenance" of roads and tracks, and found themselves in heavy demand for their bridging and rafting services. On top of these duties, engineers had to expediently construct warm advanced bases and temporary buildings.[110] They had to be trained to work efficiently, safely and quickly in the Arctic and Subarctic environments, and the success of northern deployments largely depended on their level of capability and adaptability.

Medical personnel also had to adapt to the northern environment and understand that there was no such thing as a minor casualty in the climatic conditions of the Arctic and Subarctic. The after-action reports stressed that every incident held the potential for minor catastrophe and that many injuries could become life-threatening in a northern context, particularly in light of how long an evacuation could take. Lessons learned highlighted the importance of keeping casualties warm and dry. They also stressed the important role medical personnel had to play in educating soldiers on the prevention of snow blindness, overheating, trench foot and, above all else, frost bite.[111] During *Polestar*, for example, 94 men were reported sick and nine were sent to the hospital at Fort Churchill. Their afflictions ranged from bronchitis, gastro-enteritis, intestinal colic, fume conjunctivits and frostbite.[112] Even during *Sweetbriar*, which enjoyed fairly moderate temperatures, the Canadian Army reported that the "wastage of men due to climatic conditions" was high, listing 24 cases of cold or influenza, 20 cases of frostbite and 35 evacuations for other injuries.[113] Medical personnel had to learn how to deal with this "wastage of men" effectively to ensure a force's mobility or effectiveness in the field.

Another main conclusion to come out of *Sweetbriar* and several other northern exercises suggested that, of all the troops involved in operations, signals personnel required the most pre-training and testing before deployment. These exercises highlighted that rapid tactical mobility in the North depended on the "perfection of a communications system."[114] To achieve this efficiency signals personnel had to counter all of the difficulties brought on by northern climatic conditions, which severely impeded the maintenance of good wireless communications.[115]

Exercise *Sigloo* proved how poorly lead-acid batteries functioned in sub-zero temperatures and how disruptive a role "snow static" and "auroral blackouts" could play. During *Sun Dog I*, when the wind exceeded 15 miles per hour and caused blowing snow, the interference caused by the snow static blacked out wireless communication by voice by over 75% of the range of the set.[116] *Sweetbriar* found that faults and breakdowns in wireless sets and power units would normally have been prevented or diminished to a great extent by experienced operators.[117] Signals personnel had to be taught that taking a wireless set into a warm shelter after it had been cold-soaked could ruin it, and trained signallers to give wireless sets additional time to warm up in the Arctic cold or risk blowing a fuse. They had to learn simple tricks like storing batteries under their parkas to keep them warm and extend their operating life. Even with practice and advancements in equipment, however, problems persisted, and a report from *Sun Dog III* summed up the "tenuous nature of wireless communications" during northern deployments.[118]

Throughout the late 1940s and 1950s, the personnel stationed at Fort Churchill continued to address the lessons learned from the northern exercises and various indoctrination courses, resolve the problems associated with mobility and force effectiveness, and work on the special issues faced by navigators, engineers, medical and signals personnel. Post-exercise reports constituted a steady stream of suggestions on how to make clothing, equipment and practice more effective. In particular, the experts at Fort Churchill focused many of their efforts on reducing the weight, bulk and quantity of equipment and clothing involved in northern operations.[119] They worked to make parkas, mukluks, and mitts more effective and less disruptive. They engaged in a constant process of designing and modifying new equipment, from tents, toboggans, skis, snowshoes and lamps, to rifles and Bren guns, insect repellent, snow shovels, spoons and thermos containers.[120] Personnel experimented with solutions to specific equipment problems, such as how to stop moisture from accumulating in sleeping bags when men slipped their heads inside their bags.[121] Engineers and mechanics tested gear and engine oil, winterized vehicles, experimented with prefabricated structures, and worked on water supply issues. The Chemical Corps studied gas masks and the effectiveness of chemicals under Arctic conditions. Signals experts tried to find solutions to the effects of Arctic conditions on communications, circuits and radios. Ordinance specialists carried out experiments on everything from small arms to heavy artillery, combat vehicles, fuels, lubricants, antifreeze, brakes, Arctic open storage, and outdoor exposure.[122] As the tempo of small unit exercises picked up, the staff at the fort focused on more specific combat-related issues to complement the lessons that the Army was learning in the field.[123]

By 1951, the work at Fort Churchill, when combined with the lessons learned from Canadian and American northern exercises, had developed military equipment to such a point that operations in the Arctic and Subarctic could be conducted with a reasonable operational capability down to -25°F and a fair capability to -40°F. Nevertheless, as *Sweetbriar* and other Army exercises proved, by the early 1950s operational capabilities were still well below 50% of ultimate capability, and usually somewhere between

25% and 35%.[124] The Army still had a long way to go before it could operate at peak efficiency in the North.

While the Army anticipated that additional research and development, troop training, and experience would continue to improve performance in the Arctic and Subarctic, the lessons learned from northern exercises emphasized that thorough planning and preparation were essential to increased capability. In his remarks after Exercise *Sweetbriar*, Major-General Matthew Penhale stressed that the ordinary affairs of a soldier's life in the North had to be "timed, ordered and controlled in all aspects, and in great detail, 24 hours a day, else confusion will abound."[125] Every detail possible had to be covered prior to a force deploying to the North—and northern operations involved "innumerable details."[126] The *Guide to the Planning and Execution of Operations in the North* warned that, "to leave things to chance [in the Arctic and Subarctic] is to invite defeat, not necessarily by the enemy but by the climate itself."[127] The northern environment left "a very narrow margin between successful planning and disaster."[128]

While the mistakes and omissions of planners could often be rectified in the field in more temperate regions, they generally proved "disastrous in the North." At the operational level, planning had to ensure that all necessary equipment, including a large supply of spares, were pre-positioned for northern exercises, given that the military could not replace forgotten or damaged items in the same manner it would in less isolated areas. "During all seasons of the year severe limitations are placed upon the efficiency of all types of transport to the extent that adequate logistic support is difficult to achieve at best," the Army concluded. "Sudden, unplanned, demands for increased support are not likely to be met."[129] In the field, rates of wastage of clothing and equipment were always "abnormally high," which increased the importance of pre-positioned replacements.[130] Only through superior pre-planning would soldiers on the ground and the aircrew supporting them be able to face the unforeseen challenges that always crept into northern operations and embrace the flexibility needed to overcome changing local conditions.

Planners and commanders at all levels also had to "appreciate the difference in time values" that existed during operations in the Arctic and Subarctic. Canadian military commanders, schooled on the battlefields of

Northwest Europe or in NATO training exercises, repeatedly had to learn that the northern environment placed a restraining hand on the speed of all human activity. They had to develop a special northern "time sense" and accept that things just took longer in the North. Plans had to reflect that double or triple time would be required for the completion of housekeeping duties and care of equipment, let alone the conduct of kinetic operations.[131] As the report on *Sweetbriar* noted, "Deployment of troops, preparation and distribution of orders, cross-country marches, preparation of food, erection and striking of shelter, the delivery of supplies, routine administration and maintenance—all take much longer than is normally expected for similar operations in a temperate climate."[132] During *Polestar*, for instance, a unit carrying a three-inch mortar had to turn back to camp covering only 300 yards, after which the exhausted men could go no further.[133] While training could improve the endurance of soldiers, planning simply had to accept that the movement of men and equipment would take longer in the North.

The northern exercises revealed that only careful advanced planning could allow the Army to exploit local sources of support—particularly the unorthodox units of Canadian Rangers sprinkled across the North—once a force deployed to the region. Although overlooked as an operational resource during the 1940s, the Rangers began to play increasingly active roles on exercises in the early 1950s as advisers on northern survival, guides for southern units, guerrilla forces, and even assault troops. More advanced cooperation was possible, however, only with detailed planning that understood and appreciated the benefits that the Rangers brought to northern operations—as well as their limitations. Despite enthusiastic media coverage that hyped the Rangers' potential contributions to Arctic combat, internal Army debates about the proper roles, responsibilities, and capabilities of the Rangers were never resolved during the early Cold War. Accordingly, the Army only partially capitalized on the potential opportunities offered by integrating the subject matter expertise of permanent Northern residents into military planning and exercises.[134]

The Army maintained that proper planning and preparation were essential to solving one of the greatest problems of northern exercises: morale. Every after action report on the early Cold War northern exercises stressed the morale problems experienced by soldiers on the ground—the impact of the "Arctic goblin." Soldiers inexperienced in Arctic and Subarctic operations feared the austere and harsh northern environment.[135] Penhale found it "unfortunate that most of the published results of historical expeditions to the North have stressed the appalling conditions of hardship and misery, endurance and boredom that have to be faced, in the extreme areas of our planet." Almost no attention, the general complained, had been given to successful accomplishments in the North, where "many people exist, work and in fact spend their lives in a more or less happy and contented state." As a result, soldiers came to northern exercises with their morale already dampened by a pre-conceived perception of the North forged out of their fear of its extreme cold, darkness, isolation, and barrenness. A soldier's mind, Penhale lamented, was too easily "filled with gloom and foreboding, and … depression at the thought of the arduous service to come" in the "unknown" North. Plagued by negative thoughts and associations, troops could easily become "subjects to their minds, to the insidious effect of the north land," and reduced to psychological casualties. At the very least, Penhale warned, these morale problems created an apathy that reduced the effectiveness of the individual, and in turn threatened the mobility and performance of his unit. [136]

In the lead-up to an exercise and during its execution, Penhale argued, the "firm base" for a successful operation and high morale rested "in the provision of adequate equipment, not only in respect to clothing and personal gear, but also in relation to the effectiveness in performance of weapons, which must be demonstrable, if confidence is to be established."[137] Reliable, proven equipment improved morale, as did superior planning and preparation. The Army recognized that soldiers had to believe that their leadership had ordered and controlled their every move in the North, and stressed the importance of passing this information on to the troops in the field. Confidence that leaders had planned every detail, prepared for every exigency, and had ample supplies and spare equipment in place inspired a feeling of wellbeing in the troops. In particular, morale improved once soldiers felt confident that planners and medical personnel had sufficiently prepared for casualties.[138]

The Army also recognized the strong connection between morale and the provision of relief facilities, which soldiers feared would be unavailable "on the end of a long line of communication." During northern deployments, soldiers required frequent and well-planned reliefs and ordered rests from the fatigue of operations, as well as breaks from the "squalor" of confined tents, cooking and the absence of washing water.[139] Accordingly, for the Army to maintain morale in theatre, it had to plan for, and provide, plentiful forward rest areas, complete with laundry and bath units. The report on *Sweetbriar* suggested that these services, "and mobile canteens, especially if operated by women, would materially assist in the maintenance of morale."[140]

While the knowledge of adequate planning and equipment could boost a soldier's morale prior to and during northern exercises, the Army recognized the important role that training, experience, and correct information could play in dispelling many of the fears of the North carried by soldiers, thus furnishing them with the proper mental attitude. "The natural fear of the cold," a consolidated set of lessons learned observed, "can be overcome by acquiring confidence in one's own ability to withstand it."[141] Once a soldier was provided with a high level of knowledge and understanding of the Arctic and Subarctic, imaginary problems disappeared and he could handle the real challenges.[142] Training and adequate experience could tame, if not altogether defeat, the "Arctic goblin." By *Sun Dog III*, for instance, the Army could conclude that "none of the fear of the environment that had existed on the previous exercise was evident during this one. This was probably due to the self-assurance created by the indoctrination exercise."[143]

Once in the field for an extended period, however, the Army understood that training, equipment and confidence in the plan were simply not enough to stave off declining morale without one of the most essential requirements of northern operations: effective leadership by junior officers and NCOs.[144] While leadership played a significant role in every military operation, the lessons learned from northern exercises highlighted it as one of the most important variables in Arctic and Subarctic deployments.[145] Junior officers and NCOs had to actively evaluate their personnel from the moment they learned that their units were heading north. The conclusions emanating from the more strenuous exercises on the land, such as *Sun Dog I*, established that the troops "need not be hand-picked. However, some weeding out during the training period must be permitted to eliminate temperamentally or physically unsuitable men who would otherwise become liabilities during operations."[146] During these initial preparations, officers were also advised to weed out the "chronic moaners" who would have a negative impact on unit morale.[147] To assist in building morale, officers and NCOs also had to disseminate a steady stream of "balanced and factual information on the Arctic and its problems and thus counteract the exaggerated views so widely held."[148]

During long northern deployments, even the best trained and equipped men could lose the fight against the cold, which gradually made them intellectually numb and sapped their morale, causing them to lose

interest in essential tasks. While on the land, bundled up in layers of clothing, head covered in the thick hood of a parka, the Army worried that soldiers might withdraw into themselves into a cocoon-like existence or individual hibernation,[149] even to the point of forgetting to take basic actions necessary to stay alive. When soldiers retreated into their parkas, not only were their fields of vision and hearing obstructed, but their mental processes and response to commands became sluggish.[150] Once in the warmth of tents or shelters, the northern exercises proved that troops often shirked their duties. Leadership had to ensure that this kind of individual or group hibernation did not occur, that soldiers did not seek the comfort of sleeping bags for too long of periods, or that squads did not remain in tents rather than complete their duties. To accomplish this, officers and NCOs had to constantly keep their men engaged, focused, and encouraged.

The Army recognized that the maintenance of morale, operational effectiveness, and cold-weather discipline were closely connected, and officers and NCOs were ordered to "pay constant attention to the state of clothing and equipment, hygiene and sanitation, care of weapons, feeding … and other matters." They had to ensure that soldiers wore their clothing properly (loose and in layers) and maintained their equipment. They had to watch that their men did not sleep with their heads in their sleeping bags (moisture from breathing will freeze) and to consistently promote cleanliness in their units. Captain R.R.M. Croome, the medical officer on *Musk Ox*, noted disapprovingly that cleanliness and hygiene had not been stressed prior to the exercise, under the misguided belied that washing and shaving removed "protective oils." As a result, men on the operation rarely washed, shaved or changed their clothes. Croome stressed the importance of personal hygiene, noting that dirty or greasy body parts resulted in dirty and greasy clothing, limiting their insulating value. He reported that "slovenliness lowers morale and breeds lack of discipline."[151] The Army quickly learned that when clothing became matted in dirt and grease, much of its insulation was lost as the air pockets in the clothes were crushed or filled up, allowing the heat to escape from the body more readily.

Underwear, in particular, required close attention.[152] Despite attempts to address this issue, cleanliness remained a persistent problem. The joint after action report for *Sweetbriar* noted that "military personnel scheduled for participation in northern exercise tend to become slovenly in their personal appearance and general housekeeping duties; therefore, more supervision, inspection, and basic instruction are required to maintain desired standards."[153] The Army soon associated lax hygiene practices with diminished morale and poor leadership.

Junior leadership also bore primary responsibility for two of the primary afflictions soldiers encountered during winter deployments in the North: overheating and frostbite. When a man suffered from heat exhaustion on *Polestar* despite temperatures well below zero, because he was overdressed and carried his equipment, the Army considered this a leadership failure.[154] Officers had to recognize the signs of overheating, the working conditions that created the problem and how to respond. Even more importantly, officers and NCOs had to initiate an effective "buddy system" to perform frostbite and clothing checks, which required knowing which soldiers would work well together.[155]

Officers and NCOs had to ensure that their men continued to eat and drink in the cold of the northern winter, paying particular attention to the prevention of waste. This was essential, "not only from the logistical point of view as regards supplies of all natures, but from a health and morale point of view as regards food and water wastage." The Army provided rations that had been carefully prepared to meet the caloric requirements of soldiers operating in the northern environment, and officers had to encourage their men to eat all of the food given them. "Waste of food is not only a waste of logistic effort," one report noted, "but is also an invitation to sickness."[156]

The northern exercises underlined that "strong and forceful leadership, coupled with a high degree of man-management are required in order to obtain the maximum from troops" operating in Arctic and Subarctic conditions.[157] During northern deployments, officers and NCOs had to display greater initiative, self-reliance, mental and physical endurance than was generally required during operations in more temperate areas. They had to improvise, remain flexible and adaptable, and possess strong skills in navigation and bushcraft. The Army discerned that unselfishness represented one of the central components of effective leadership. During northern deployments, an effective leader had to remain out in the cold longer than his men, providing for their warmth and comfort before his own. The rigours of the northern environment could test even the most competent leader, particularly when bad weather struck. The post-exercise report from *Sun Dog I* stressed the need for officers and NCOs to keep the men moving even in harsh conditions to sustain operational mobility, reduce cold casualties and maintain morale. Not every officer could accomplish such a difficult task, but success on northern operations depended on those who could.[158] In the end, the formula for successful northern operations included suitable training and equipment, superior planning, organization and preparation, and the maintenance of morale. The northern exercises conducted by the Canadian Army suggested, first and foremost, that effective leadership represented the essential ingredient that forged all of these factors into an effective deployment.

Conclusions

> *The day is past when our Armed Forces can afford to suspend operation for the winter months. Space is power only when we can move and fight effectively in that space during all seasons of the year.*
>
> \- Final report for Exercise *Eskimo* (1945)[159]

The after-action reports from the northern exercises conducted between 1945 and 1955 provide a road map of the trials and errors, failures and successes, and lessons learned that shaped the Canadian Army's experience in the North. These reports give the impression that steady progress was being made on the development and improvement of equipment and other tangible factors, as exercises and tests pointed to technical solutions that would allow "machines, materiel, and men" to overcome the Arctic's "unique challenges not met elsewhere in the world."[160] There remained, however, a whole layer of intangibles for which it proved more difficult to engineer solutions through iterative processes. Human factors, particularly morale and motivation, remained a consistent problem in northern exercises even when the Army supplied troops with the proper training and equipment. Overcoming this "hostile environment" was not simply a physical challenge, but a psychological one as well.[161] Although another human factor—effective leadership—provided a stout defence against weakening morale, the "Arctic goblin" proved a difficult enemy to eradicate.

Post-exercise reports highlighted that the only real solution to some of the more intractable human factors involved in northern operations, and the only way to increase the Army's effectiveness in the Arctic and Subarctic, was time. It took time to familiarize troops, at every level from staff officers and planners to the individual infantryman, with the Arctic. It took time to teach soldiers how to think about the North and defeat the "Arctic goblin." It took time and repetition for soldiers to absorb the necessary training and skills to make the "business of living" in the North more manageable. Finally, soldiers had to spend time in the North, rather than simply passing through the region for short periods, if the Army wanted to significantly improve its Arctic capability.

By 1955 the Canadian Army had spent a decade operating in the Arctic and Subarctic and had developed an adequate northern capability—although on a more modest scale than originally intended.[162] As its capability improved, however, the changing strategic environment started to undermine the perceived military value of these efforts on the ground. When the Soviets acquired long-range bombers such as the TU-16 Badger, the MYA-4 Bison, and the TU-20 Bear, all of which could be aerially refuelled, the threat of an enemy lodgement in the North declined precipitously while the threat of an atomic strike on the North American heartland grew exponentially.[163] Defence planners focused on meeting the threat of Soviet air attacks on Canadian and American cities by creating an elaborate radar system in the Arctic. As these new concerns and priorities gripped Canadian-American defence planning, a new wave of sovereignty concerns also hit Ottawa—concerns that drew federal officials' attention to the coastline of the Arctic Ocean and into the Arctic Archipelago itself.[164]

Army activity in the Canadian North peaked in the mid-1950s and thereafter declined until, by the mid-1960s, the military had virtually abandoned the region as a potential operational theatre. Sub-units continued to train episodically at Churchill, but after this military base closed in 1964 training became increasingly rare. The Canadian Rangers were seriously affected by the diminished Army interest in the North and left to wither on the vine.[165] The 1964 *White Paper on Defence*, which did not contain a single reference to the North, gave official utterance to what had become an informal reality. "It is, for the foreseeable future, impossible to conceive of any significant external threat to Canada which is not also a threat to North America as a whole," the policy document noted, although it allowed that "the minimum requirements for the defence of Canada are: the ability to maintain surveillance of Canadian territory, airspace and territorial waters; the ability to deal with military incidents on Canadian territory."[166] While these may have been the minimum requirements, there is no indication that the subsequent structuring of the Canadian Armed Forces involved any specific steps to develop a surveillance or combat capability in the forces appropriate to the needs of the North in the 1960s. Instead, the lessons learned by the Canadian Army in the decade after the Second World War were forgotten, a casualty of the arrival of the missile age and, as historian Andrew Godefroy observes, the fixations of "an army increasingly concerned with fighting on the north German plains."[167]

Appendix 2: Canadian Army Exercises in the Canadian North, 1945-55[168]

YEAR	NAME	LOCATION
1945	Eskimo	Prince Albert and Lac la Ronge area, Saskatchewan
1945	Polar Bear	Caribou and Coastal Range British Columbia
1945	Lemming	Churchill, Manitoba to Padlei, NWT
1946	Musk Ox	Churchill, Manitoba to Edmonton, Alberta, via Cambridge Bay, Kugluktuk (Coppermine) and Tulita (Fort Norman)
1946	North	Alaska Highway
1947-1948	Moccasin	Churchill, Manitoba
1948-1949	Sigloo	Churchill, Manitoba
1950	Sweetbriar	Northwest highway system between Whitehorse, Yukon and Northway, Alaska
1950	Sun Dog I	Churchill, Manitoba
1950	Cross Country	Fort Churchill to Cape Churchill, Manitoba
1950	Shoo Fly I	Cape Churchill, Manitoba to Duck Lake, Saskatchewan
1951	Sun Dog II	Fort Churchill and Nunnalla area
1951	Shoo Fly II	Churchill, Manitoba
1951-1952	Polestar	Churchill, Manitoba
1952	Sun Dog III	Kuujjuaq (Fort Chimo)
1952	Deer Fly I	Fort Churchill and Christmas Lake, Manitoba
1952	Deer Fly II and III	Fort Churchill and Christmas Lake, Manitoba
1952	Eager Beaver	Kluane Lake, Yukon
1952-1953	Prairie Tundra	Area north of Fort Churchill, Manitoba
1953	Bull Dog I	Area around Tulita (Fort Norman) and Norman Wells, Northwest Territories
1954	Bull Dog II	Area around Fort Churchill and Baker Lake
1954	Loup Garou	Area around Sept Îles, Quebec
1955	Bulldog III	Yellowknife, Northwest Territories

Notes

[1] Exercise Sweetbriar, vol.1, Cover Letter and Narrative History, Department of the Army, The Adjutant General's Office, NARA, RG 409, Entry (NM3) 429, box 3, file Narrative History - Exercise Sweetbriar; and Exercise Sweetbriar, vol. III, Report of Canadian Army, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III.
[2] Exercise Sweetbriar, vol. 3, Report of Canadian Army, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III.
[3] Bernd Horn, *Bastard Sons: An Examination of Canada's Airborne Experience, 1942-1955* (St. Catherines: Vanwell Publishing Limited, 2001), 80; Bernd Horn, "Gateway to Invasion or the Curse of Geography?: The Canadian Arctic and the Question of Security," in *Forging a Nation: Perspectives on the Canadian Military Experience*, Bernd Horn ed. (St. Catherines: Vanwell Publishing Limited, 2002), 309.
[4] Quoted in *Time* (7 June 1948).
[5] For the strongest indictment of the MSF see: Bernd Horn, *Bastard Sons*, 16, and his chapter in this volume. See also: David. A. Charters, "Five Lost Years: The Mobile Striking Force, 1946-51," *Canadian Defence Quarterly*, 7:4 (Spring 1978), 44-47, and Sean Maloney, "The Mobile Striking Force and Continental Defence, 1948-1955," *Canadian Military History* 2:2 (Autumn 1993): 75-88.
[6] "Guide to Planning and Execution of Operations in the North," DHH, 122.3M3 (D2), ii. The Army's operational experiences in the early Cold War period were inextricably linked to the joint research conducted at Fort Churchill, which also served as a hub for many of the exercises. As an American report noted, the activities at Churchill provided both armies with the experience, materials and equipment they needed to function "on a front hitherto neglected and now of prominent significance – the Arctic." "An Introduction to Churchill and Surrounding Area, by 7099th ASU," NARA, RG 156, entry 646-A, file An Introduction to Churchill, Fort Churchill and Surrounding Area; 1st Lt. C.C. Moore, Unit Historical Report, 1 July 1948 to 30 June 1949, Headquarters, 7099th Area Service Unit, NARA, RG 319, entry (NM3) 429, box 4750, file Historical Report - 7099th ASU, 1st Arctic Test Detachment.
[7] See for example: Robert Bone, *The Canadian North: Issues and Challenges*, 4th ed. (Don Mills: Oxford University Press, 2012), 2-4.
[8] These barren lands, encompassing 1.1 million square miles, covered 32% of Canada's land mass. "Guide to Planning and Execution of Operations in the North," DHH, 122.3M3 (D2), 1. See also: J. Tuzo Wilson, "Winter Manoeuvres in Canada," *Canadian Geographical Journal* 32:33 (1946): 88-93, and Omond McKillop Solandt, "Exercise 'Sweetbriar'," 30 March 1950, *The Empire Club of Canada Addresses* (Toronto): 276-293, speeches.empireclub.org/62437/data.
[9] Kendrick Lee's research paper on "Arctic Defences," published in *Editorial Research Reports* 2:5 (31 July 1946), represented a classic example of this approach.

In making the point that "Russia was more advanced in Arctic warfare than any other nation," the author cited Soviet combat experience in Finland and the winter campaigns of the Great Patriotic War as evidence in support of his contention. What he really meant was that the Soviet Army was highly experienced in winter warfare. "Arctic Push Button War 'Out': Winter Too Tough for Army," published in the *Winnipeg Tribune* on 10 May 1949 dealt with a series of trials that had been conducted at Churchill the previous winter. The author emphasized the "cold arctic" claiming that "keeping alive (was the) biggest problem." The article went on to recount problems raised by extreme wind chills, the necessity of training troops to load sleds and toboggans, to ski, to pitch a tent, to shelter in snowbanks. In short, "arctic" was equated directly to "winter." American Lieutenant Colonel Joseph J. Peot's article "The Arctic Can be Our Ally," *Military Review* 31:11 (February 1952), fell into the same trap by depicting the Arctic as an area "where conditions of snow and extreme cold make necessary the use of special Arctic equipment and training."

[10] See: Andrew B. Godefroy, *In Peace Prepared: Innovation and Adaptation in Canada's Cold War Army* (Vancouver: University of British Columbia Press, 2014), 91, and contrast with Kenneth Eyre, "Custos Borealis: The Military in the Canadian North," unpublished Ph.D. thesis (University of London - King's College, 1982), 285-86, 161.

[11] Andrew B Godefroy, *In Peace Prepared,* 85.

[12] Conclusions Reached as a Result of the Experience Gained During Exercise Yukon, NARA, RG 337, entry (NM5) 28, box 381, file 401-410, Arctic Program.

[13] C.P. Stacey, *The Military Problems of Canada* (Toronto: Ryerson Press, 1940), 5.

[14] For an introduction to Swedish, Russian, German, American, British, and Canadian interests, see: Kenneth Eyre, "Tactics in the Snow: The Development of a Concept," *Canadian Defence Quarterly* 4:4 (Spring 1975), 7-12.

[15] Canadian Army Training Pamphlet no.6, *Instructions for Winter and Ski Training* (Ottawa: King's Printer, 1941).

[16] Prior to the Japanese capture of Attu and Kiska in June 1942, the U.S. Army did not consider the Arctic to be of primary importance and naively assumed that a mountain trained unit could operate in cold weather anywhere. The Japanese invasion, however, convinced the U.S. Army that it had to improve its Arctic capabilities. Shortly after, the service established the Alaskan Department Development Board at Fort Richardson, where researchers worked to establish special clothing and equipment for wet-cold and dry extreme cold conditions. Headquarters, Army Arctic Indoctrination School, "Background of Cold Weather Training and Experimentation, NARA, RG 338, entry 37042, box 826, file Army Arctic Centre, Arctic Training Doctrine. Early during the war, U.S. Army interest in cold weather operations centred on Camp McCoy, Wisconsin, where units like the 10th Mountain Division trained in winter warfare.

[17] Then Vice Admiral Lord Louis Mountbatten, the British Chief of Combined Operations, conceived Plough as a diversionary operation that would employ specially-trained and equipped troops to operate across snow and carry out sabotage raids on Norwegian hydroelectric facilities, thus diverting German forces from the intended invasion area of Normandy. Great Britain was unable to produce a highly mobile oversnow vehicle in sufficient time, however, and the concept was offered to General Marshall who accepted it on behalf of the United States. The American agencies assigned the responsibility of producing the vehicle, eventually christened the "Weasel," used the services of the National Research Council of Canada in the research and development stage. Canada also undertook to develop an armoured snowmobile of her own design. Eventually, the Plough project was dropped in the autumn of 1942 due to lack of transport aircraft to support the operation. The importance of Plough to the development of a winter warfare capability was that it engendered the development of two vehicles specifically designed for cross snow operations. Although neither vehicle ultimately proved to be totally acceptable in its designed role, they both were important first steps in solving the all important winter mobility problem.
[18] See for example: Wilson, "Winter Manoeuvres in Canada."
[19] *Exercise Eskimo,* "Briefing on Exercise Eskimo for Visiting Senior Officers from, U.K., U.S.A. and Canada" (henceforth Ex Eskimo Briefing), 21 January 1945, Appendix 17, DHH, 112.352 (D7).
[20] For an overview of the three exercises see: Hugh Halliday, Recapturing the North: Exercises 'Eskimo,' 'Polar Bear' and 'Lemming' 1945, *Canadian Military History* 6:2 (Autumn 1997), 29-38.
[21] Ex "Eskimo," undated (probably summer 1945), DHH, 746.009 (D17). All subsequent references to this exercise are from this source.
[22] Winter Warfare Research Programme, 1944-45 – Exercise Eskimo (Dry Cold), DHH, file 746.013 D2. The exercise study group further advised that only vehicles operating in the forward areas needed an over-snow capability. They were content that the rear area vehicles could safely remain road bound without affecting the tempo or security of combat manoeuvre. Given that their analysis of tactical doctrine led them to conclude that each of the many frozen lakes in the sector was a potential landing ground for enemy airborne troops, one must question the validity of accepting a logistic tail that could only move on prepared and maintained roads. If the authors of the report had had the opportunity to interview a Russian survivor of the Winter War battle of Souomussalmi, which was fought on terrain almost identical to that of northern Saskatchewan, they might have drawn different conclusions. During the Battle of Suomussalmi (7 December 1939-8 January 1940), Finnish forces—with solid leadership and fighting on familiar terrain—managed to defeat a vastly superior Soviet force in numbers and heavy equipment using mobility, unorthodox tactics, equipment suited to the winter conditions, and

simple planning. See: John Hughes-Wilson, "Snow and Slaughter at Suomussalmi," *Military History* 22:10 (Jan-Feb 2006): 46-52.
[23] Canadian Army Operational Research Group Report 28, "Polar Bear," 15 July 1945, DHH, 746.083 (D20). All subsequent references to this exercise are from this source.
[24] Lemming also served the purposes of the Department of Mines and Resources, which had expressed an interest in using over-snow vehicles to supply survey parties which they hoped to dispatch to Victoria and Banks Island during the winter of 1945-46. *Winter Trials: Tests 1944-45* "Exercise Lemming," 1 March 1945, 314.009 (D179).
[25] "Exercise Lemming, Lessons Learned: Winter Exercises, 1945-54," DHH, 81/675
[26] Cold Weather Trials: *Exercises Ex Lemming CAORG Report* no. 25, 24 May 1945, DHH, 746.083.
[27] The M7 half track was deemed unsuitable for Arctic operations. Cold Weather Trials: *Exercises Ex Lemming CAORG Report* no. 25, 24 May 1945, DHH, 746.083.
[28] Post-War Canadian Defence Interests in United States Defence Projects in Northwest Canada,
Preliminary Draft by Army Representatives on Joint Drafting Group, Working Committee on Post-Hostilities Problems, 6 July 1945, *DCER*, vol. 11, 1944-45, 1582.
[29] Exercise Sweetbriar, vol. III, Report of Canadian Army, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III.
[30] Considerable publicity attended the completion of Musk Ox but the Canadian government made no attempt to capitalize on this national and international attention, and in fact, tended to play down the operation. The Minister of National Defence speaking in the House said, "There is nothing secret about this expedition; it is a very small one. *Debates,* 14 December 1945, 3552-3. Despite the "non-secretive" nature of the expedition, the exercise report was not classified as an open source until, at Eyre's request, it was declassified on 25 November 1975. In some respects, it is surprising that Canada did not attempt to develop the sovereignty implications of the expedition. Certainly the government had often expressed concern over the extent of wartime America military development in the North and American long-term commercial designs on the region. No evidence could be found that would indicate that either the Canadian military or government considered this option. This makes the title of Hugh A. Halliday's article "Exercise 'Musk Ox': Asserting Sovereignty 'North of 60,'" *Canadian Military History* 7:4 (2012): 37-44, rather peculiar.
[31] Ex "Musk-Ox," DHH, 746.033 (D2).
[32] House of Commons, *Debates,* 14 December 1945, 3552-3.
[33] On Musk Ox see: G.W. Rowley, "Exercise Musk Ox," *Geographical Journal* CE:4-6, (October 1947): 175-185; J.T. Wilson, "Exercise Musk-Ox, 1946," *Polar*

Record, 5:33 (December 1947): 14-27; Patrick Baird, "Musk Ox Retold," *North* 25:5, (September/October 1978): 24-44; Halliday, "Exercise 'Musk Ox'"; and Kevin Mendel Thrasher, "Exercise Musk Ox: Lost Opportunities," unpublished M.A. thesis (Carleton University, 1998).

[34] French Army Scientific Bureau in *Revue des Troupes Coloniales* 1946 (trans. and digest in "Polar Expeditions," *Military Review* 27:1 (April 1947).

[35] Press Analysis Section C.I.S. – *Canadian Embassy, Washington, D.C. Exercise Musk Ox,* DHH, 314.009 (D15).

[36] Headquarters, Army Arctic Indoctrination School, "Background of Cold Weather Training and Experimentation, NARA, RG 338, entry 37042, box 826, file Army Arctic Centre, Arctic Training Doctrine.

[37] Intelligence Research Project, Intelligence Division, WDGS, Possibilities of Trans-Arctic Attack on the United States, 13 January 1947, NARA, RG 319, entry (NM3) 82, box 2894, file Project 3506 - Possibilities of a Trans-Arctic Attack, 1947; File Report on the Arctic, Atlantic Division, Air Transport Command NARA, RG 319, entry (NM3) 82, box 2975. On the "gateway to invasion" idea see also: Horn, "Gateway to Invasion or the Curse of Geography," 307-332.

[38] Sean Maloney, "The Mobile Strike Force and Continental Defence, 1948-1955," *Canadian Military History* 2:2 (1993), 77.

[39] Headquarters, Army Arctic Indoctrination School, "Background of Cold Weather Training and Experimentation," NARA, RG 338, entry 37042, box 826, file Army Arctic Centre, Arctic Training Doctrine.

[40] Horn, *Bastard Sons,* 75, and chapter three in this volume.

[41] Alfred James Tedlie, "'Winter and Rough Weather': Fort Churchill 1946-1964 in Defence of Northern Canada," (unpublished M.A. thesis, University of Victoria, 1986), 60. The Canadians started a northern research program at Churchill in the spring and summer of 1946, with the summer research consisting mostly of equipment and weapons tests.

[42] Memorandum by Joint Canadian-United States Military Cooperation Committee, 23 May 1946, *DCER,* vol. 12, 1946, 1615-23.

[43] Andrew Iarocci, "Opening the North: Technology and Training at the Fort Churchill Joint Services Experimental Testing Station, 1946-64," *Canadian Army Journal* 10:4 (Winter 2008), 75.

[44] An Introduction to Churchill and Surrounding Area, by 7099th ASU, NARA, RG 156, entry 646-A, box A764. According to Andrew Iarocci, "Most significant was its geographic location at an ecotone, a transitional zone between two ecological systems: the arctic barrens to the north and the boreal forest to the south. As such, the terrain around Churchill broadly represented the character of arctic lands across the north." Iarocci, "Opening the North: Technology and Training at the Fort Churchill Joint Services Experimental Testing Station, 1946-1964," *Canadian Army Journal* 10:4 (Winter 2008), 76.

[45] The Combined Experimental and Training Station, Fort Churchill, DHH, 91/171. The railhead, port and town at Churchill were located at the mouth of the Churchill River, while the military camp was about 5 miles eastwards along the coast of the Bay. On 1 October 1946 the site was officially passed from the Department of Transport to the Canadian Army, which quickly re-named it Fort Churchill.
[46] Tedlie, "'Winter and Rough Weather,'" 41.
[47] "No Big Arctic War Believed Possible: Extensive Tests Said to Show Weather Prevents Use of Armies or Even Brigades," *New York Times* (10 May 1949).
[48] The Combined Experimental and Training Station, Fort Churchill, DHH, 91/171
[49] Tedlie, "'Winter and Rough Weather,'" 118.
[50] The Combined Experimental and Training Station, Fort Churchill, DHH, 91/171
[51] Extracts from the Report of the Training Wing, Fort Churchill and The Combined Experimental and Training Station, Fort Churchill, DHH, 91/171.
[52] Abstract of Reports on Canadian Army Training, Trials and Tests, Winter 1948-1949, Canadian Army Headquarters, June 1949, University of Toronto Archives, B93-0050, box 51, file 09.
[53] J.L. Collins Jr., "The Army Arctic Indoctrination School," *Military Review* 28:8 (August 1949), 28.
[54] *Calgary Herald* (3 July 1947).
[55] House of Commons, *Debates*, 16 June 1955, 4870.
[56] *Halifax Herald* (9 May 1949).
[57] House of Commons, *Debates,* 15 February 1951, 384.
[58] *Halifax Herald* (9 May 1949).
[59] Colonel Paul V. Kane, "If War Comes to the Arctic," *Military Review* 27:10 (January 1948), 25.
[60] See: Horn, *Bastard Sons;* and Horn, "Gateway to Invasion or the Curse of Geography."
[61] Exercise Haines, Whitehorse, December 1947, DHH, 91/285.
[62] Abstract of Reports on Canadian Army Training, Trials and Tests, Winter 1948-1949, Canadian Army Headquarters, June 1949, University of Toronto Archives, B93-0050, box 51, file 9.
[63] Minutes of the Permanent Joint Board on Defence, 1947, NARA, RG 59, entry 1181, box 15, file 1947; Conclusions Reached as a Result of the Experience During Exercise Yukon, NARA, RG 337, entry (NM5) 28, box 381, file 401-410, Arctic Program
[64] Headquarters, Army Arctic Indoctrination School, "The Friendly Arctic Conference," NARA, RG 338, entry 37042, box 826, file Army Arctic Centre, Arctic Training Doctrine
[65] Tedlie, "Winter and Rough Weather," 139.

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[66] On the MSF, see Horn, *Bastard Sons*, and his chapter in this volume. After 1954 the reality of the situation was recognized by the Department of National Defence when the three independent battalions were styled the Defence of Canada Force (DCF). Reflecting the lessened importance of the North, the DCF was reduced to a single reinforced company per battalion after 1958.
[67] "Exercise Sweetbriar and Exercise Sun Dog I," *The Arctic Circular* 3 (September 1950), 34.
[68] Report on Ex "Sun Dog One," DHH, 736.033 (D4).
[69] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2) and Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675. Historians Andrew Iarocci and Matthew Wiseman have explored several of these northern exercises, particularly Sun Dog I. See: Iarocci, "Opening the North," and Wiseman, "The Development of Cold War Soldiery: Acclimatisation Research and Military Indoctrination in the Canadian Arctic, 1947-1953," *Canadian Military History* 24:2 (2015): 127-55.
[70] Exercise Sun Dog III: Opening Narrative, DHH, 181.0004 (D7).
[71] "Exercise Eager Beaver," *Arctic Circular* 5:2 (February 1953), 22.
[72] Exercise Prairie Tundra in Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[73] Exercise Bull Dog I in Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[74] Summarizing the press reports on the exercise that appeared in British newspapers, *Polar Record* concluded that the failure of the infantry to reach their objective indicated that paratroops could not be relied on as an effective striking force in Arctic regions. "Canadian Combined Forces 'Exercise Bull Dog II', 1954," *Polar Record* 7:51 (September 1955), 492.
[75] Final Report, Bull Dog III, DHH, 327.033 (D2).
[76] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2).
[77] Abstract of Reports on Canadian Army Training, Trials and Tests, Winter 1948-1949, Canadian Army Headquarters, June 1949, University of Toronto Archives, B93-0050, box 51, file 09.
[78] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[79] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2).
[80] Exercise Sweetbriar, vol. III: Report of Canadian Army, 96, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III
[81] "An Appreciation on the Employment of the Mobile Striking Force in the Defence of Canada," 19 November 1949, DHH, 112.3 M2 (D400).
[82] "Movement and Mobility" in A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2).

[83] E.C. Gibson, "Summer Arctic Operations," *Military Review* 32:7 (October 1952), 50.
[84] "An Appreciation on the Employment of the Mobile Striking Force in the Defence of Canada," 19 November 1949, DHH, 112.3 M2 (D400).
[85] Exercise Sweetbriar, vol. III, Report of Canadian Army, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III.
[86] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675. As helicopters became more common in the military inventory, increasing emphasis was placed on "heliborne" operations in an attempt to solve the problems posed by the summer terrain. Lieutenant Colonel John S. Zimmerman, "Arctic Airborne Operations," *Military Review* 28:8 (August 1949), 28.
[87] Exercise Sweetbriar, vol. III, Report of Canadian Army, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III.
[88] Sleep: Progress Report on Personal and Tent Group Equipment Required for One Infantry Company on Northern Military Operations, June 1953, LAC, RG 85, vol. 300, file 1009-2, vol. 6
[89] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[90] Matthew Wiseman, "The Development of Cold War Soldiery: Acclimatisation Research and Military Indoctrination in the Canadian Arctic, 1947-1953," *Canadian Military History*.24:2 (2015), 150.
[91] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2).
[92] Exercise Sweetbriar: Address Given to the USI by Major-General Matthew Penhale, LAC, MG31-G21, vol. 5, Exercise Sweetbriar.
[93] Lessons Learned: Winter Exercises 1945-54, DHH, 81/675
[94] Wiseman, "The Development of Cold War Soldiery," 127-55. For a more general overview see: D.J. Goodspeed, *DRB: A History of the Defence Research Board of Canada* (Ottawa: Queen's Printer, 1958).
[95] Exercise Sweetbriar, vol. II, Detailed Discussions Recommendation on Maneuver Objectives, 35, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. II.
[96] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2).
[97] Lessons Learned: Winter Exercises 1945-54, DHH, 81/675.
[98] Hanson W. Baldwin, "Air Power is Arctic Key: Operations aloft Showed Efficiency in War Game – Ground Forces Profited by Training," *The New York Times* (26 February 1950).
[99] A Soldier's Guide to the North (Ottawa: Directorate of Military Training, 1955), 3-5.
[100] Exercise Sweetbriar, vol. III: Report of Canadian Army, pg. 96, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III.
[101] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.

[102] Exercise Sweetbriar, vol. III: Report of Canadian Army, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III
[103] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[104] Exercise Loup Garou in Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[105] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[106] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[107] Iarocci, "Opening the North," 88.
[108] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2).
[109] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[110] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2).
[111] Ibid.
[112] Iarocci, "Opening the North," 89.
[113] Exercise Sweetbriar, vol. III: Report of Canadian Army, NARA, RG 409, Entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III.
[114] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[115] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2).
[116] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[117] Exercise Sweetbriar, vol. III: Report of Canadian Army, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III.
[118] "Report on Exercise Sun Dog III by the Air Force Commander," n.d., DHH, 181.003 (D2627).
[119] Shoo Fly I in Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[120] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675. See: Iarocci, "Opening the North," for more detail on the equipment tests undertaken at Churchill, particularly on vehicles and other forms of transport.
[121] Sleep: Progress Report on Personal and Tent Group Equipment Required for One Infantry Company on Northern Military Operations, June 1953, LAC, RG 85, vol. 300, file 1009-2, vol. 6
[122] "An Introduction to Churchill and Surrounding Area, by 7099th ASU," NARA, RG 156, entry 646-A, file "An Introduction to Churchill, Fort Churchill and Surrounding Area"; 1st Lt. C.C. Moore, Unit Historical Report, 1 July 1948 to 30 June 1949, Headquarters, 7099th Area Service Unit, NARA, RG 319, entry (NM3) 429, box 4750, file "Historical Report - 7099th ASU, 1st Arctic Test Detachment."
[123] "No Big Arctic War Believed Possible." On Canadian Army Operational Research Establishment (CAORE) studies into Arctic and Subarctic warfare during this period see: Godefroy, *In Peace Prepared*, 86, 89-91.
[124] Committee on Geophysics and Geography, Panel on Arctic Environments: Conduct of Military Operations on Land in Arctic and Subarctic Environments, 1

June 1951, NARA, RG 330, entry 341A, box 171, Panel on Arctic Environment, folder 1, Military Operations in Arctic
[125] Exercise Sweetbriar, Address Given to USI by Major General MHS Penhale, LAC, MG31-G21, vol. 5, Exercise Sweetbriar.
[126] Exercise Sweetbriar, vol. III, Report of Canadian Army, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III. Abstract of Reports on Canadian Army Training, Trials and Tests, Winter 1948-1949, Canadian Army Headquarters, June 1949, University of Toronto Archives, B93-0050, box 51, file 09. Even as the Army grew more experienced in northern operations, the movement if troops from south to north continued to be a major problem. During Exercise Bull Dog I, the time between the first warning of the lodgement and the arrival of the first company group in the assault area was four days – a delay that the Canadian Army wanted to improve. Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[127] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2)
[128] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[129] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2)
[130] Ibid.
[131] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675
[132] Exercise Sweetbriar, vol.1, Cover Letter and Narrative History, Department of the Army, The Adjutant General's Office, NARA, RG 409, entry (NM3) 429, box 3, file Narrative History - Exercise Sweetbriar
[133] Iarocci, "Opening the North," 89.
[134] See: P. Whitney Lackenbauer, *The Canadian Rangers: A Living History* (Vancouver: UBC Press, 2013), 152-77.
[135] Abstract of Reports on Canadian Army Training, Trials and Tests, Winter 1948-1949, Canadian Army Headquarters, June 1949, University of Toronto Archives, B93-0050, box 51, file 09.
[136] Exercise Sweetbriar, Address Given To USI by Major General MHS Penhale, LAC, MG31-G21, vol. 5, Exercise Sweetbriar.
[137] Ibid.
[138] The post-exercise report from Sweetbriar stressed that "the fear of being left out to die of exposure must be combated by an efficient organization for the recovery of casualties." Exercise Sweetbriar, vol. III: Report of Canadian Army, pg. 54, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III.
[139] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[140] Exercise Sweetbriar, vol. III: Report of Canadian Army, pg. 52, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. III.
[141] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.

[142] The emphasis on knowledge and understanding are present in most Canadian after action reports. This was also the central focus of the U.S. military's "Friendly Arctic" conference held in 1947. See: The Friendly Arctic Conference, 1947, NARA, RG 338, entry 37042, box 826, file Army Arctic Centre, Arctic Training Doctrine.
[143] S.H. Woodend, "Report by the Operational Research Group Observer with the Enemy Force on Sun Dog Three," DHH, 181.009 (D3434).
[144] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[145] Exercise Sweetbriar, Address Given To USI by Major General MHS Penhale, LAC, MG31-G21, vol. 5, Exercise Sweetbriar.
[146] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675. Commanding officers were told not to bring men with domestic problems on northern operations, with the Army deeming them "poor psychological risks." A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2).
[147] Abstract of Reports on Canadian Army Training, Trials and Tests, Winter 1948-1949, Canadian Army Headquarters, June 1949, University of Toronto Archives, B93-0050, box 51, file 09.
[148] Lessons Learned Winter Exercises 1945-54, DHH, 81/675.
[149] "Cocoon-like existence or individual hibernation" is terminology used in United States Army, *Soldier's Handbook for Individual Operations and Survival in Cold-Weather Areas* (Washington D.C.: 1986), 1-2.
[150] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.
[151] Halliday, "Exercise 'Musk Ox,'" 40-41.
[152] Canadian Army Headquarters, A Soldier's Guide to the North (Ottawa: Directorate of Military Training, 1955), 6.
[153] Exercise Sweetbriar, vol. II, Detailed Discussions Recommendation on Maneuver Objectives, pg. 34, NARA, RG 409, entry (NM3) 429, box 3, file Exercise Sweetbriar vol. II.
[154] Iarocci, "Opening the North," 89.
[155] A Soldier's Guide to the North (Ottawa: Directorate of Military Training, 1955), 93-95.
[156] A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2). See also: National Research Council, Observations on a Mobile Arctic Military Force: The Health, Physical Fitness and Nutrition of Exercise Musk Ox: Report to the Association Committee on Army Medical Research, NARA, RG 319, entry 82(A1), box 2480, file "Observations of a Mobile Arctic Force."
[157] Exercise Sweetbriar, vol.1, Cover Letter and Narrative History, Department of the Army, The Adjutant General's Office, NARA, RG 409, entry (NM3) 429, box 3, file Narrative History - Exercise Sweetbriar
[158] Lessons Learned: Winter Exercises, 1945-54, DHH, 81/675.

[159] Winter Warfare Research Programme, 1944-1945 – Exercise Eskimo (Dry Cold), DHH, 746.013 (D2) in Hugh Halliday, "Recapturing the North," 29.
[160] Howard quoted in: Matthew Farish, "Frontier Engineering: From the Globe to the Body in the Cold War Arctic," *Canadian Geographer* 50:2 (2006), 181.
[161] On these themes see: Farish, "Frontier Engineering": 177-96; P. Whitney Lackenbauer and Matthew Farish, "The Cold War on Canadian Soil: Militarizing a Northern Environment," *Environmental History* 12:4 (2007): 920-950; and Matthew Farish, *The Contours of America's Cold War* (Minneapolis: University of Minnesota Press, 2010).
[162] For example, between 1952 and 1954 more than 2,200 army personnel participated in training or research at Fort Churchill to form a sturdy nucleus of soldiers with northern experience. Canadian Army Needs at Fort Churchill, 28 January 1955, LAC, RG 24, vol. 8152, file 1660-15 (vol.4).
[163] Maloney, "The Mobile Striking Force and Continental Defence," 86.
[164] One striking aspect of the Army's intense involvement with the North during the 1950s was the simple fact that all exercises were conducted on the mainland. The Army did not venture into the Arctic Archipelago at all. There are obvious reasons for what seems today to be a strange void; most of them are associated with peacetime limitations. An advanced base was needed for administrative and safety reasons. There were simply more settlements with the appropriate facilities in the treeline. Churchill in particular was an ideal training site and in time came to be used almost exclusively for exercises. On the other hand, considering that the main requirement of a support base was that it have a suitable airport, there were three sites in the islands that met this qualification: Cambridge Bay on Victoria Island, Frobisher Bay on Baffin Island, and Resolute on Cornwallis Island. The Mobile Striking Force concept prepared in September 1951 envisioned that the most likely enemy targets for a lodgment in the Archipelago would be these air strips, in particular the facilities at Resolute Bay. If this happened, the MSF striking concept advised against launching an airborne assault into the Arctic islands. "Since we may not be able to use Resolute Bay or carry out an airborne attack on it, it is likely that operations against targets in the extreme Northern Islands will have to be carried out by long range bomber aircraft," the report concluded. Given the logistical nightmare of establishing advanced bases to support an airborne operation, and in view of the limited enemy action that would be involved in any lodgement in the Archipelago, the defence plan called for the situation to be dealt with using an air strike. With these parameters in mind, "The employment of parachutists could then be planned for a much smaller area limited by Canada's north shore line." "Mobile Striking Force Concept," Appendix 'A' to "Mobile Striking Force – Advance Base Requirements," September 1951, DHH, 112.3 M2 D371. The possible value of a large-scale army exercise as a method of asserting sovereignty in the High North does not seem to have occurred to Canada's leaders at the time nor was there a perceived requirement.

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[165] On this topic, see Lackenbauer, *The Canadian Rangers*.
[166] Ibid.
[167] Godefroy, *In Peace Prepared*, 91.
[168] Andrew B. Godefroy, *In Peace* Prepared, 87–88, supplemented by A Guide to Planning and Execution of Operations in the North, DHH, 112.3M3.003 (D2).

Chapter Three

Paper Tiger: The Mobile Striking Force and the Chimera of Arctic Defence

Colonel (retired) Bernd Horn

The Arctic has always been both a blessing and a curse from a defence perspective. For much of Canada's history it represented a seemingly impenetrable barrier against invasion, allowing political and military leaders to consistently dismiss the notion of an attack over the barren Arctic tundra. This notion of the Arctic as an impenetrable barrier was challenged, however, by the northern defence activities of the Second World War and the Cold War threat of Soviet bomber attacks over the Arctic Ocean. This new Soviet threat meant not only new security concerns, but a political threat as well, given that the United States was certain to fill any security vacuum created by a lack of Canadian forces in the North. The Canadian military's solution to the problem—both military and political—was the Mobile Striking Force (MSF). In theory the MSF was an airborne brigade group, able to respond with one airborne battalion to any incursion into the North immediately, the deployment of a second battalion within 60 days, and the entire brigade group within four months. The MSF was envisioned, and in many respects sold, as Canada's Arctic defence force, its domestic strategic reserve and the sharp end of the spear that protected its northern sovereignty and security.

The reality was much different as the MSF never became more than a paper tiger. Throughout its existence it lacked the resources, equipment, airlift, as well as political and military support to make it operationally effective. The issue was twofold. First, no Canadian political leader or military commander actually believed in the likelihood of a Soviet incursion in the North, therefore, they saw little risk in not fully committing to the MSF. Second, the Canadian Armed Forces (CAF) never fully embraced the concept of airborne forces and, once the North Atlantic Treaty Organization (NATO) was established in 1949, focused totally on the heavy mechanized combat arms that the Army required to fight on the Central European Front. As such, the MSF quickly became a nuisance that received only minimal support, allowing it to act as a sop to American concerns but little else.

The Arctic as an "Open Flank"

In the early years of the Cold War the United States perceived the North as a gateway to invasion that required immediate attention. It was the shortest route between the Soviet Union and the continental US and was largely undefended. Canadian politicians and senior military commanders quickly supported the new emphasis on the defence of the North, however, their motivations were mixed. Like their American counterparts, Canadian generals recognized the reality of the Soviet threat but were also consumed with countering any perceived American usurpation of, or challenge to, Canadian sovereignty. Within this framework, the political requirements outweighed the operational and the military forces intended for northern defence were designed with these priorities in mind.

In large part, this prioritization of the political elements of northern defence was due to different assessments of the Soviet threat between Canadian and American defence officials. Canadian defence analysts were "less alarmist" than their American counterparts about both Soviet intentions and the pace of technological advancements.[1] A Canadian intelligence report from 1948 makes this point clearly, stating: "the USSR is not considered capable at the present time of endangering, by direct action, the security of Canada and the United States."[2] It continued on to say that the present American outlook depicted a greater threat to the security of Canada and the United States than actually existed. The Deputy Chief of the General Staff (CGS) confessed, "I feel there is often a tendency for the Americans to place the worst picture before us in our discussions, with the result that our thinking is often along the lines of 100% protection and does not take into account a more realistic policy of calculated risks."[3] The British Foreign Office concurred. They affirmed that "Russia, so far as we can judge, is neither prepared for, nor in the mood for war, and Stalin is a sober realist."[4]

The Canadian intelligence assessment also disagreed with the American assertion that the Soviets had the potential capability to seize objectives in Alaska, Canada, or Labrador, from which they could operate to strike vital strategic targets in North America. The report commented that the Americans "credit a potential enemy with greater capabilities than we consider reasonable."[5] Under Secretary of State for External Affairs Norman Robertson candidly stated, "I hold that the scales of attack, to which it could reasonably held we were exposed, were, are and will be almost insignificant."[6] Minister of National Defence Brooke Claxton echoed those sentiments. He clearly believed that Canada faced no imminent threat. "On the information as is available to the Canadian government," he wrote in November 1946, "it appears most unlikely that the Soviet Union would be in a position to wage another war in the near future, and for this reason it is highly improbable that the Soviet Government would run the risk of deliberately provoking such a war."[7] He postulated that the Soviet Union required a period of fifteen years before it would be physically capable of contemplating war.[8]

The political concern for Arctic sovereignty, compounded by the requirement to address excessively dire American threat assessments of their northern flank, necessitated a Canadian response. However, Prime Minister King felt that "any attacks which might develop would be of a diversionary nature which would not warrant the establishment of an elaborate defence scheme employing our resources in a static role."[9] As a result, he directed, "in view of the immense financial outlays involved, it might be more appropriate to adopt measures of more modest proportions."[10]

Finding a Solution – The Mobile Striking Force (MSF)

By 1945, the debt conscious Mackenzie King Liberal Government was fully aware that the war-weary public held little sympathy for continued defence expenditures or large forces. As a result, an Interim Force was established for a two-year period that would allow the Department of National Defence (DND) time to carefully craft the military that the government thought was sufficient to fulfill the nation's requirements. The post-war Army was to be anything but extravagant. First, it was to consist of a representative group of all arms of the service. Second, in the view of the Government, its purpose was to provide a small but highly trained and skilled professional force which, in time of war, could expand and train the citizen soldiers who "would fight that war."[11] The reality was that the strength of the post-war Army was to be its mobilization potential. Claxton announced to Parliament in 1946 that the role of the military, "at the present time, is as a training force for future staff officers and leaders, and for the reserve force of Canada."[12]

Political agreements, specifically the 1946 Canada / US Basic Security Plan (BSP), shaped the actual make-up of the post-war Canadian Army, at least initially. The BSP obligated Canada to provide one airborne / air-transportable brigade and its necessary airlift as its share of the overall continental defence scheme.[13] This translated into almost the entire Active Force Army being trained on the basis of an airborne / air transportable brigade group. This proved to be an almost ideal situation for the government. Paratroopers became the solution to the vexing problem of defending the vast North in the face of a perceived Soviet threat, at the lowest possible cost, while preserving Canadian sovereignty in light of the growing American concern over the potential northern enemy line of approach. Politically expedient, the possession of paratroopers represented the nation's ready sword. They afforded a conceivably viable means to combat any hostile intrusion to the North. Better still, they could be incredibly cheap, if they were maintained simply as a "paper tiger."

In the autumn of 1947, the Chiefs of Staff submitted a memorandum to the Cabinet Defence Committee that described the Active Force Brigade as a "Mobile Reserve" which could provide an immediate and rapid counter to any enemy lodgement on Canadian territory. The military advisors insisted that this meant the Brigade Group was to be organized as a force "immediately available, fully equipped, and trained for airborne operations."[14] The Cabinet Defence Committee noted the submission but deferred consideration. After all, the proposal implied a substantial investment of resources, particularly costly equipment purchases such as transport aircraft.[15]

Roughly a year later, the Chiefs of Staffs made another pitch to their political masters. This time the proposal entailed a slower, more conservative approach. The Active Force Brigade Group was now designated the Mobile Striking Force (MSF). The military explained that the Brigade Group would concentrate initially only for formation training. Furthermore, the Army directed that merely one infantry battalion would be converted into an airborne / air-transported unit at a time. Only after the first infantry battalion had completed its training would the remaining units, in a consecutive manner, undergo conversion to airborne status, until the entire Brigade Group was air-transportable.[16]

The government's reluctance to actually spend money on Arctic defence became evident in the summer of 1948 when the lethargy in fulfilling the Canadian commitment to the 1946 Basic Security Plan came home to roost. The creation of the MSF had not advanced beyond the conceptual agreement of the senior military commanders. The spark that finally prompted action was not due to governmental or military diligence or conviction, but rather once again the spectre of the Americans. The BSP, entered into two years previously, had obliged the Canadian Army to prepare for Arctic airborne and / or air-transportable operations to counter or reduce enemy lodgements in Canada, on a prescribed schedule of availability. This program compelled the Canadian government, by 1 May 1949, to have a battalion combat team prepared to respond immediately to any actual lodgement, with a second battalion available within two months, and an entire brigade group within four months.[17] Time was running out. Two years had elapsed since the government's public declaration that the Active Force Brigade Group would become an airborne / air-transportable organization, namely the MSF. Yet, it was not until July 1948 that national defence headquarters (NDHQ) granted authority to commence airborne / air-transportable training.

The MSF – A Paper Tiger

If the MSF's gestation was tenuous, its existence was nothing short of ephemeral. From its inception, the MSF was intended to be the "smallest self-contained force" capable of meeting peacetime requirements. The original design concept supported the idea of airborne battalions or, at a minimum, a single paratroop unit. The staff assessment argued that "the role of the force [counter attacking enemy lodgements in Canada] would indicate that there is justification for the organization of one airborne battalion." It further stated that the airborne element should be in a homogeneous group that was best achieved by "the formation of one para-battalion – organized, equipped and trained in this role."[18]

The prevailing confusion and debate in regard to the airborne role and concept resulted in the scaling down of the entire airborne idea. Army Headquarters had decided by late 1948 that the respective airborne units would be established with an organization identical to a normal infantry battalion, with the exception that one rifle company be designated as a parachute company. Despite the observation that it was considered unsound in principle and practise for the airborne element of the force to be split among two or three battalions, the decision was taken to give each battalion its own component of paratroops.[19] Contrary to the accepted conventional wisdom, as far as the Army leadership was concerned the MSF was never established, nor intended, to consist of entire parachute battalions. The misconception, which originated with the designation of the Princess Patricia's Canadian Light Infantry (PPCLI) for conversion to airborne / air-transportable status, was addressed immediately with apparently little success. The Director of Infantry issued a clarifying memorandum in September 1948, which stated:

> The impression is prevalent in some quarters that the PPCLI has been converted into a Parachute Battalion. This is not correct … The organization of the battalion has been changed in that one rifle company has been designated for the airborne role, i.e. parachute troops, and the remainder of the battalion as air-transported troops.[20]

Despite the confusion over the concept of an airborne battalion, staff planners quickly established a training schedule to realize the goal of the airborne / air-transportable brigade. This plan meant that other regiments would be involved. Soon Army Headquarters designated The Royal Canadian Regiment (RCR) to commence their conversion upon completion of the Patricia's training cycle. In turn, the Royal 22nd Regiment (R22eR) were to follow-up the RCR. The Deputy CGS anticipated that the long-term objective of forming the nucleus of the Active Force Brigade, around three infantry battalions trained in airborne / air-transported operations, would be realized by April 1951.[21] Not surprisingly, this timeline failed to comply with the 1946 BSP requirements.

While the staff officers buried in the labyrinth of NDHQ may have sincerely believed in their task, their conviction was not matched by that of their military or political masters. Once again it was a question of political priority. Political reality valued economic frugality, particularly in the sphere of defence, and utterly dismissed the idea of a potential threat to the Canadian homeland.

Early 1950s Army appreciations recognized the chance of enemy airborne attacks as extremely slight because of the difficulties of re-supply and re-embarkation of the attacking force.[22] The official 1951 NDHQ assessment regarding the direct defence of Canada, Defence Scheme No. 3 – 'Major War,' concluded that as a result of the extremely limited base facilities in Eastern Siberia, the Soviets were not capable of more than isolated airborne operations totalling more than a few hundred men. Furthermore, it explained that the lack of a fighter escort would make sustained operations impossible. Even the use of the North for transitory aircraft operations was discounted. The Defence Cabinet Committee rationalized that "if the Soviets attempted to use a Canadian Arctic station as a bomber base, warning would be received and it was expected that such a base, which would have immense supply problems, could be immobilized rapidly."[23]

More important, the official defence plan identified only Western Alaska and the Aleutian Islands as targets of potential enemy airborne forces.[24] Joint Intelligence Committee assessments clearly remarked that the data available "implies that the Soviet Union cannot land any airborne forces on Canadian territory."[25] Nevertheless, prudence necessitated caution. It was also instrumental that the government demonstrate that a contingency plan to protect the Canadian North was in place. As a result, the MSF was required to respond to the landing of small parties of approximately 30 to a maximum of 100 personnel "by air or submarine, in the hinterland areas of Canada, with the intention of establishing a refuelling airstrip, a weather or electronic station, or just to cause alarm and despondency."[26] Government statements, however, failed to harmonize with how important Canadian decision makers saw the issue.

The apparent disconnect between word and intention linked directly to the government's consistent belief that the North in itself did not represent a grave security risk. Prime Minister King consistently harkened back to the Governor General's wartime observation that stations in the Arctic "may become bases from which the enemy himself may operate were they not there."[27] He subsequently formulated the strategy that "our best defence in the Arctic is the Arctic itself."[28] Claxton reiterated this belief. "In working out the doctrine of defence of our north," he proclaimed, "the fewer airfields we have the fewer airfields we have to defend against the possibility of the enemy using them as stepping stones from which to leapfrog toward our settled areas. Indeed, was it possible that the greatest single defence throughout our northland would be the rough nature of the ground and the extent of the territory itself?"[29] General Andrew McNaughton agreed with the concept that "ice is something of a defence in itself," and the Department of External Affairs' L.B. Pearson quickly dubbed the government's position the "scorched ice policy."[30]

American apprehension regarding its northern flank remained an issue that could not be downplayed convincingly. The Minister of National

Defence correctly emphasized that Canada's role in joint defence should be focussed specifically on the defence of the nation and on doing the things the country could and should do "in preference to the United States, particularly in the North."[31] This sentiment was consistent with the government's active "re-Canadianization" program which, since the end of the war was aimed at "keeping the Canadian Arctic Canadian."[32] Government reports highlighted the necessity of ensuring effective protection of Canadian sovereignty against American penetration. One note from the Privy Council Office (PCO) remarked, "our experiences since 1943 have indicated the extreme care which we must exercise to preserve Canadian sovereignty in remote areas where Canadians are outnumbered and outranked … Of much greater concern is the sort of de facto US sovereignty which caused so much trouble in the last war and which might be exercised again."[33]

Canadian concern for the North was aptly described by an editorial in the *Canadian Forum* which commented, "We must be certain that we defend it [Canada] as much from our 'friends' as from our 'enemies.'"[34] Norman Robertson, the Under-Secretary of State for External Affairs, explained that "what we have to fear is more a lack of confidence in United States as to our security, rather than enemy action … If we do enough to assure the United States we shall have done a good deal more than a cold assessment of the risk would indicate to be necessary."[35]The Mobile Striking Force was to provide this assurance to the Americans.

The MSF paratroopers were the guardians of the northern gateway. The MSF's existence, however, was also wedded to Claxton's directive that "everything possible must be done to ensure that we obtain the utmost value for the defence dollar."[36] The Minister of National Defence did not believe in the Soviet threat to Canada. He consequently felt little devotion to the MSF. Claxton held a firmly entrenched conviction that a "direct attack upon Canadian territory was extremely remote and there was no need to maintain the MSF as a powerful fighting unit."[37]

The Active Force Brigade Group suffered from neglect even before it was fully established. The training of the three infantry battalions was fraught with shortages of instructors, equipment and aircraft. One report bluntly stated that "the training and preparation for war of the Mobile

Striking Force is not proceeding as quickly and as efficiently as is desirable at this time."[38]

The credibility of the embryonic MSF suffered another severe blow in 1949 when, during the final phase of training for the newly converted PPCLI battalion, it failed its test exercise. The scenario for Exercise *Eagle* painted a picture of a lightly-armed force of Russians landing and capturing the airfield at Fort St. John and the Peace River Bridge in British Columbia. The task to conduct a rapid counter-attack and destroy the enemy penetration was assigned to the PPCLI. The plan required "D" Company, the airborne company group, to seize the airstrip by parachute assault. With the bridgehead secured, the remainder of the battalion was to air land and conduct follow-on operations.[39]

The exercise misfired badly and destroyed any credibility the fledgling MSF hoped to attain. The Patricias were short transport aircraft and were so lacking in equipment that they were forced to borrow jump jackets and parachutes from the Canadian Joint Air Training Centre at Rivers.[40] Further difficulties were encountered when the lead aircraft missed the Drop Zone during the parachute assault. The final nail in the coffin was the fact that the "enemy" dominated the airspace throughout the entirety of the exercise. Veteran war correspondant Ross Munro of the *Calgary Herald* was present and what he saw did not impress him. He let his readers know that "the Joint Army – RCAF Exercise *Eagle* has shown that these defence arms, in their present stage could not deal rapidly and effectively with even comparatively small landings by enemy airborne troops and fighter aircraft along the Alaska Highway and on these Northland aerodromes."[41]

Even the PPCLI itself agreed with Munro's brutal assessment. Regimental reports pointed out that their troops had insufficient training or experience in airborne operations. They admitted that the unit in a real situation "would have had much difficulty had there been the slightest opposition."[42] Immediately upon the completion of the exercise, the media and parliamentary opposition savaged the government, particularly the Minister of National Defence, for the lack of military preparedness. Brooke Claxton, a man who was described as extremely sensitive to criticism of any kind, was subsequently given a "roasting that he never forgot."[43]

As a direct result of the furor which the exercise raised, the CGS appointed Brigadier George Kitching as the Commander Designate of the MSF. The CGS gave Kitching the responsibility for the planning of operations for the parachute battalions and for mapping out in detail the defence of the Arctic. The importance assigned to the new position was such that the CGS told Kitching that he would be given special priority and all the resources he required.[44] Optimists felt that with the reputation of the Minister of National Defence at stake, support for the MSF seemed assured. The test came six months later. In February 1950, another exercise was conducted to redeem Claxton's status, and that of the progeny MSF. Military communiques described Exercise *Sweetbriar* as a joint Canadian-American training operation along the Alaska Highway. It involved 5,000 military personnel from Canada alone. Its officially stated aim was to develop "procedures, doctrine, and techniques for the employment of combined Canadian and US Armies and Air Forces operating in the Arctic."[45] Unofficially, the Minister of National Defence planned to use it to compensate for the "debacle of *Eagle*."[46] He personally briefed Kitching that he wanted good press and he did not care how the Brigadier got it.[47]

The exercise scenario was similar to that of *Eagle* less than a year prior. It was based on the premise that an enemy force captured the airfield at Northway, Alaska and was conducting an advance down the Alaska Highway to Whitehorse. The allied forces, including the elements of the MSF, were tasked with destroying the enemy penetration and recapturing the aerodrome. The outcome of the endeavour was officially touted as an outstanding success. It was also the last major exercise conducted by the Active Force in the MSF role.[48]

The success of *Sweetbriar* restored Claxton's reputation. This, however, did not translate into support for the MSF. Claxton had demonstrated the government's ability to respond to a hostile incursion on Canadian soil through a successful exercise. But having achieved the intended aim, he and others in government quickly lost their enthusiasm in the support of the MSF airborne / air-transported brigade group. Ministerial and Cabinet belief of the MSF's necessity was simply not present—nor, in their minds, was the will to finance an organization of questionable utility.

Continuing internal debate within DND only exacerbated the problem. By the early-1950s the outbreak of the Korean hostilities and the looming communist threat in Europe gave the Army a new focus. The peacetime CAF were no longer obliged to find a legitimate excuse for their existence. International tensions and growing public fear provided support for large standing peacetime forces in Canada.[49] The MSF now became a burden. As a result, it was downplayed even before it was ever fully established.

The End before a Full Beginning: The Demise of the MSF

Overseas commitments provided impetus for growth of the military but these activities ultimately changed its focus, and it was not for the better from an MSF perspective. During the 1950-1951 period, the three Active Force infantry regiments expanded to provide forces not only for duty in Korea but also to man 4 Canadian Mechanized Brigade Group, part of Canada's NATO commitment in Europe.[50] Although a parachute force was maintained in Canada for territorial defence, it was a far cry from that envisioned in the original MSF concept.

The initial plan had called for the force to be centrally located with operational command retained by Army Headquarters.[51] Instead, after 1950, the individually assigned units remained scattered across the country. Command of the widespread elements was placed under control of their respective geographic Army Commands. This new focus, compounded by the dismissal of any substantial threat to Canadian territory, resulted in another reorganization of the airborne component of the MSF, which reflected doubt and decreasing support. An Army appreciation explained:

> It is felt that the whole MSF to fulfill the role given it in the 'Emergency Plan for the Defence of Canada' and the 'Canada - U.S. Emergency Defence Plan' should be airborne and trained for Arctic operations but as this would require tremendous airlift and, as the Brigade Group has the added commitment of retaining and developing the techniques of conventional warfare, a compromise is necessary. The prime need is for a force to carry out air-ground reconnaissance and small scale offensive operations.[52]

Army Headquarters determined that one airborne company in each battalion, together with the necessary support troops would be sufficient.

A similar NDHQ staff assessment made it clear that there was more confusion and waning support for the MSF. This time the justification for minimizing the airborne component was not credited to resource constraints. Rather it now determined that the requirement for offensive action would unlikely exceed one infantry battalion group and "in practise it will more probably be a company group or platoon group."[53] Major-General Chris Vokes, General Officer Commanding (GOC) Western Command, went so far as to suggest that "a platoon or squad of fifteen men well-trained for northern operations would be a compact, hard-hitting group with greater mobility than one of normal strength."[54]

The RCAF added their own ideas that challenged the basic MSF concept by declaring, in many cases, that "air action alone might be sufficient to reduce an enemy lodgement."[55] The widespread reassessment of the relevance of the MSF had its effect. Hence, the MSF would operate as three independent airborne / air-transported infantry battalion groups, each responsible for ground action against enemy lodgements in a specific sector of Canada's northern approaches.[56]

The MSF was on a slippery slope. Its marginalization as a viable force continued with ever accelerating speed. In 1950, an Army policy statement reported that the training role of the Active Force infantry battalions "now" took on a dual function. Significantly, the two functions turned out to be mutually competitive. The policy claimed that the "primary role of the parachute battalion will be to prepare to operate in an airborne / air-transportable role in Arctic and sub-Arctic; and its secondary training role will be that of keeping alive the techniques of operating in the normal infantry ground role in temperate climates."[57] In reality, the priorities were reversed. General Foulkes asserted, "by 1950 Canadian defence policy was wholly concerned with NATO and with the UN [United Nations]."[58] The reversal of actual priorities to those announced by NDHQ was evident. The Director of Military Operations and Plans wryly commented:

> At present the MSF trains in conventional operations, superimposed upon which is airborne and northern training. This leads to a lack of economy in both numbers and training and adds to the length of time required. It further imposes on the man a variety of roles which may tend to reduce his effectiveness.[59]

It became apparent that the supposedly primary function of the MSF was being shoved into a declining secondary role. The Acting Vice-CGS announced that the MSF plan for the reduction of enemy lodgements in Northern Canada did not mean that "the aircraft or troops should be kept at the ready, but that these forces would be concentrated and made available if and when occasion required."[60] He evidently was not familiar with the obligations under the joint Canadian / US BSP requiring Canada to have the aircraft and troops available to respond immediately to any hostile incursion on Canadian territory.[61]

The acid test of reality indicated that the MSF was not taken seriously by National Defence Headquarters or the government. The airborne / air-transported infantry battalions were consistently hamstrung with resource limitations. Equipment deficiencies, particularly aircraft, and manpower shortages crippled the MSF units. In April 1950, the severity of the problem prompted the PPCLI to protest to Western Command. The Regiment's concerns were clearly identified. The Commanding Officer wrote:

> The Regiment is entirely dependent upon a few personnel who were trained at the CJATC [Canadian Joint Air Training Centre] as Parachute Instructors and Parachute and Safety Equipment workers. These numbers are gradually diminishing. At present trained personnel have to be borrowed from all companies for such duties and all other training and activities are affected.[62]

The PPCLI complaint was not a profound revelation. A 1952 assessment by the Directorate of Military Operations and Plans reiterated that the "Mobile Strike Force battalions have the dual role of training overseas replacements and preparing for their MSF role. Units are generally short of instructors and overburdened with recruits; they are thus under

considerable strain and their operational capabilities leave much to be desired."[63] Another official report candidly observed that the Army, for all intents and purposes, had disregarded the special Arctic / airborne nature of the MSF and consistently denuded it of resources. It conceded that the heavy drain on the force to supply trained officers and non-commissioned officers to 25 Canadian Infantry Brigade Group overseas stripped the units of key personnel and reduced the operational efficiency an estimated 50%.[64]

The erosion of the MSF capability became so severe that in April 1953, the Director Military Operations and Plans outlined the problem yet again in an official letter to the Brigadier responsible for the planning cell of the General Staff. He explained that the operational efficiency of the MSF battalions had decreased since 1950 because of the "posting of a considerable number of Arctic and parachute trained personnel to units of 25 Brigade; the use of the first battalions (MSF battalions) to train personnel of the second battalions to the detriment of their own training; and the channelling of infantry recruits to units of 25 Brigade rather than to MSF battalions."[65] He further warned that "it is noted with alarm that the operational efficiency of the MSF has been so reduced and continues to be threatened by the present expansion of the Army."[66]

The Director of Infantry concurred. He confessed that, due to the existing rotation plan, battalions spent a comparatively short time in the MSF role. He further elaborated, "during this period of service units are required to become proficient in parachute and airborne operations and operations in the Arctic both summer and winter."[67] He explained that MSF battalions are responsible for the training of 200-400 reinforcements for Korea. The Director of Infantry concluded that these conflicting priorities placed an extremely heavy load on the MSF.[68]

The Director's concerns, however, proved irrelevant. The existence of a strong and viable MSF was never a priority for political or military leadership. Their actions, or more precisely their state of inaction, sent a clear message in regard to the priority of the MSF. Critics of the government's defence policy quickly seized the opportunity to attack. In April of 1953, the Conservative opposition in Parliament declared that the "airborne brigade serves only to lull the people of Canada into a false sense of security."[69] They noted that:

> the airborne striking force has already been broken up and its personnel distributed not only among the forces raised for Korea but also the forces sent with the 27th brigade, with the result that today we have no striking force of units which have been accustomed to work together and which have carried out any extensive training under arctic conditions.[70]

Finally, the Conservatives accurately charged that the MSF "has not trained; it has not carried out many exercises, if any, at unit level or any operations which it would be called upon to do in the future."[71]

The Opposition protests did little to sway the political or military leadership. The Liberal government juggernaut was very hard to overcome for the out-numbered opposition. Public and external criticism was not very effective. In short, an increase in support of the MSF was implausible. There was just no belief in the MSF's actual relevance to a very NATO-centric military establishment.

To add fuel to the fire, a 1954 sub-unit level exercise highlighted the continuing shortcomings of the MSF that provided further ammunition for its detractors. Exercise *Bull Dog II*, conducted in Baker Lake, North West Territories, was designed to practise the RCR parachute component in a defence of Canada role. Area Headquarters tasked the RCR paratroopers with recapturing the local radio station and destroying the hypothetical enemy lodgement. Unfortunately, equipment problems and poor weather

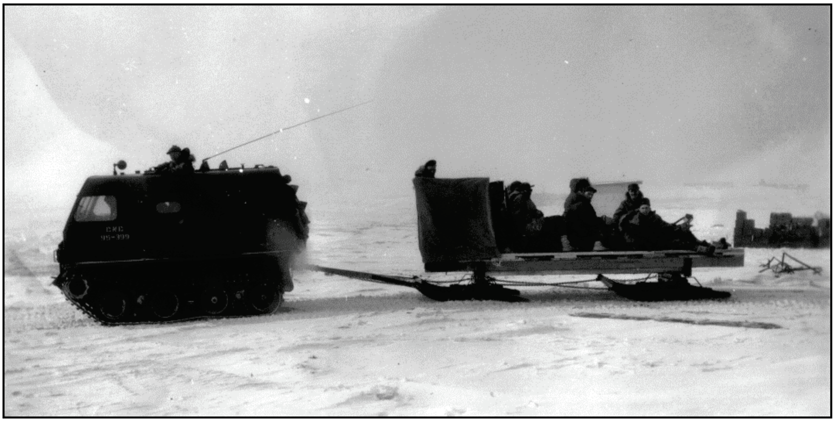
held the rescue force at bay. The exercise was called off before the RCR soldiers were able to conduct their assault.

The experience was another severe blow for the MSF. Knives were quickly drawn in Ottawa and in the Army at large. Other military interests that were short of resources or perceived support wanted to carve up the MSF's corpse. The after action report on *Bull Dog II* revealed a major problem with the MSF concept, indicating "that paratroops cannot be relied on as an effective striking force in arctic regions and that many problems of mechanical maintenance have yet to be solved."[72] Another assessment asserted that "many officers feel that the day of the paratrooper and the glider-borne soldier are finished … and it is felt that some new means of carrying this soldier to the attack area must be evolved."[73]

Similar to Munro's reporting on Exercise *Eagle*, the media attacked the prevailing facade of northern defence. One reporter commented, "For years now, Canadians have been lulled into a false sense of security and have been completely misled on the capabilities of Canada's defence forces to defend this country against aggression from the north."[74] The issue of resource constraints and multiple taskings, however, were not addressed. The intent was not to find a cure for the MSF's problems but to justify its destruction.

The myriad of negative reports and press did present a false dilemma: while a military failure, the MSF fulfilled exactly the political role politicians and many soldiers intended it to fill. A 1955 DND publication entitled *The Defence of Canada (Notes on CAF for NATO Troop Information Lecturers)* clearly documented that the most probable threat to North America was by air, specifically by manned bombers with atomic weapons. This tract cursorily dismissed the role of airborne troops with a single vague line: "the army maintains a mobile striking force for defence against airborne attack." In total the role of the Army in the defence of Canada merited but a single paragraph of the 32 page document.[75]

By the mid-1950s, the hapless MSF provided a financially inexpensive means of mollifying the Americans and calming the public in regards to the "vulnerable" North. The political and military leadership never postulated a serious threat to Canadian territory. Similarly, they never accepted the need for a strong or viable MSF capability. It simply provided an expedient with which other goals could be achieved. As a result, resources were never fully



committed to such a force. Internal debate and dissent were never reconciled. Most telling, the MSF was never allowed to exist as a viable organization. Instead it was used to nurture the Army's true concern: its conventional forces in NATO and the United Nations.

Given the whims and vagaries surrounding the MSF in the late-1940s and 1950s, its future was tenuous at best. Historian David Bercuson claimed that the "MSF remained largely a concept rather than an operational reality."[76] The issue has always been that few decision makers believed the MSF was relevant. Firstly, they did not believe the Arctic represented a threat, much less an "open flank," and therefore they never accepted the MSF's role as credible. Quite simply, many saw the MSF, and the airborne capability it represented, as a potential diversion of resources required for the more important NATO or UN roles. In the end, Lieutenant-General Jack Vance assessed, "the MSF was an unrealistic demand on the Canadian military at the time."[77]

Although support for the MSF was minimal, its fortunes languished even further as the 1950s progressed. By mid-decade a shift in the strategic nature of war, with its new emphasis on thermonuclear weapons delivered by bombers, and later, the Inter-Continental Ballistic Missile (ICBM), prompted a reassessment of the threat to the North America continent. This development sealed the fate of the MSF. In the process, the military and political leadership clearly demonstrated the magnitude of their lack of commitment to the idea of Canadian airborne forces.

In the same years the assaults against the belief that the North represented Canada's defence Achilles' heel—a veritable gateway of invasion to the North American land mass—picked-up momentum. This renewed belief was due to the fact that bombers and missiles would over fly it and technological advances were rapidly putting greater distances into possible detection and early warning capability. By mid-decade it was universally accepted by the government, military and public, that the only probable method of attack, as highlighted in the 1954 Defence Program, was by manned bomber. The Minister of National Defence bluntly affirmed "that in the final analysis the task of Canadian defence is defence against aerial attack over the north pole. We have to discard from any realistic thinking any possibility of an attack by ground forces on the area of Canada either by air or by sea."[78]

The change in threat perception provided Canadian politicians with a welcomed financial respite and from having to carefully define all aspects of defence policy. The emphasis of military activity in the North shifted from a focus on active "defence" to one of simply "surveillance." This subtle shift was reflected in DND annual reports between 1946 and 1957. Initially, the narratives contained in the publications *Report on the Department of National Defence* and *Canada's Defence Program* for these years defined the military's efforts in terms of "defence of Canada from direct attack." With the change of the threat assessment, the wording was amended to a more ambiguous "to provide for the security of Canada."[79] The reports also demonstrated a transformation of the officially pronounced definition of risk. Originally, the annual summaries documented the primary peril facing the country as a potential surprise land attack in coordination with a campaign of aerial bombardment of North America.

By the mid-1950s, however, the defence department expressed risk to the nation in terms based almost exclusively on the threat posed by strategic bombers. This change significantly affected the need for land forces capable of responding to the perceived menace. From 1949 to 1955, DND's annual summary, *Canada's Defence Program*, spoke of the need to repel "surprise attacks." In 1956, the wording was changed to reflect a scaled down level of direct danger to Canadian territory. The reports now noted that troops were required to deal only with "possible enemy lodgements."[80] This was a subtle change in emphasis. Unfortunately, it meant different things to different parties in the airborne debate. One defence analyst observed:

As the Cold War developed, soldiers looked at the North as an approach. There were a few extremists who posited the notion of 'Slavic hordes' invading North America via the Yukon-Mackenzie Valley route; their voices soon vanished once the geographic realities of the concept were examined. What came to be known as the 'lodgement scenario,' however, refused to go away.[81]

By mid-decade the enigmatic "lodgement scenario" quickly became tied to Canada's MSF. Paradoxically, it provided the justification for both the retention of paratroopers, as well as the rationalization for their marginalization.[82] In the summer of 1958, Major-General Vokes lamented that "it is difficult to plan anything in the face of a threat which is defined so vaguely."[83] He went on to question, "if the threat of lodgement is so nebulous, why do we bother about it at all? Could it not be taken on by air bombardment?"[84] Similarly, the Director of Military Operations and Plans confessed that "many commanders and staff officers are under the impression that the threat of enemy lodgements is a rather nebulous one."[85] The Chief of the Air Staff agreed. "The concept for reduction of enemy lodgements," he stated, "does not appear to be in consonance with the

threat and should be scaled down accordingly. It follows that the Canadian forces allocated to this task are either not warranted or should be scaled down considerably."[86]

The question became largely redundant. The final death knell for the MSF was sounded on 26 August 1957 when the Soviet Union announced that it had successfully launched its first ICBM.[87] The vacillating commitment to the airborne / air-transported infantry battalion capability of the MSF collapsed. In January 1958, the MSF was officially downsized to a reinforced company group for each of the respective 'parachute' battalions and renamed the Defence of Canada Force.[88]

Conclusion

The story of the MSF is representative of the Canadian approach to the defence of the Arctic. The government and the CAF never really bought in into the notion of an actual military threat to the North. Although fully realizing that an enemy 'lodgement" of any sort would create panic and consternation, particularly with the Americans, the actual risk of that happening was always slight. Investment of defence resources has therefore always been minimal.

The real concern to the government was the matter of maintaining sovereignty over the Arctic Archipelago vis-à-vis the United States. As such, it was the ability to demonstrate Canadian surveillance, control, and governance that mattered. It was only during periods where the government felt its claims to the North were challenged that it insisted on a military capability to display and demonstrate control over the vast Arctic regions. The government endeavoured to maintain its ability to call on a robust MSF-like capability, but only wanted to fund the "paper tiger" version.

This reality was not lost on the military. Senior commanders shared the government's view of the minimal risk that attacks to, or through, the Arctic represented to the nation. As a result, the military, like its political masters, was unwilling to invest substantially in Arctic operations. The strategic lesson learned from the MSF was that it was impossible to try to build a defence budget around northern operations. As such, those operations remained subordinate activities that may have provided some training and public relations value, but little else. NATO and UN operations remained the core of an operationally-oriented CAF.

Notes

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Chapter Four

Operation CANON

Reprinted from *Canadian Army Journal* (May 1948)

Preliminary Planning (30 September to 4 October 1947)

"Operation *Canon*" began for Headquarters of Prairie Command, Winnipeg, Manitoba, when the Directorate of Air at Army Headquarters, Ottawa, requested a teletype conversation with General Staff Officer (GSO) 2 at 1645 hours, 30 September 1947. In this conversation the condition of the Reverend Canon J.H. Turner, an injured missionary, was stated and a plan suggested for a paradrop of a rescue team to include a medical officer and two Signals operators. The missionary was stationed at a small mission at Moffet Inlet on the northern tip of Baffin Island. The size of the dropping party suggested by Army Headquarters was four, together with necessary medical stores, signal and other equipment. Little information was available at Prairie Command regarding Moffet Inlet, but those maps and photographs which could be obtained from other sources were to be sent forward as soon as possible.

All the available information was passed to GSO 2 (Air Liaison) at HQ 11 Group, RCAF, Winnipeg. Executive instructions were received and passed to all concerned the same night. "Operation *Canon*" was under way. About ten to five in the evening a telephone message from Prairie Command was passed to the Officer Commanding the Army Wing at the Joint Air School Rivers, Man. The gist of the remarks of the GSO 2 was: "George, write this down. A teletype has just been received from Army Headquarters to the effect that a missionary has been severely wounded at Moffet Inlet, Baffin Island. He must receive immediate aid. We will probably parachute a small party at the mission. It should include a medical officer and signals operators. Their task will be to keep the wounded man alive until he can be evacuated safely – probably by an aircraft operating off the ice which may be strong enough to take the aircraft in about a month or so. The party will maintain wireless contact with operational headquarters and will reconnoitre the surrounding area to locate a suitable landing strip–possibly on a lake. Any questions?"

"Plenty," was the reply, "but I don't suppose you have any more information."

"No, that's all I have. This is a warning order only – all instructions will be passed to you through the normal channels—RCAF are directing Search and Rescue generally—Good Luck."

This brief message from Prairie Command was the first intimation received at the Joint Air School about the mission which was later named "Operation *Canon*." It was passed to Lieutenant Colonel D.R. Ely, MBE, Officer Commanding the Army Component of the Joint Air School, who conferred with Group Captain M.G. Doyle, Commanding Officer of the School. It was then directed that a preliminary conference would be held in the Operations Room at 1900 hours that evening.

This was the first of several meetings held, and a brief summary of what happened at each will be given here for the purpose of emphasizing the planning necessary for such an undertaking. The Library was notified early and a lot of reference material was made available. Maps of the area showing average ice and weather conditions in the North from month to month were produced, together with the positions of weather stations, radio beams and airports.

The issue of the warning order took little time. Major George Flint was placed in charge of the Army side of the operation and Flying Officer Bob Race was detailed to head the Air Force team. A payload of 4,500 lbs. was allocated for Army purposes and the respective commanders were then instructed to proceed with their planning.

Another meeting was then held of Army personnel only in Major Flint's office. At that time the dropping team was detailed as follows:

Commanding dropping team: Captain G. D'Artois, DSO.

Medical Officer: Capain. R. Willoughby.

Signallers: Sergeants Cook and Judd.

Duties were also allocated for planning as follows:

- Signals arrangements: Major P.R. Layard, MBE.
- Preparation of stores for air dropping: Captain I.C. Stewart.
- Co-ordinator of supplies: Captain R.B. Firlotte.

Captain D'Artois was instructed to prepare a list of requirements based upon an anticipated stay of one month and to present them at a later meeting.

The Medical Officer was instructed to have his instruments and special supplies ready for packing for air drop by 0830 hours the next morning.

The final meeting of the evening was held at 2230 hours. The RCAF had received a similar warning order for the operation. Because of the necessity for carrying additional emergency equipment the total Army payload was reduced to 3,500 lbs. Captain D'Artois then presented his requirements of food, clothing and equipment. A representative of the Quartermaster advised that a number of items were not available at Rivers and suggested that they might be picked up at Fort Churchill where the party would stage. A telegram listing these items of winter equipment was prepared for despatch the following morning. The co-operation of those at

Fort Churchill assisted greatly in the success of the preparations. Medical supplies were obtained through the Command Medical Officer and made ready at Stevenson Field, Winnipeg.

It was anticipated that the rescue team could land at Canon Turner's Mission, and that adequate medical assistance and advice would be available from the Medical Officer. AHQ had advised that no operation would be attempted without prior reference to that HQ except in case of extreme emergency. Communications were to be established to Coral Harbour and to Arctic Bay as soon as possible and reconnaissance was to begin immediately to discover a suitable lake on which to land a transport aircraft.

All next morning preparations continued. At a meeting held at 1030 hours information was received that as it was desirable that the aircraft to be used on the last lap of the journey should be equipped with Loran[1] and other navigational aids; therefore aircraft would be exchanged at Churchill.

At about noon information was received from 11 Group, RCAF, Winnipeg, that the operation had been approved but that the aircraft would not leave Rivers until 0800 hours the following morning. The reason for this was that a former missionary at Moffet Inlet, the Reverend Flint, would arrive at the Joint Air School later in the day to give the party all information which he possessed about the mission and the characteristics of the surrounding terrain.

Later in the day, Sargent Ross was detailed as an air supply member of the party. His duty was to drop extra supplies which might be required, and, in the event of urgent need, to parachute to assist the party.

The Reverend Flint was late in arriving at Rivers. As some of the dropping party lived at Shilo Camp, some 47 miles distant from Rivers, and wished to see their families before leaving, a preliminary briefing was held at 2100 hours. The information was repeated and instructions given about dropping, signals, procedure and the selection of a landing strip for the evacuating aircraft. This had just been completed when Reverend Flint arrived. He had flown all the way from Ottawa and was tired and hungry, but readily agreed to do what he could immediately, so that those desiring to get home could leave as soon as possible.

Reverend Flint had spent some two years at Moffet Inlet and was well acquainted with the area. He brought with him photographs and sketch maps which were projected upon a screen, enlarged so that they might be seen by all. At the same time he elaborated verbally on the subject. This briefing was of great value, and any idea that the drop would be a simple one was quickly dissipated. The Mission station itself was a very small house constructed on a small spit of land approximately 200 feet long and 110 feet wide. Back of the Mission, and rimming the coast for miles, was an ugly, precipitous escarpment some 400 to 600 feet high.

It was obvious that no drop could take place close to the Mission since the water temperature was reported at 29 degrees, which would quickly prove fatal to a parachutist landing in the water. Attention then turned to the back country behind the cliffs. This was reported to be rocky, littered with boulders with a number of small lakes. It was generally described as "very rugged."

Because of this unpromising information, Major Flint, who had not intended to accompany the party, decided to do so to make the decision if, and where, the drop would take place. The drop would have to be made inland, and during the planning stage, due to lack of detailed information, it was not possible to designate a specific dropping zone. The first requirement would be to reconnoitre a suitable dropping zone as close as possible to the Mission. Proximity was important because of the weight of

stores which would have to be transported from the dropping zone to the Mission. The largest item was a 52 set, which, with its gear, weighed some 900 lbs. Knowing the country as well as he did, Reverend Flint was somewhat pessimistic about the operation and the chances of its success.

The possibility of wireless failure or defects was countered by the provision of ground strips and the establishment of a visual system for communication from ground to air. Through the Department of Transport and the Army Signals at Churchill, a careful check was made on all operating frequencies and schedules of wireless stations in the North. All of these stations were alerted and warned of the intended rescue. The aircraft was to leave Rivers, proceed to Winnipeg to load additional stores and to allow the Medical Officer the opportunity of a conference with the Command Medical Officer, thence on to Churchill where aircraft were to be exchanged, further equipment was to be loaded and then on to Coral Harbour, Southampton Island. This would be the immediate base for the operation from which the aircraft would proceed to Moffet Inlet. All administrative matters were carefully planned and quickly organized, ensuring every chance of the completest success.

At HQ Prairie Command, a special roster for duty officers, to include only experienced staff officers, was established. This was to ensure the quickest handling of all matters pertaining to the rescue; the GSO 2 was detailed as the co-ordinating officer to whom all information was to be passed by the special duty officer. It was arranged that all messages with reference to the rescue would be passed to HQ 11 Group, RCAF, HQ Prairie Command, and the Joint Air School. In this way it was assured that all relevant information would be available to all concerned. On receipt of information from any source, a wire would be despatched to AHQ relaying the purport of the message.

Because of Major Flint's decision to accompany the party, it was necessary for Sargent Ross to stay behind and follow on to Churchill on a plane leaving later that day.

The party left Rivers at 0820 hours, 2 October. Upon arriving at Winnipeg it was met by Brigadier R.O.G. Morton, CBE, and Air Commodore Costello, CBE, and other service and press representatives. A little Eskimo girl, Chinook, who had recently been flown from Coral

Harbour for treatment of burns, was placed aboard the aircraft which soon left for Fort Churchill.[2]

Immediately after landing at Churchill a weather forecast was obtained. As it was not too good, F/O Race decided to remain there for the night. As it transpired this time was used to the very best advantage.

After lunch Sergeants Cook and Judd accompanied F/L Morobito, the wireless operator of the aircraft, and Lieutenant. Kohler, Royal Canadian Signals officer, to visit the Department of Transport representative in the town of Churchill. The remainder of that afternoon was required to

"Sgt H C Cook" "Sgt W W Judd"

complete all signals details.

At the same time Captain Willoughby liaised with Major Lippett, the Senior Medical Officer at Fort Churchill, and Major Flint and Captain D'Artois drew the clothing and equipment previously requested by teletype and, aided by other military personnel there, transferred the load to the aircraft (later nicknamed the "Snowbird" and subsequently "The Blizzard Belle").

The value and efficiency of the detailed preliminary planning was exemplified in the successful organization of the rescue party so that only four days after receipt of instructions to stand by for the operation, the first stage had been completed at a distance of some 1,700 miles from the initial base.

The party left Fort Churchill at 0950 hours, 3 October, and arrived at Coral Harbour, Southampton Island, North-West Territories, at 1300 hours. The remainder of the afternoon was then used to refuel the aircraft and auxiliary tanks which had to be done by hand from 45 gallon drums.

The rescue party was not in contact with the Mission at Moffet Inlet. Their job was to aid the wounded man until he could be evacuated. If, by this time, he was beyond help, then the situation would call for quite different action. In order that this information on the Canon might be obtained before a drop was made, a message was placed in a streamer. This was wrapped in two fluorescent signal panels ready for dropping.

The next day dawned clear and bright but a delay was encountered when the starting motor on the port engine refused to function. This difficulty was overcome by starting the motor with the aid of a rope tied to a tip of the propeller. Although not normal procedure, it worked and at 0925 hours the aircraft left Coral Harbour for Moffet Inlet. The flight was uneventful. The Army personnel, having nothing to do, read and slept, and Captain D'Artois took several rolls of moving picture film of terrain features that might be used at some later date.At 1248 hours the aircraft arrived over Moffet Inlet. The ground up to the south side of the Inlet was snow covered and rolling, and would have made an ideal area to drop. The north side, on the other hand, was even more rugged than expected after the briefing by the Reverend Flint. The Inlet was fairly free of ice and looked blue and cold. This feeling was accentuated by the sight of two dazzling icebergs on

the horizon. The Mission was not to be seen and the maps available did not prove too accurate in detail. The shoreline contained numerous indentations of various depths and the search was difficult and made more so by a low fog which covered portions of the Inlet. One house was spotted but it did not answer to the description and there was no sign of life. To be on the safe side the radio operator at Arctic Inlet was asked if he knew of another similar structure in the neighbourhood. He replied "No" so we told him of the one sighted and its approximate location. The search continued. Then Sargent Judd came up from the cabin and said that a boat and building had been seen through a break in the fog. We turned back and at 1340 hours spotted the Mission buildings. The aircraft made a circuit while the rear door was being taken off. On the run in over the Mission people could be seen waving, and Major Flint dropped the following message:

"WE ARE TO HELP CANON TURNER. IT IS PROPOSED TO PARACHUTE A SMALL PARTY INCLUDING A MEDICAL OFFICER FOR THIS PURPOSE. OWING TO THE RUGGEDNESS OF THE GROUND MEN CANNOT BE DROPPED SAFELY NEAR THE MISSION BUT WE INTEND DROPPING THE LESS FRAGILE STORES AT THE MISSION AND THE MEN AND OTHER EQUIPMENT IN THE DEER COUNTRY. DIVIDE YOUR ESKIMOS INTO TWO PARTIES. KEEP ONE PARTY AT THE MISSION AND SEND THE OTHER TO THE TOP OF THE CLIFFS TO GO TO THE AID OF THE PARTY WHEN THEY DROP. PLEASE ACKNOWLEDGE BY SIGNALLING A REPLY TO THIS QUESTION WITH THE PANELS ATTACHED.

ARE WE STILL IN TIME TO BE OF HELP?

GEORGE FLINT MAJOR
CANADIAN ARMY"

Owing to the amount of time and gasoline which had been consumed in locating the Mission, it was necessary to locate a dropping zone and commence dropping as soon as possible. As soon as the message was dropped the aircraft began to reconnoitre the back country for a suitable area. As we had been informed previously, this was very rugged and appeared to be of rock, littered with boulders, windswept of snow, and dotted with tiny lakes. After several circuits over the area one small lake was selected as a dropping zone. This was estimated to be about 1,000 feet above sea level, 250 yards long, and 100 yards wide. It was about five or six miles in a direct line from the Mission and considerably longer on foot, but no closer one could be spotted. Capain D'Artois concurred in the selection, and the aircraft returned to the Mission where one panel, meaning "Yes," had been laid out in answer to our message.

Dropping commenced at 1400 hours. A petrol drum weighing 200 pounds was dropped first to test the thickness of the ice, and a smoke bomb was dropped at the same time to assist in estimating the speed and direction of the wind.

The drum was seen to land safely, and from the result it was estimated that the ice was strong enough and that it was covered with four to five inches of snow.

Dropping of stores then commenced. The gasoline had been carried for a generator which would keep the batteries of the radio set charged. The generator was then dropped—this weighed 150 pounds. Then followed food, tents, sleeping bags, weapons, ammunition, packboards, cigarettes, and medical stores. Major Flint did the dropping, assisted by Captain Willoughby and Sargent Cook. Captain D'Artois kept viewing the country from a window so that he would know it thoroughly upon landing. Soon it was time for personnel to drop. Sargent Judd went first with a portable radio set, followed by Captain D'Artois. Then the main radio set and batteries followed. The total weight of the set with spares was 580 pounds, and that of the batteries 300 pounds. These were seen to land, then on the last pass Captain Willoughby and Sargent Cook bailed out.

All the dropping was done on signal from Flying Officer Race, the pilot, and during the latter portion of the drop when Captain Willoughby and Cook were getting into their parachutes, excellent assistance was afforded by members of the aircraft crew.

All dropping concluded at 1,455 hours. The aircraft made one more trip over the dropping zone and the Mission and then set course for Coral Harbour.

Sargent Judd had his portable set in operation and contacted the aircraft before the whole drop was completed. He said that he had made a stand-up landing and that conditions were good. At the same time Captain D'Artois could be seen heading for the Mission.

En route to the Mission, Captain D'Artois was met by two Eskimos. He indicated that one native should contact the other three members of the paratroop team while the second should accompany him to the Mission. The overland journey to the Mission took approximately two-and-one-half hours because of the rocky hills, some of which ranged to heights of 400 to 600 feet.

Arriving at the Mission the Dropping Team Commander was met by Mr. John Cormack, Hudson's Bay Factor from Arctic Bay. He accompanied Captain D'Artois to the Mission house and introduced him to Mrs. Turner, wife of the injured man. Captain D'Artois then met the patient, assuring him that medical aid would arrive shortly. Canon Turner at this time was unable to speak with clarity.

With two Eskimos, Mr. Cormack and Captain D'Artois left by boat for Bartlett Inlet which borders near the dropping zone. There they met the other members of the team who had been conducted to the rendezvous by the Eskimo sent by Captain D'Artois. The party returned to the Mission by boat with the medical supplies.

Examination by Medical Officer

On arrival, Captain Willoughby examined the patient. Canon Turner's left side was completely paralyzed … and there was a large bed sore on his lower back. Generally, his condition was much better than was expected. The most imminent dangers were the probable development of meningitis and the extension of the bed sore.

Treatment which then commenced and continued throughout the seven-week period consisted of regular dressing of the bed sore, administration of penicillin every three hours, day and night, as well as administration of sulfa drugs and general nursing care. Captain Willoughby arranged to carry out the necessary treatment each night, being assisted during the day by Mrs. Turner.

The first food in 14 hours that the paratroopers felt the urge to eat was a hot meal provided by Mrs. Turner. All members of the Ground Force were weary from the strain of the day's operations and the food was most welcome.

The Mission house is eleven feet by 24 feet and contains two rooms. These were occupied by the patient, Mrs. Turner, their two children, and an Eskimo girl. Captain D'Artois decided to use a shack, ten feet by seven feet, to house the team and store equipment and supplies. Living conditions for the seven-week period were primitive.

In the meantime, the aircraft was returning to Coral Harbour. Weather conditions had become worse, and so much time had been spent over Moffet Inlet that not enough fuel was left to carry the aircraft to an alternative airport if a landing could not be made at Coral Harbour.

A landing was finally effected there, however, at 1840 hours under a 200 foot ceiling. Eight hours and 50 minutes flying time had been required to accomplish the first part of this operation.

It had been intended to fuel the aircraft the next day—5 October—at Coral Harbour, but an average wind there of 52 miles per hour (gusting to 77 miles per hour) made that impractical and there was no urgent need.

On the same day, with Mr. Cormack, Captain D'Artois and the two sergeants returned to the dropping zone. There they collected the widely scattered equipment. This was made difficult by the complete lack of contrast between the snow and the white parachutes. A tent was then set up and the Number 58 wireless set put into operation. The Number 52 set was tested and found to be out of order. Throughout the afternoon and night, until 0625 hours 6 October the Signals sergeants worked without rest or sleep in an attempt to repair the damaged set. These efforts were not successful, however, although the receiver and supply units were put into operation. Batteries, however, went dead.

At Coral Harbour, 6 October, the wind had lessened to an average of 40mph all day, but the aircraft was re-fuelled and some work was done on the starting motor. As the next flight over the Mission would be with a light cargo load, the pilot decided to carry four drums (180 gallons) of gasoline in the fuselage which could be pumped into the auxiliary tanks if bad weather was again encountered. All this time a dozen radio operators from all stations in the North were listening for signals from Moffet Inlet, but none was heard.

We now know that on 5 October none of the sending sets at Moffet Inlet was in working order. On that same evening, however, a newscast was heard over the CBC at Coral Harbour to the effect that the party at Moffet Inlet had established communication through Coral Harbour. As this was not so, enquiries were made to determine whether communication had been established through some other point, but it was learned that the newscast had been made in error. That same night Major Flint received instructions from Rivers to return by the first plane as the drop had been successful and nothing further could be done until time to evacuate the party.

The party at Moffet Inlet was still active. Early on the morning of 6 October the radio equipment and parachutes were stacked and covered with a tent. Mr. Cormack advised immediate return to the Mission because of the possibility of a freeze-up in the Inlet. After loading the boat with supplies the party returned to the Mission.

On the suggestion of Mr. Cormack and the advice of Captain Willoughby, Captain D'Artois decided to move the patient and his family to Arctic Bay, 70 miles north of Moffet Inlet. Accommodation and medical facilities were better there.

Weather prevented a departure on 7 October. That afternoon a storm nearly resulted in damage to Canon Turner's whaler. To prevent the boat from being smashed on rocks, the team, with the aid of Eskimos, moved out to the whaler in a small boat and attached a block and tackle. The whaler was then manhandled until safely on the shoreline.

On 8 October another flight was made over the Mission. Radio communication was immediately established when it was learned that the large set had been damaged in the drop and that other supplies were needed. A message was also relayed to Arctic Bay stating that the party intended to try to move Canon Turner and his family to that place and asking them to prepare accommodation. These messages were also passed to Churchill to be relayed to operational headquarters, and the aircraft once again returned to Coral Harbour.

The following day the aircraft returned to Fort Churchill to obtain a new starting motor and pick up supplies which had already been flown from Winnipeg. Major Flint returned to Rivers and Sargent Ross joined the "Snowbird" when it returned to Coral Harbour for its re-supply mission.

After the aircraft had paid its visit and received the messages, the Ground Team travelled overland to the dropping zone once more, and, with packboards, strapped the supplies on their backs and returned. The terrain to be crossed was impossible for travel by dog team. This movement of supplies exhausted all members of the party.

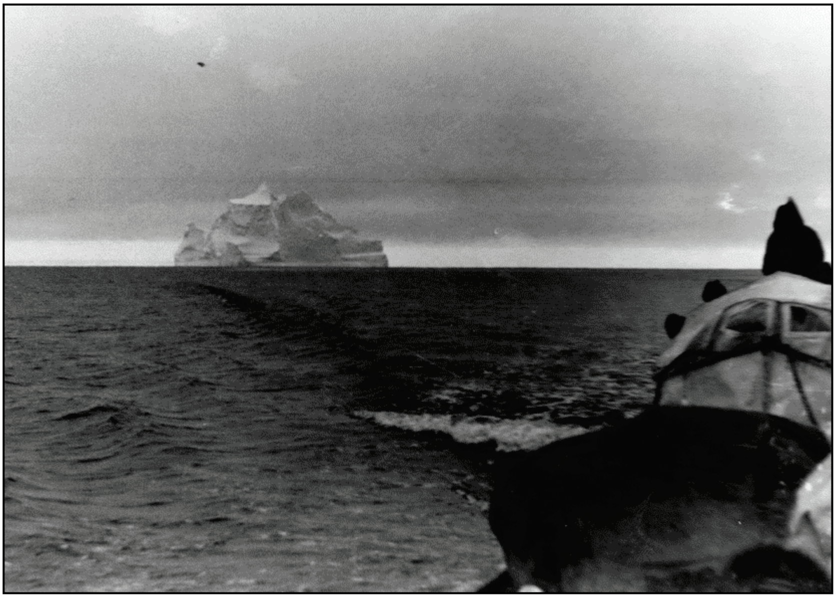
On 9 October the boats were loaded and a stretcher fashioned for the patient. The Canon's boat was launched but weather prevented departure.

Unsuccessful Voyage

On Thursday 10 October the patient was put aboard the whaler. This proved extremely difficult because the boat could not be brought too close to shore due to rocks and thin ice. The weight of the patient (approximately 230 pounds) complicated the problem. The stretcher-bearers broke through the ice and waded through two feet of water to reach the vessel. The first boat, with the patient aboard, started the journey at 0820 hours. The second boat left one hour later. About two miles from the Mission thin ice was encountered but it did not halt the voyage.

The motor of the whaler went out of action early in the trip and the vessel drifted close to a large iceberg. However, Sargent Judd was able to restart it, but rough water and ice slowed progress and at nightfall the party anchored in a small inlet for protection.

The following morning an attempt was made to complete the trip. The calm of the previous night had permitted the ice to thicken and the whaler was frozen in and was in danger of being crushed as its engine was inoperative.



Mr. Cormack and Captain D'Artois manoeuvred the second boat through the ice until a line could be thrown to the whaler. Gradually the stranded craft was worked free and the two vessels returned to the anchorage of the previous night.

In view of the patient's long exposure, Captain Willoughby explained that it would be necessary either to complete the journey immediately or return to the Mission. Meanwhile, an Eskimo who had surveyed the ice ahead from the vantage point of a high hill, reported it was impossible to proceed. The party then turned back. The return was made hazardous by thickening ice and the necessity of towing the whaler. The Mission was reached in mid-afternoon 11 October. Bitter disappointment was felt by all members of the party as a result of the failure to reach Arctic Bay.

The attempted trip had aggravated the patient's bed sore and Captain Willoughby decided that drastic treatment was necessary. On Sunday 12 October he operated. Approximately two inches deep and five inches across, the sore had become gangrenous. It was necessary to cut away the devitalized flesh. The Medical Officer was assisted by Mr. Cormack and Captain D'Artois. Although it was not possible to administer an anaesthetic, Canon displayed remarkable courage and stood up well under the ordeal. The operation lasted about 20 minutes.

Previous to this date, search for a suitable airstrip had been impossible as the ice was too thick for travel by boat and too thin for travel on foot.

Trip in a Blizzard

On 14 October Captain D'Artois decided that an attempt must be made to move the damaged Number 52 Wireless set from the dropping zone to the Mission where efforts to complete repairs could be made more conveniently. On reaching the dropping zone, the commander and two sergeants strapped sections of the 450-pound set to packboards and commenced the journey back. The rough country and heavy load proved formidable. A slip or fall on the rocky hills might have meant irreparable damage to the set. The last portion of the trip was made at night in a blizzard and was climaxed by a descent down a 600 foot cliff back of the

Mission. The previous day it had been necessary for Mr. Cormack to return to Arctic Bay.

On arrival, although worn, the team stripped the set to permit more rapid drying. The 15th of October was spent in attempts to repair the set. The receiving unit was put into operation but the sender unit still was unserviceable. Further attempts at repair were made without success the following day.

The next day the RCAF Dakota arrived over the Inlet to carry out a re-supply drop. The first 'chute released carried a Number 29 wireless set which dropped into the sea 25 feet from shore. The remainder of the supplies were dropped with precision and messages were exchanged between the ground party and the aircraft. The medical supplies were undamaged. The Number 29 set was salvaged but salt water had caused extensive damage. Sargent Judd was assigned to repair the set while Sargent Cook continued work on the Number 52 set.

Using part of the Number 58 set and an unused circuit in the Number 52 set, Cook completed repairs. At 1827 hours, 18 October, the ground party made their first contact with another station—Arctic Bay—since the team had dropped at Moffet Inlet on 4 October. Establishment of communications, through the initiative and improvisation of Cook and Judd, proved an invaluable aid to the successful completion of the operation.

From 18-22 October, Captain D'Artois carried out several reconnaissance trips in search of an airstrip on the Mission side of the Inlet. On 22 October, due to a southeast wind clearing the ice from the Inlet, he made a reconnaissance by boat after arranging a rendezvous with Judd at Willoughby Lake. The latter's delay in reaching Willoughby Lake by the overland route caused considerable concern. However, the two met late in the evening and returned safely to the Mission, having discovered a suitable airstrip.

On 24 October, despite an extremely low ceiling of some 200 feet, F/O Race carried out a re-supply drop of urgently-needed medical supplies, tubes for the wireless set, and newspapers. The low ceiling and high hills were a serious threat to the safety of the aircraft and only superb flying made the drop a success.

Search for an Airstrip

Since landing at Moffet Inlet, Captain D'Artois had kept a constant check on the thickness of the ice. On 28 October, having searched the area on the Mission side of the Inlet thoroughly for an airstrip without success, he set out to explore the territory across the Inlet. Canon Turner suggested an airstrip might be found there. From this date onward, the Ground Force Commander made a reconnaissance trip each day that weather permitted. His problem was to find an airstrip suitable for RCAF requirements as well as those demanded by the doctor for the patient. The distance that the patient could be transported in Arctic weather was a limiting factor. These trips were made on foot with a dog team and an Eskimo and averaged approximately 25 miles. In all, Captain D'Artois covered approximately 300 miles in his search for the airstrip. Thin and shifting ice was always a serious danger.

On one occasion Captain D'Artois fell through the ice and might well have lost his life. He returned to the Mission after being pulled from the water by an Eskimo boy, changed clothes, and set out once more.

Finally, on 2 November, Captain D'Artois discovered a lake 23 miles south of the Mission. It was situated in the barren lands at the foot of the hills. Examination showed that more than the 15 inches of ice required by the aircraft covered the lake. The approach from the south was suitable and the area was level.

For 11 days the Ground Force Commander camped at the lake in a tent, preparing the strip with markers and panels, and checking the snow and weather conditions. This information was forwarded to Cook for relay to the RCAF. During this period a blizzard prevented an Eskimo from reaching D'Artois with fuel for his stove and lamp. In addition, a high wind smashed the tent pole, and D'Artois was forced to live for two days without either light or heat. He remained in his sleeping bag throughout the two days, waiting out the storm.

On 18 November, Flying Officer Race attempted to reach the airstrip but was forced to return to Coral Harbour by bad weather. D'Artois then returned to the Mission on 20 November, his supplies having run low.

Landing Made

On 21 November, word was received that the aircraft had taken off from Coral Harbour on another attempt to reach the airstrip. D'Artois left the Mission and proceeded to the airstrip. Half an hour from the airstrip he saw the aircraft circle overhead. Visibility was poor but through a break in the fog F/O Race spotted the markers set up at the airstrip and decided to attempt a landing. With considerable skill he succeeded.

While landing, the wireless operator of the aircraft notified the Mission of the arrival of the Dakota. The patient was wrapped in furs, blankets, and a sleeping bag and placed on a dog sled. The temperature was -24°C. The fastest team was used to move the patient. A second team conveyed Mrs. Turner and her two children, while a third team was used by Sargent Cook, who closed the Mission before departing.

The intense cold was a danger to the patient but the precautions taken and the excellent time in which the dog team made the trip—three and one-half hours—prevented serious ill-effects to Canon Turner.

While the patient was en route to the airstrip, Captain D'Artois prepared the tent for his reception. A delay of approximately five hours took place before weather was suitable for a take-off.

At 2230 hours, aided by a flare path laid down at the 6,000-foot strip, the party took off and returned to Coral Harbour. Here, due to the cold and exhaustion suffered by the patient and passengers during this flight, F/O Race decided to remain for five hours.

Early on the morning of 22 November the rescue aircraft departed from Coral Harbour, and landed at 1715 hours at Winnipeg, where the patient was admitted to hospital and his family turned over to the care of the Church of England.

Notes

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[1] Long range aid to navigation.
[2] In reprinted articles, the editors have chosen to retain the term "Eskimo" to acknowledge the time when the authors wrote their articles. Chapters written specficially for this volume use the preferred current name "Inuit".

Chapter Five

On Frozen Wings and Waves: RCN Operations and RCAF Maritime Air in the Arctic 1946-1950.[1]

Richard Mayne

Canada's Arctic waters were not at risk during the Second World War. In fact, there was only one known example of a German U-boat venturing as far as the Labrador Sea, and it achieved little of significance.[2] The peace that followed changed everything. Growing postwar tensions quickly made the Arctic strategically relevant, as it represented the most direct route between the United States and the Soviet Union. While the Soviet Union had little with which to threaten the Canadian Arctic (and even less reason to do so), concerns remained that the situation might change as the Cold War progressed. Whether they were ready for it or not, the task of protecting the northern maritime approaches fell, in large part, to the Royal Canadian Navy (RCN) and the Royal Canadian Air Force (RCAF).

In the immediate post-war period, Canada's new Minister of National Defence, Brooke Claxton, began pushing to send Canadian forces north. In many ways, however, Claxton was swimming against the current. Prime Minister Mackenzie King had left little doubt about his resolve that Canada's northern policy should be "primarily a civilian one" and, when issues of Arctic security were discussed, he argued that "our best defence in the Arctic was the Arctic itself."[3]

Immediately following the peace, Canada began a rapid disarmament. King's desire for a peace dividend and the pace of this demobilization made maintaining the RCN's Atlantic and Pacific capabilities difficult. Chief of the Naval Staff, Vice Admiral H.E. Reid, had faced considerable pressure after voicing his concerns over the defence cutbacks.[4] More to the point, Reid's objection to the government's defence funding cuts and diminishing political support represented a theme that would haunt the RCN's efforts in the Arctic between 1946 and 1950—with the RCN struggling to fund its two coast navy, where would the resources come for operations on a third? [5]

Naval deployments into the Arctic did begin soon after the end of the war, however they were not by the RCN. In early 1946 the US Navy (USN) deployed the carrier USS *Midway* and its escorts on Operation *Frostbite*, a cruise into Davis Strait to test the effect of cold weather on air operations. The task force never sailed into Canadian waters but such a large American presence in this area began to shake loose a government opposed to expanded military operations. In a region where questions of sovereignty remained uncomfortably unresolved, the optics of the northern waters becoming exclusively an American preserve was considered unacceptable.

This incentive was only strengthened later that year by Operation *Nanook*, where US vessels did enter Canadian waters (though with the permission of the Canadian government). The five participating warships (and one Coast Guard vessel) made this a formidable force for the Arctic. Its primarily objective was reconnaissance and training to familiarise the USN with Arctic conditions. Canadian observers were invited to participate, but Prime Minister Mackenzie King was worried about appearances. *Nanook* may have received his government's blessing but the Americans were asked that the publicity surrounding the exercise be kept as "undramatic as possible with emphasis on scientific knowledge acquired rather than on purely defence aspects."[6]

By the end of 1946 there was finally momentum to bring Canadian vessels north. In September, Vice Chief of the General Staff Major-General Churchill Mann advised the RCN that his superior (the Chief of the General Staff) did not understand why neither the Navy nor the Air Force were putting proposals for Arctic exercises before the Chiefs of Staff Committee. Mann's main purpose in contacting the RCN was to prod them for resources; namely, a 4,700 or 10,000 ton naval headquarters ship that could be "frozen in" over the winter to support an Army plan for a purely Canadian Arctic expedition in 1948. Not only would this ship help the with the Army's proposal, Mann argued, but it also could be used as a potential springboard for "a 'Navy baby."[7] The trouble in this instance was that the RCN did not have any ships that fit the description, nor did they see the concept of acquiring an American Tank Landing Ship (LST) for this purpose as being a practical solution. While the RCN politely declined the Army's offer, the idea was percolating.

The RCN had actually been "cooking up" its own ideas even before the Army's proposal; so much so that the Assistant Chief of the Naval Staff, Commodore H.G. DeWolf, was keen to observe that the Plans Division had developed various Arctic scenarios which were somewhat similar to the ones the Army had contemplated. They too shared a desire to carry out a purely Canadian exercise where the military would operate independently from the Americans. The Director of Naval Plans and Intelligence, Captain H.N. Lay, was one of the officers on the Naval Staff advocating a nationalist approach when it came to RCN operations in the North. For instance, Lay left little doubt where he stood on the issue when, in response to calls for a US landing ship to support the Army proposal, he shot back that it "would almost certainly mean the USN would wish to be the dominant partner in the expedition, and I believe if Canada is able to do it herself, she should do so."[8] Given that Lay's uncle was the Prime Minister, it is likely that he knew King's preference for not appearing to be ganging up with the Americans in a region so close to the USSR. Indeed, Lay was a firm believer that whenever possible the RCN should conduct unilateral operations in the Arctic even if a lack of resources meant sending only a solitary ship. The result was an early plan in which the Navy would send the destroyer HMCS *Nootka* on an "exploratory expedition" to the region sometime during the summer of 1947.[9]

While DeWolf certainly appreciated this nationalistic approach, it was clear to him that Canada simply did not have the maritime assets to patrol the region alone. Perhaps influenced by unconfirmed reports that a Russian submarine was operating in the Davis Strait, DeWolf felt a more practical option to meet an immediate need was for the RCN to take part in the USN's northern deployments.[10] This plan suffered from the same challenge as the proposal to send a destroyer on a lone expedition. As DeWolf confided to Mann, the Navy was most "anxious to send a ship along [with the Americans], if we can spare one, but to do so we will certainly stretch our resources."[11]

Operating with an American task force was a good idea. While the idea of a Russian submarine operating in the Davis Strait was troubling, others were concerned about the Americans' interest in the Arctic. The status of the northern waters remained unsettled and it was felt that Canadian personnel or ships sailing with the Americans might help to avoid misunderstandings and improve the optics of the situation. Theoretically, it also gave Canada a say in American northern deployments and, as a result, it was the option that the RCN pursued.

After reminding the Americans of their earlier invitation for the RCN to join an upcoming exercise, Commodore Frank Houghton was surprised that the force being sent was a relatively small one. The fact that the United States was deploying only three ships on what was effectively a minor supply mission was enough for some to question the value of the RCN participating in this particular expedition. The Americans had concerns of their own.[12] Having initially welcomed Canadian interest, there were still some reservations over the "suitability and practicability of including light-hulled vessels (such as destroyers) in a force of this kind."[13] This was an important point. Not only was the RCN wrestling with limited resources, its available ships were not well-suited to Arctic conditions. The RCN had no icebreakers and its warships were only capable of northern operations for a small window of approximately one to two months during the summer.

With the RCN having passed on the American cruise, Lay was able to direct attention back to his plan of sending a single destroy on a northern deployment during an ice-free period in 1947. His arguments were sound. He reminded the Naval Staff that, in the Navy's 37 year existence, no Canadian warships had ever entered Hudson Strait or Bay. Even more to the point, Lay continued that "in the light of the present interest in the Canadian Arctic it is considered that such a cruise would be of benefit to the Canadian defence programme." He was right and it is not surprising that the Naval Staff—with a hint of a national pride—were "of the firm opinion that it would be preferable to undertake a northern cruise under Canadian auspices."[14] The Naval Board agreed and, on 29 April 1947, they approved the plan to embark the RCN on its first voyage into the Canadian Arctic. [15]

Working with a tight deadline, the RCN began to hash together an operation (named *Iceworm*) that would see two of its destroyers sail from Halifax to Churchill in late summer 1947 for a "preliminary familiarization cruise."[16] It was at this junction that the Navy came to a conclusion that had important repercussions on the future of naval-maritime air co-operation in the North. Realizing that it would rarely act alone in this future operating environment, the RCN asked the RCAF to provide aircraft for tracking and other exercises in the vicinities of Churchill and Southampton Island. Given the unique conditions of this area, the RCN made its case for RCAF participation by pointing out that their aircraft would add a safety feature to the deployment by performing an invaluable ice reconnaissance role. Put another way, the ship's radars and lookouts could never spot ice as far in advance as an aircraft could. Unfortunately, just as this plan was coming together, the bottom fell out. With no apparent explanation—other than that the minister had given it "very careful consideration" —it was decided at the political level that *Iceworm* would not proceed.[17]

Despite their disappointment, the Navy did learn from the planning process that had come before the cancelation. For instance, it was determined that sailing in the North would involve many special logistical and operational considerations. The original plan was simple: the destroyers HMCS *Nootka* and *Micmac* were going to embark on a five to six week familiarization deployment to conduct radio communication tests, bathythermographic exploration, hydrography, and magnetic observation.[18] Complications soon followed. It was quickly found that the window for safe sailing in relatively ice free waters was (as the American had warned the previous year) very small. *Nootka* and *Micmac* were designed for operations in the North Atlantic and, as a result, their light hulls were no match for any substantial amount of ice. This left the cruise with a firm schedule, where the ships could not arrive any time before mid-August and leave no later than mid-September. Although this was a limiting factor, it was one that the RCN could work around. The issue of fuel, however, was by far the greatest obstacle facing the planning staff.

A return trip from Halifax to Churchill amounted to approximately 7,700 miles, far beyond the range of the destroyers. Planners realized that there were only two places to refuel during the voyage: Churchill and St. John's, but these locations lacked either suitable fuel types or quantities. Two possible solutions were proposed. Tank cars might transport the fuel to St. John's and Churchill or the auxiliary vessel *Dundalk* could be turned into a temporary refuelling ship. There were problems with each. The first was that *Dundalk* did not possess a gyroscopic compass or radar. The Navy considered both pieces of equipment essential in a region where icebergs were plentiful, magnetic compasses almost useless, charts (if they existed) horribly outdated, and navigation conditions so challenging that they would test the mettle of the most skilled sailor. In the end, the cost of transporting fuel by land was just too great, and, despite the risks, the RCN opted for the *Dundalk* option. It also decided to send only *Nootka*. But, even with *Dundalk* waiting at the end of the first leg, it was appreciated that the destroyer was being pushed to her operational limits. This was particularly true after it was estimated that *Nootka* would only have a 25% fuel reserve left by the time she reached Churchill. This would be enough to make any captain nervous and meant that, with almost no margin of error, *Nootka* would not be able to conduct exercises or training diversions en route.[19]

Other issues related to the fuel situation complicated planning for *Iceworm* prior to its cancelation. Even with only one destroyer, the voyage was still going to consume a good portion of the RCN's yearly fuel allowance. It did not help that the government's cuts to National Defence had just forced the Navy to reduce that appropriation by 25%.[20] With planning in advanced stages, the Navy was undeterred until the Claxton's hammer fell.[21]

The cancellation of the mission was a disappointment but the RCN continued to advance the need to operate in the Arctic. That they had just forwarded a submission to build a Canadian naval icebreaker to the Minister of National Defence was certainly illustrative of the fact; as was the Naval Board's decision at its 25 February 1948 meeting to include plans for another cruise.[22] Scheduled to take place from 2-28 September 1948, the RCN was going to ensure its first foray into the Arctic was done in style. While the goals of this new operation remained fundamentally the same as

those intended for *Iceworm*, the RCN was not only planning to send the destroyer *Haida* with *Nootka*, but also its brand new aircraft carrier, HMCS *Magnificent*.[23]

Much had changed since the cancellation of the previous year's operation. The worsening relationship between the Soviet Union and the West was certainly the dominant motivator and the Russians were developing a sizable submarine fleet that brought back memories, for both the RCN and RCAF, of the difficulties they had faced trying to overcome the German U-boat threat. The change in attitude was certainly recognizable by mid-1947 as strategic reports to the Chiefs of Staff Committee were finally allowed to treat Russia as Canada's most probable future adversary.[24] More important was the anxiety created by the 1948 Berlin blockade and the subsequent Western airlift.[25]

The RCN drafted a new deployment concept in response to these growing tensions with Russia. Seeing that the Army and the RCAF would play key roles in some or all of these exercises, it also took great care to invite both of the other services to participate. While the Army turned this request down—a somewhat ironic development given the Army's previous clamoring for the Navy and Air Force to initiate joint Arctic exercises—the RCAF was willing to take a deeper look at what it could do. RCAF participation was deemed essential to a more active program for the aircraft carrier, as well as offering a better opportunity to learn about operating naval aircraft at northern latitudes. Preliminary discussions were therefore carried out in February 1948 between the RCAF and the RCN regarding the co-ordination of maritime air operations in the Hudson Strait area.[26]

The RCAF, however, was facing the same resource limitations that troubled the Navy. The Air Council was enthusiastic about co-operating with the RCN and exploring its maritime air capability in the Arctic, but the simple reality was that they did not have any aircraft to spare for this exercise. Much like the Army and RCN, the RCAF was greatly impacted by the drastic postwar cuts which had left it with a fraction of its wartime capabilities. At its peak in January 1944, the RCAF had 215,000 serving members, which was reduced to a post-war strength of only 16,100 regulars, 4,500 auxiliary members, and 10,000 reservists.[27] This made it difficult for the RCAF to meet all its peacetime operational commitments. As part of these reductions it was determined that Eastern Air Command (EAC), which was the former nerve centre for Canada's air war against Germany's U-boats, was no longer needed and therefore closed down. Most of the RCAF's maritime aircraft were sold to the scrap metal industry.

What was left of this once proud force was eventually reconstituted as Central Air Command's 10 Group.[28] This reduced the RCAF's immediate postwar maritime air capability to little more than a token force but did not diminish the fact that Air Force still wanted to find ways to co-operate with the Navy in the Arctic. Their initial response was to offer two Air Force observers—one qualified in fighter operations and the second in coastal operations—who, it was determined, could provide the RCAF with a sense of the control, organization, communication, and air sea rescue arrangements that would be necessary for future co-operation between surface ships and aircraft in the Arctic. It was not the type of participation that the RCN wanted but, owing to its lack of resources, it was all the RCAF could offer. Presumably due to the Berlin blockade the Chief of the Air Staff (CAS), Air Marshal W.A. Curtis, reversed course in mid-1948 and made the aircraft available.

Operational commitments still precluded the stationing of aircraft at either Churchill or Chimo (as the RCN had requested) but the CAS was prepared to use assets already based on the East Coast to carry out interception and shadowing of the Task Force on its outward journey to Churchill.[29] He was clearly stretching his understaffed and overworked force to the limit to accommodate the Navy's proposal and he let them know as much when he warned, "such air patrols as are authorized will however be few in number and dependent entirely on the availability of aircraft."[30]

The original planning for the northern cruise pitted the fictitious counties of "Blueland" and "Redland," which bore a not-so coincidental similarity to the West and Soviet Union. The central purpose of the exercise was for the Blueland carrier and two destroyers to escort a convoy from Halifax to Hudson Bay. On the way, *Magnificent* would search for submarine activity and conduct photo reconnaissance of bays and inlets to determine if "Redland" had established refueling depots on the Labrador coast.[31] Planners did not define the extent of the Redland forces involved, yet they did ensure that one fictitious enemy submarine and long-range shadowing aircraft were present (for the purposes of the exercise, small ice could be reported as a submarine while the RCAF played the role of hostile aircraft). The program for air activity over the exercise area was ambitious and included the following components:

Exercise 1 – Search for naval force by RCAF aircraft (1,000 ft).

Exercise 2 – Shadowing of naval force by RCAF aircraft. (RCAF aircraft will attempt to avoid detection and interception by naval aircraft. (1,000ft or lower)

Exercise 3 – Inception of RCAF aircraft by naval fighters. (2,000 ft. RCAF to cease shadowing and carry out dummy attack on naval force at 500ft).

Exercise 4 – Anti-submarine Patrol by RCAF aircraft.

Exercise 5 – Strike by naval aircraft on a shore target.

Exercise 6 – Homing exercise for RCAF aircraft.[32]

In more general terms, the aim of the Air Force was "to familiarize the RCAF crews with naval operations," while the Navy sought "to enable their fighter aircraft to deal with enemy attacks from the air, make fighter interceptions and to familiarize the [Task Force] with RCAF tactics."[33] The RCAF also had real-world tasks, such as providing ice patrol flights for the Task Force. It was further emphasized that the primary role of these aircraft was search and rescue (SAR), meaning that they would have to abandon the exercise immediately if required elsewhere.

The aircraft selected for this exercise—an Avro Lancaster (call sign CHK) and a Consolidated Canso (CHB)—were from 103 Rescue Flight. Based out of RCAF Station Greenwood in Nova Scotia, these aircraft left for what became their temporary home at Goose Bay on 1 September. As former wartime aircraft, both platforms had considerable wear and tear. This was evident when, after a routine flight to Goose Bay, the Canso landed with a malfunctioning radio transmitter and Loran while the Lancaster reported issues with its H2S radar. The radar was a vital asset for the northern cruise and was repaired immediately. It failed again in short order, dying while the aircraft was airborne. This would have impacted the exercise had it not been for the fact that the RCN's schedule had also been delayed. In what would become a pattern for Arctic operations, other maintenance issues followed. A short circuit in the Lancaster's wiring led to the fire extinguishers in all four engines discharging. This incident almost knocked the aircraft out of the exercise until someone came up with the simple solution of replacing them with the extinguishers from the aircraft that had brought the spare parts for the H2S set.[34]

The exercise itself began on the following day when the Lancaster and Canso took off in search of the task force. Eager to have an impact on the exercise, both aircraft left half an hour early to ensure that they could react if the Task Force was not in position, but also to "give the Navy a bit of a surprise." It worked. The RCAF found the convoy in the Strait of Belle Isle before the planned time and began shadowing and intercepting. Using a combination of cloud and coastal terrain as cover, the RCAF reported on the RCN's progress while, simultaneously, trying to evade the carrier's fighters for the three hours of the evolution.

Once this portion of the exercise was complete, the Lancaster carried out a homing exercise with *Nootka*, while the Canso flew ahead of the convoy to conduct a patrol. Overall, the first day went well and was only hampered by a stint of sea fog that led to the recall of *Magnificent*'s aircraft and the early return of the Lancaster and Canso to Goose Bay. This did not spoil the sense of achievement within both the RCN and RCAF, which was evident in official reports that called the deployment "quite successful."[35] Another report went even further, observing that the aircrew had gained tremendous experience in northern operations, going so far as to say that "their morale was rapidly increasing, and they felt that their efficiency and airmanship was on the up grade [sic] with the lessons learnt each day."[36]

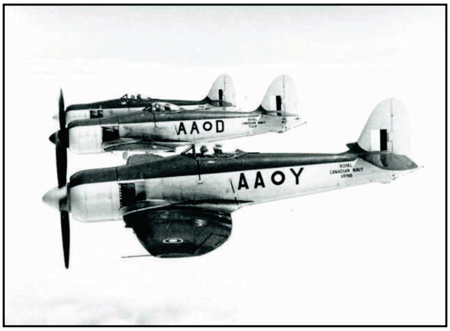
Unfortunately, this was as far as their luck with weather held. Persistent fog and low cloud cover effectively halted the carrier's flying schedule. It also impacted the Canso, as this aircraft's lack of radar made it "of little use" in conditions of reduced visibility.[37] The air portion of the exercise was in tatters as only the Lancaster was left. In an attempt to resuscitate some type of air program, the Lancaster did what it could by practicing homing and radar tracking exercises with the destroyers. However, even the Lancaster soon succumbed to the weather. After a full day of conducting radar and homing exercises off the tip of Labrador, the Lancaster returned to Goose Bay "through fairly heavy icing conditions" that left two of its engines unserviceable.[38] While the Lancaster was capable of flying on two engines, it was a dangerous situation. This close call (in combination with the fact that the weather was showing little signs of improvement) led to the decision to cancel the rest of the Air Force's

schedule. Despite this disappointing end, *Magnificent* informed the RCAF that they were nonetheless happy with what had been achieved, telling them: “Thank you for your ready co-operation. The exercises have been of great value to the Magnificent [sic].” The RCAF was equally pleased as they responded that they too “enjoyed entire operation. It was of great benefit to us all. Hope to carry out similar exercise with you again.”[39]

Despite the short duration of the flying operations, both the RCAF and RCN nevertheless learned some important lessons. The first was that weather was an unpredictable and potentially decisive factor in operations. The sea fog that the task force encountered was a common phenomenon. It grounded the carrier’s aircraft, as well as the radar-less Canso, giving the Lancaster free reign of the skies above the convoy. Poor weather also sometimes worked in the convoy’s favour. This was evident when the carrier’s fighters were able to locate the Lancaster by the slipstream track it left as it flew in misty conditions. Remaining on the surface long enough to create a convenient trail that led the fighters directly to the shadowing aircraft, these tracks of mist represented a new problem for which the RCAF lacked a response.[40]

More lessons followed. Post exercise analyses identified a requirement for air navigators to further develop their skills in the North through additional patrols. Additional work with relative navigation was also recognized as a future Arctic training requirement, as was the need to do more with regards to anti-submarine warfare (ASW). More specifically, the Canso crew found the ASW patrol patterns for the exercise “a bit ridiculous for that area” since the strait was “very narrow” and often led them over land. This was such an important issue that the air component’s daily diary noted, with tongue in cheek, that adhering to established ASW patrol routes that took them over forested terrain made it “rather difficult to spot a submarine there!”[41] It was an important point. Designed during the Second World War, these particular search patterns were effective for finding submarines in the open waters of the North Atlantic. Such tactics were obviously not appropriate for a future fight in the littoral waters of Canada’s Arctic Archipelago, which had similar characteristics to the Strait of Belle Isle.

During the operation, it was no shock to anyone that the Canso was an easy mark for *Magnificent*'s Sea Fury fighters. The officer commanding the detachment tried to put a positive spin on a bad situation when he observed that "had this been wartime, I am certain that she [the Canso] could [have] sent out reams of valuable information before being shot down." The Canso had made effective tactical use of the



strait's coastal terrain, and "several times, we like to think, the tired old work horse was able to pop out from behind the hills and get a good look at the Force without being detected."[42] Despite trying to use low altitudes to avoid its interceptors, the Canso was a slow aircraft and caught virtually every time it approached the Task Force. The simple reality was that the proud Canso had seen its day and, while suitable for its current SAR function, could not be sent against modern aircraft in the Arctic (or any) environment.

While the Canso was not a good candidate for Arctic Maritime Operations, the Lancaster was. During its three hour shadowing exercise it kept constant watch on the task force. Not only did it successfully make contact at roughly fifteen minute intervals, but it also evaded the carriers' pursuers every time but one. That it was able to do so while *Magnificent* was maintaining a continuous fighter patrol was impressive and allowed the RCAF to brag:

> The conclusion we drew from the days work [sic] were, that although the Task Force could possibly give a good account of itself against slow aircraft like the Canso, they would have to be very sharp indeed to keep their vessel afloat when encountering modern high speed aircraft that are fully equipped with radar and other navigation aids.[43]

Although referring to the Lancaster as a modern and high speed aircraft was something of a stretch, the fact remained that it had bested the convoy, leading to another RCAF memorandum that observed:

> From the experience gained in the first day's operation in which the Naval aircraft participated, it was unanimously felt by the RCAF crews that shadowing of surface vessels by a high speed aircraft such as a Lancaster, confronted the Naval Fighters with a problem that only concentrated practice on their part would overcome. The fact that … the Lancaster was only intercepted once would make it appear that a fast aircraft is a formidable threat to all surface craft.[44]

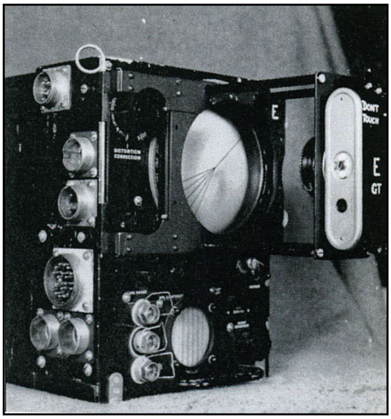
This report caused some consternation in the RCN, but others accepted the RCAF's opinion as one naval officer told his superiors how "the exercise were [sic] of great value if only to show how much actual practice we do need."[45]

The Commanding Officer (CO) of *Magnificent,* Commodore, G.R. Miles, agreed with this conclusion, observing that there was "a certain amount of truth in the RCAF claim about shadowers creating problems that only practice can solve." Still, Miles found this conclusion a bit simplistic and argued that the RCAF was conveniently forgetting that "in open sea (as opposed to the Straits of Belle Isle) radar detection of a low shadower would be more reliable and rapid, and with two CAP's [Combat Air Patrol] airborne interception would be much easier."[46] Acting-Captain A.B.F. Fraser-Harris, who was the CO of the RCN's Air Station in Dartmouth, made a similar argument. In his view, the RCAF's conclusion did not take into account of how confined the waters of the Strait of Belle Isle actually were and ignored how the "problem of interception is much easier in the open sea."[47] More criticisms followed as the Director of Naval Aviation also weighed in on the debate, conveying his feelings that the RCAF had "assumed a lesson which is contrary to the experience of the last war… Fighters, with less than half the speed of Sea Furies, successfully dealt with these shadowers, despite the low performance of radar and lack of good fighter direction of the period."[48]

The Navy had missed the point. The RCAF was not trying to say that all maritime task forces were useless against air attack, instead they were merely identifying that the RCN had failed to protect the convoy from the exercise's objective of fighting a future battle in an Arctic Archipelago. This area was filled with waters that were similar to the Strait of Belle Isle, meaning that what happened there could be easily repeated in other locations elsewhere in the North. More to the point, the RCAF was saying that the Arctic was a littoral environment that was very different from what the Air Force and Navy had faced in the "openness" of the North Atlantic during the Second World War. The conclusion was obvious: both services needed to realize that the maritime air requirements of the Arctic offered unique problems requiring new ways of thinking.

The RCAF had other thoughts about fighting a war against the Russians in the North as well. Still reeling from the deep budget reductions, the RCAF was trying to figure out how to deal with the emerging Soviet submarine threat. With the RCAF's maritime air organization all but gone, the air force needed to recreate one. It took some time but by late 1949, 10 Group had become a Maritime Group with the important job of protecting the approaches to the East Coast.

Wartime Lancasters were taken out of storage, or bought from scrapyards, and modified to become maritime patrol aircraft.[49] It was not the ideal situation, but it filled the immediate need. It also seems that the northern cruise had played a part in showing the RCAF that the Lancaster would make a satisfactory maritime patrol aircraft, particularly in the Arctic. Post-operation reports were absolutely fulsome of the Lancaster, noting that its serviceability "was excellent," that it was "able to carry on the job with extreme success;" and that it had made "a very good show" as a maritime patrol aircraft.[50] With a fuel capacity that permitted ten hours of operational flying time (with an additional two hours of reserve) the



Lancaster was impressive, but had problems as well. The H2S set, for instance, was "a great asset" but dated. What was required was a modern search radar that could be used for coastal operations. It was also discovered that it was impossible for the navigator or wireless operator to leave their duties long enough to operate the radar. The solution to this problem was to add a new crew member by having a radar mechanic sent from Greenwood to Goose Bay who could operate the set on a continuous basis.[51] These conclusions helped to determine the requirements for the new Lancaster X (maritime reconnaissance) version that was under design, particularly since the Lancaster "had proved itself [an] aircraft for this type of [maritime air] operation."[52]

Despite the debate over the Lancaster's true capability, testing its maritime air capability in the Arctic, along with sending *Magnificent*—the RCN's most prized and potent weapon system—sent a powerful message.[53] Canada's air force and navy were willing to develop and use a maritime air and naval capability to protect its Arctic waterways. This moment of northern glory was short-lived. As *Magnificent* turned home for Halifax, she would never again sail this far north in Canadian waters, and the air force still had a long road ahead to recreate a maritime air fleet built around the Lancaster X (MR)s.

While marking the end of the carrier exercises, the destroyers continued on to Churchill where, after a port call and refuelling, they travelled to Coral Harbour on Southampton Island and Port Burwell for a rendezvous with the *Dundalk*.[54] The possibility of running out of fuel and stranding a destroyer in the Arctic was by far the biggest concern that the RCN faced in the Arctic. Help was days away and the thought of a couple of destroyers drifting aimlessly in the Arctic was a scary one, explaining why (despite the cost) the RCN went with both the tank car and *Dundalk* refuelling options that had been explored for *Iceworm*.

Although this was good news for the destroyers, it did pose certain risks for *Dundalk*. Without enough time to install a radar set, some were concerned that the mixture of ice and fog off the Labrador coast posed an unacceptable risk to this vessel.[55] The *Nootka* was also about to experience a change of command, leaving the Flag Officer, Atlantic Coast, wondering if it might be "unfair … to have him [the new CO] make his first voyage … in these poorly charted waters."[56] Some were suspicious that the source of this caution was *Nootka*'s outgoing commanding officer who, it was assumed, was actually trying to stay onboard for this fascinating journey. If this was his desire it was understandable, and there was some justification about his concern related to sending a rookie captain into the Arctic. Sailing in the Arctic required unique preparations, including additional anchor shackles, propeller guards, and new, specialized personnel. The RCN had also looked at acquiring 25-foot motorboat cutters, equipped with echo sounders, for the purpose of scouting out areas ahead of the destroyers where data on the depth of water was unavailable.[57] The fear of grounding in the Arctic was constant, as was the possibility of running into ice, particularly since it was found that small growlers and "bergy bits" could not always be detected, while the destroyer's consumption rate left "little margin for unforeseen contingencies."[58]

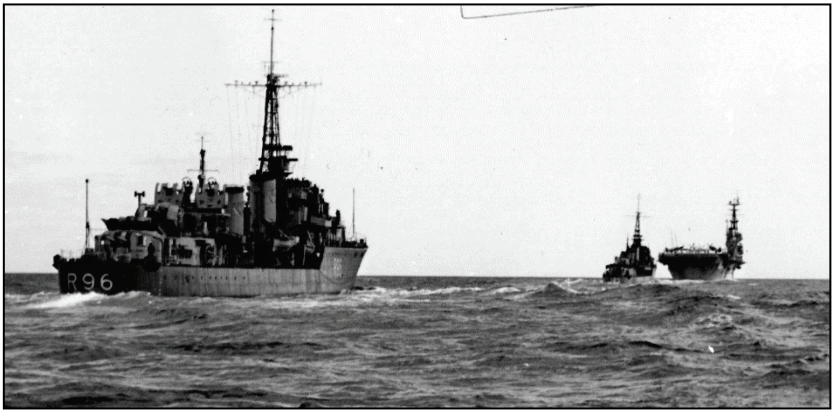
In the end all went well. *Nootka* and *Haida* acquired much knowledge about sailing in the Arctic, equipment was tested, and invaluable scientific data gathered. The final conclusion was an optimistic one. The destroyers reported no major difficulties with respect to navigation and compared summer sailing in the area to that in the Western North Atlantic in iceberg season. The cruise was also popular with the crew, not to mention the fact that it was an invaluable public relations opportunity as both destroyers' personnel were able to interact with the communities that were visited.

Although the operation was a success, not enough time had been spent in the Arctic to form any lasting conclusions about northern naval operations. As a result, the RCN began planning a similar cruise for August—September, 1949. These plans were disrupted by the fact that *Magnificent* grounded in June, and the three months required for repairs meant that the carrier missed the ice-free window. Where some saw disappointment, others saw an opportunity. There was a need to use ships for reserve training commitments and, originally, the RCN saw the escorts accompanying *Magnificent* as a good opportunity to meet that requirement.

The *Magnificent's* absence complicated matters but the Naval Board was still determined to go north, concluding that such a move was essential "both to the ships and their crews, and also from a political point of view." Realizing that building institutional knowledge in the North would take time and dedication, the Board did what it could by committing one ship "which should be combined with the training commitment, and that if possible the RN [Royal Navy] submarine [stationed in Halifax] be included for the whole or part of the cruise."[59]

Unfortunately, the Royal Navy was unable to participate, but the RCN did free up the frigate HMCS *Swansea* and tasked her with further familiarizing naval personnel on operating conditions in sub-Arctic waters, as well as the collection of scientific data. The planned route was exciting and introduced the RCN to many new locations, such as Frobisher Bay (Iqaluit), Koojessie Inlet, Padloping Island, Godthaab (Nuuk), and Hebron. This fact alone made the voyage innovative, but the ship's captain, Commander E.J. Dawson, was determined to make a difference to future Arctic naval operations and wrote a detailed and, in many ways, ground-breaking report on the trip.[60]

Dawson's account did a particularly good job of capturing his ship's challenges in the North. Much like the 1948 cruise, his voyage was marked by its fair share of comments on ice and weather. For example, Dawson admitted that he was obsessed with ice from the moment he sighted his first iceberg in the Strait of Belle Isle two days after leaving Halifax, observing that "one growler, weighing several tons, will badly damage a steel-hulled and un-strengthened ship such as a frigate." His concern was well-founded. As Dawson noted, constant heavy fogs, rough weather, and night-time conditions were a recipe for disaster. The solution to safe passage in the Arctic was to go slow. While *Swansea*'s original planned speed of advance was 14 knots, it was "lucky" if five knots were actually achieved in ice-invested areas. Things only got worse in bad weather, which led to speeds of two knots or less. Dawson was unapologetic for going so slow, noting that: "this is not being in any way overcautious" as chances of running into



growlers that were undetectable by radar was simply too great. There were sacrifices that came with going so slow and Dawson reported that "one factor stands out from all others when reviewing the cruise—namely, lack of time. In view of ice and weather conditions it is virtually impossible to carry out a satisfactory survey of these waters and coast lines and at the same time adhere to a definite timeline." Put another way, the scientific data collected during his expedition was "disappointingly small" due to the fact that the operational conditions in the Arctic had left the original schedule in disarray.[61]

Ice was only one issue that impacted *Swansea*'s mission. It did not take long before the navigational charts were found "hopelessly incorrect and inadequate," and that the "soundings shown appear to bear little relation to fact."[62] Worse yet, other areas of the Arctic had no soundings at all. This was a serious problem, illustrated by one bone-chilling experience when the ship was transiting through Bartlett Narrows only to find that the depth had gone from 100 to eight fathoms in seconds. This was just the beginning of *Swansea*'s navigational challenges. At one point, Dawson was unable to locate a particular destination because the description of the cape at the mouth of the Clyde River was unrecognizable (and was in a different place) when compared to the Admiralty charts. These charts were obviously disappointing, but Dawson was also disturbed that the established navigational aids were basically useless. So, too, was the ship's magnetic compass. In Dawson's prophetic words, Arctic navigation was "an art of its own" that would reduce a captain's experience to "either trusting radar or poking [and] blindly trusting luck."[63]

The value of the ship's gyro compass, echo sounder, and radar were clearly realized for both navigation and ice avoidance but Dawson also saw how other equipment, such as the ship's dory and dinghy, were essential to sounding waters ahead of the ship and ferrying personnel ashore. *Swansea*'s small vessels were important but Dawson saw equal value in a stronger motor cutter that could weather the Arctic climate. Perhaps his most innovative idea was that ships entering Arctic waters should be fitted with helicopters which (while a relatively new technology) were clearly the best and most effective means of conducting ice patrols, assisting in navigation, speeding up personnel transfers, and performing aerial and photographic reconnaissance. Given the Arctic's unique operating conditions, Dawson made one final request that special medical and navigating officers, as well as a "pilot with experience in these waters," should be provided to RCN ships in this area.[64] His arguments on this latter point were particularly noteworthy as he found that northern pilots—such as the ones at Padloping Island (whose English was limited to "Yes" "No" and "I don't know") — were of little help.[65]

That the North suffered from insufficient infrastructure created its own logistical problems. The 1948 cruise had already identified refueling as a significant issue. As had been the case during the previous year, it was recognized that the ship's fuel reserves would come close to the 30% mark by the time it could make a rendezvous with a tanker. This was stretching *Swansea*'s endurance to the acceptable limit as riding the ship so light on fuel also had an impact on stability.[66] Remarkably, the Navy was willing to

push the limits to get a frigate into the North and *Swansea* did not disappoint (having 9% more fuel than forecasted). Yet, the fact remained that riding so high in the water came with costs; the ship had to make constant trim adjustments and it was not surprising that Dawson, much like his predecessors on the previous cruise, was extremely relived at the news that *Dundalk* was at the agreed location.

While *Swansea* had many of the same experiences as the previous year's northern cruise, it had its own unique problems as well. The belief that winter clothing was not needed for a late summer deployment proved horribly incorrect. With temperatures much colder than anticipated, Dawson reported that his crew was reduced to wearing woolen socks on their hands since they did not have gloves. Boredom was another discomfort. There was little for the crew to do when they were off-duty, the more so since the four "Class B" movies on board offered little entertainment. Worried that this would have a psychological effect on the crew, the ship's routine was relaxed as a means to "compensate for certain discomforts." It worked. *Swansea* had had a rash of discipline problems over the first part of the summer of 1949, yet this northern deployment turned things around for the ship. Believing that they were doing good work in the Arctic, Dawson was happy to report that his crew's morale was "very high" throughout the voyage.[67]

Given their achievements, it is understandable why *Swansea* was in such good spirits. They had made a difference in the Arctic and not just with their assigned mission of gathering data on northern operations. Although the Arctic was isolated, *Swansea* was not alone in these waters as the ship unexpectedly found itself on a real-life SAR mission. Serving as another powerful illustration of why the RCN belonged in the Arctic, *Swansea* came to the aid of the RCAF supply vessel *Malahat*, which was drifting aimlessly some 30 miles off Digges Island with burnt out bearings. Getting *Malahat* to port in Goose Bay resulted in the longest tow ever performed by the RCN up to that point, covering a distance of some 1,600 km. Considering the vast expanse of the Arctic, it was clear that the RCAF's ability to cover large distances meant it was better suited for the overall SAR role in the Arctic but the *Malahat* incident showed that there was potential for the Navy to play a valuable part in these types of northern mercy missions too. While RCAF aircraft would have been able to locate and theoretically drop supplies to the *Malahat*, they would not have been able to do much else for the 163-ton vessel.

In some respects the same was true for demonstrating Canadian sovereignty in the North. Whether it was participating with Army exercises or its own activities—such as 408 Squadron's important photographic and mapping work—the RCAF was already playing an active role in the region. This presence was essential, but did not always have the same impact as personnel on the ground or sailing the Arctic's waterways. Put another way, there was a definite need for ground and maritime assets in addition to the RCAF's aircraft. One case in particular illustrates this point. During a visit to a US facility on Padloping Island, Dawson was troubled when an American from the station asked why a Canadian warship was "in these waters." Dawson's response was simple. He let this individual know "[i]n a friendly, but firm manner," that his ship and crew being there "was not unreasonable since this was Canada; a point which seemed to have been forgotten."[68]

On a separate but similar occasion, the *Swansea* received a cold reception from Danish authorities at Godthaab, Greenland who wondered why Canada was suddenly sending warships into the area. Dawson's explanation about needing to operate in the area failed to ease the tension

and the Danes freely expressed their "doubts" about Canada's presence. Eventually Canadian hospitality did convince the Danes that Canada's presence was not a threat and the crew even received an invitation to extend its stay in Greenland. It was a small triumph, but one that was repeated across the Arctic Archipelago in small Inuit communities. In these instances *Swansea*'s interaction with the local population gave the Inuit a unique opportunity to connect with the Canadian military while raising the government's profile in the region.

In the end, *Swansea*'s deployment was a textbook example of what the RCN hoped to achieve in the Arctic. In fact, it could be argued that it was the most important of the RCN's pioneering expeditions. Dawson's "very excellent and comprehensive report" was packed with so much useful information on the challenges that the RCN faced in the region that he was recommended for an official commendation.[69] Dawson's rationale was defined in his conclusion, which centered on the important lesson that the RCN had to constantly acclimatize its crews to the North through annual deployments because:

> … service in these waters adds a considerable strain to almost all sections of the ship's company. Amongst the men it is mainly a physical one. To the officers it is a mental one which increases with responsibility. It is felt that, under war conditions, periods of

> service in these waters will have to be very shorter than in the more Southern oceans. This will necessitate a manning pool to provide a floating population for ships in Northern operations. It is also thought that officers holding appointments in ships in Arctic Waters will not remain mentally alert and efficient for as long as they would if employed in the North Atlantic.[70]

The ideas of a pool of personnel with Arctic experience, coupled with a northern naval base, were good ones and indicative that meeting the unique challenges of operating in this area would require innovation. However, as was so often the case with the RCN's efforts to maintain a presence in the North, operational pressures and a lack of resources stifled efforts to go beyond small-scale missions.

The RCN did what it could to maintain some semblance of a northern presence throughout the year. Nevertheless, while HMCS *Cedarwood*'s 1949 voyage north via the Bering Strait, as well as HMCS *Haida*'s participation in an American exercise in 1948, may have introduced other RCN members to the Arctic, they were small-scale commitments that did little to raise the RCN's profile in the region.[71] In fact, *Haida*'s role in Exercise *Normex*, (aimed at keeping an enemy force from converting a Labrador weather station into an airstrip) provided some sense of scale to the RCN's inability to defend the North on its own. Although it was better than not sending a ship at all, *Haida*'s presence was dwarfed by an American force that consisted of 33 ships and 3,500 marines.

Things only got worse for the RCN's Arctic presence in 1950.[72] With the dream of sending ships on annual northern deployments dead, further manning reductions and growing Atlantic and Pacific anti-submarine requirements meant that the RCN was not in a position to send any ships to *Noramex* II. As usual, the Navy tried to do what it could to participate. In this instance they began scavenging personnel and even commissioning ships early in the hopes that they could assign *Nootka* to the exercise. Operational factors linked to the outbreak of the Korean War not only scuttled these plans, but also forced the Naval Board to the rather firm and unfortunate conclusion that Arctic operations were simply "beyond the present and projected physical resources of the Navy."[73] As a result, the RCN's Arctic presence was put on the backburner until their icebreaker, HMCS *Labrador*, was ready in 1954.[74] It was a sad conclusion to four years of hard work trying to establish some type of naval and maritime air presence through co-operation with the RCAF in the Arctic. Still, despite this disappointment many lessons were learned by both the RCAF and RCN regarding Canada's naval and maritime air requirements in the North. These lessons were not only significant at the time but provide many useful insights for today's military and political decisions makers.

Old Problems, Same Lessons

Ice, extreme weather conditions, fuel constraints, a lack of infrastructure, up-to-date charts, and equipment challenges all conspired to make sailing a warship into Canada's Arctic a difficult task at best. Flying over Canada's northern waterways was no easy matter either. For both the RCAF and the RCN, therefore, these specific northern exercises provided many tactical and operational lessons that all identified that working in the Arctic was a truly unique experience requiring new ways of thinking, new procedures, and specialized kit. It was also something that needed resources and a certain level of commitment. While both the RCN and RCAF were keen to work in the Arctic, their efforts were continually frustrated by budget cuts, heavy operational requirements elsewhere, and perhaps most significantly a lack of political will. These were particularly important lessons for the RCAF, given that it would take well over ten years before the service had a fully resuscitated maritime air capability; or had at least built one that could properly respond to a wartime situation in which Soviet submarines or maritime forces likely would be operating in Canada's Arctic waters.

No state can be fully prepared for unexpected shifts in geopolitical sphere, but the extent to which the Canadian military was cut immediately after the Second World War stands as an illustration of the challenges of recovering from periods of austerity. Reconstructing lost capabilities is never an easy task and there is nothing worse than trying to do so in the middle of a war or a national emergency. This was exactly the challenge the RCAF faced in the late 1940s and they were fortunate to have a large number of stockpiled Lancasters to help them create a stop-gap maritime air patrol capability.

In fairness to the government of the time, there was no crystal ball in Ottawa to warn them about Soviet aggression or the coming Cold War. In their view, the German U-boat threat was defeated and, in a time when Canada was trying to return to a peace-time economy, there was no perceived need for the RCAF to maintain a large maritime air fleet. And that is the problem with sudden shifts in the strategic environment, preparing for them is extremely difficult since their implications are only understood in hindsight.[75] Few nations have the money or resources to respond to every possible military contingency and, as a result, politicians and senior military officers are often left with little choice but to take measured risks when designing their future force structures. Extensive strategic analysis, historical case studies, good intelligence and a thorough understanding of the security environment represents the best way to mitigate such gambles, particularly when it comes to the defence requirements of Canada's Arctic.

While the need to be prepared stands as an important lesson from this period, perhaps an even more significant observation is the fact that an effective naval and maritime air capability in the Canadian Arctic was (and is) completely reliant on continuous presence. The military needed to build institutional knowledge and, although HMCS *Labrador* eventually gave the RCN considerable experience in the Arctic, her transfer to the Department of Transport in the late 1950s led to another period during which the Navy was all but absent from this region.

This pattern of lengthy absence created a situation in which each generation of naval vessels entered the Canadian Arctic as if it were the Navy's first venture into the area. Nowhere was this more evident than in the words of one naval officer, who, in the early 2000s, observed that a lack of naval presence for over a decade in the Arctic meant that "corporate knowledge had faded and a trip north really was a trip into the unknown."[76] It is clear that Canada's renewed Arctic naval activity at the turn of the millennium was largely a process of relearning lessons from approximately sixty years earlier. For instance, a comment from operation *Narwhal 2004* described the voyage as "an eye-opening experience which clearly demonstrated how difficult it is to operate in the north"—an almost identical observation to those made in Dawson's 1949 report.[77]

A comparison of attitudes from this earlier period to those from the recent past point to the importance of maintaining a constant presence in Canada's Arctic.[78] Take, for example, an account from Captain (N) Paul Dempsey who, having commanded HMCS *Montreal* during a 2006 trip to Baffin Island, noted that his ship's "experience is a prime example of the operational and political usefulness of a Canadian warship as it conducts … Arctic sovereignty [patrols] … [and] at the same time, the ship's deployment illustrates some of the specific challenges of operating a Canadian warship in northern waters." While Dempsey's conclusion is absolutely correct, the truly remarkable thing is how closely it echoes Dawson's 1949 assessment, in which he noted that "apart from its importance as a means of testing the efficiency of equipment and the ability of personnel, [this northern deployment is] considered of importance to Canada as a whole, as a means of emphasizing the sovereignty of the country to a population."[79] That these conclusions are so similar is hardly surprising. Conditions in the Arctic are largely the same today as in the 1940s and the difficulties of operating there have remained fairly consistent. Likewise, Canada's need to be there has never really changed. The lessons from these early operations are surprisingly applicable to contemporary voyages and, as the Navy rebuilds its presence, knowledge of its early Arctic endeavours will only become increasingly important. The same is true of the Air Force which, despite multiple demands on its CP 140 Aurora fleet, still tries to protect Canadian Northern sovereignty in a potential new age of military austerity and disinterest in the Arctic

Notes

[1] This chapter is largely based on the following articles: Richard Mayne, "A Very Good Show: The RCAF and Northern Cruise 1948, Royal Canadian Air Force Journal," 3:2 (Spring, 2014): 7-17; Richard Mayne, "An Unusual Voyage in Canadian Waters: The RCN's First Post-War Forays into the Arctic, 1946-1950," *Canadian Military History* 22:4 (Autumn, 2013): 34- 44; and Richard Mayne, "An Art of its own: Corporate Knowledge, The Canadian Navy, and Arctic Operations," *Canadian Naval Review* 5:3 (Fall, 2009): 10-16.

[2] "Submarines - Enemy Activities - Activities in Arctic Ocean and Hudson Bay," LAC, RG 24, vol. 4027, file 1062-13-22. German submarines did, however, assist in establishing a weather station (Station Kurt) along the Labrador coast.
[3] Joint Statement issued in Ottawa and Washington, 12 February, 1947, DHH, 82/196, file 5, meeting 58; William Lyon Mackenzie King, *Diary*, 22 November 1946, www.bac-lac.gc.ca/eng/discover/politics-government/prime-ministers/william-lyon-mackenzie-king/pages/search.aspx; George Stanley, *Canada's Soldiers: The Military History of an Unmilitary People* (Toronto: Macmillan of Canada, 1974), 268.
[4] Cabinet conclusion, 15 November 1946, LAC, RG 2, vol. 2639, reel T-2364; King Diary, 13 November 13 1946.
[5] For excellent accounts of this period see: Jan Drent, "A Good Workable Little Fleet: Canadian Naval Policy, 1945-1950," *A Nation's Navy: In Quest of Canadian Naval Identity,* Michael Hadley et al. eds. (Kingston: McGill-Queen's University Press, 1996), 218-220; Elizabeth Elliot-Meisel, "Arctic Focus: The Royal Canadian Navy in Arctic Waters, 1946-1949," *The Northern Mariner* 9:2 (April, 1999), 23-39.
[6] Tony German, *The Sea is at our Gates* (Toronto: McClelland & Stewart, 1990), 250.
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Chapter Six

The *Labrador* and the DEW Line

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"INTENTIONS proceed Strait of Belle Isle."

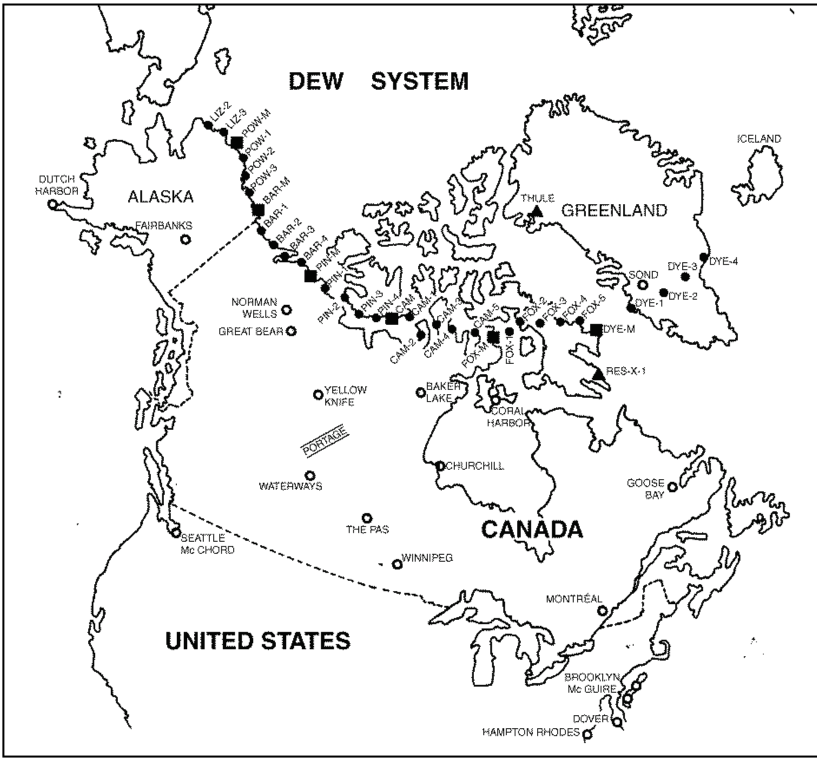
Thus did HMCS *Labrador* inform Naval Headquarters on 10 November of her departure from the Arctic waters in which she had spent the past five months and where she had taken part in one of the greatest seaborne operations ever attempted in the Far North.

The *Labrador* made history in 1954 by becoming the first naval ship to negotiate the Northwest Passage and to circumnavigate North America. This year she has added another thick chapter to her record of achievements.

Her principal and most testing assignment was to serve, from mid-June until the end of September, as senior ship of a task group of some fourteen ships charged with the delivery of thousands of tons of supplies for Distant Early Warning (DEW) Line sites in the Foxe Basin area of the Eastern Arctic.

The project involved not only the delivery of personnel, equipment and supplies, but numerous other associated tasks requiring a high degree of operational efficiency and an equivalent amount of effort. These included the survey of previously uncharted waters, selection and survey of landing sites, installation of navigational control stations and, most important, the safe passage, through hazardous, ice-infested seas, of the ships comprising the Task Group.

All objectives were successfully attained and the part played by the *Labrador* was recognized in the form of messages of commendation and congratulations to the commanding officer, Captain O.C.S. Robertson, of Montreal, and his ship's company. Among those addressing messages to the ship were the Naval Board of Canada; Admiral Arleigh Burke, Chief of



Naval Operations, US Navy; Vice-Admiral F.C. Denebrink, commander of the US Navy's Military Sea Transport Services, and V. B. Bagnall, project manager, Western Electric Company, prime contractor for the DEW Line.

But despite the high praise heaped upon them and the knowledge that they helped to make naval history, it is probable that the *Labrador* ship's company will be just as glad if they never see, at least for a while, another walrus, or polar bear, or even an ice cube.

To them the job was anything but glamorous. For the most part it entailed long hours and hard, tedious work. When to that were added bad weather, the strain of operating in unknown water and the responsibility for the safety of a dozen or more other ships, it became something less than a pleasure cruise.

Worst of all, perhaps, was the monotony—of work, of scenery and of dwelling with 260 other persons in a steel-enclosed space 269 feet long, 63 feet wide and 40 feet in depth. Many of the *Labrador's* ship's company did not set foot on shore from the time she left Halifax until she returned.

The *Labrador's* 1955 operations properly began on 1 June, when, at 3 pm, Atlantic Daylight Time, she set sail from Halifax. She carried 25 officers, 13 scientists and 222 men, a six-month supply of provisions, three helicopters and a bewildering amount of special equipment and gear.

As soon as the ship was clear of the harbour, the captain spoke to the ship's company, outlining her role in the DEW Line project and the scientific work in which she would be engaged. No sooner had he finished than the scientific staff began oceanographic and hydrographic studies that were to continue almost without let-up throughout the ensuing months.

Instituted, too, was a training program involving all hands, and particularly those who would, or might, have special duties to perform in the Arctic. These included hydrographic, shore station, beacon erection, tide gauge and search and rescue parties.

By 9 June the *Labrador* was in the Strait of Belle Isle, which body of water fully lived up to its reputation. Visibility dropped to a few hundred yards and the radar screen looked as though it had chickenpox, with as many as 50 icebergs showing up at one time. This situation continued until 11 June, when loose pack ice was met.

Proceeding northward through Davis Strait, the ship took numerous oceanographic stations, encountered the "white fleet" of fishing vessels and sighted its first seals of the 1955 trip.

On 15 June the *Labrador* entered Hudson Strait. Heavy ice stretched to the westward, as far as the eye could see, and icebreaking began in earnest. The helicopters took off for a reconnaissance and eventually located a stretch of open water on the north side of the strait. To the tune of some monumental crashes and the disturbance of several polar bears, the ship worked her way in that direction.

Cape Dorset, Baffin Island, was reached on 21 June, and that morning, while the ship lay about ten miles off shore, Captain Robertson was flown by helicopter to the Hudson's Bay Company post. With him he took a box of fresh provisions-potatoes, eggs, lemons, and grapefruit. On a second trip, the helicopter took ashore the medical officer, Surgeon Lieutenant Commander D.J. Kidd, of Halifax, to treat Mrs. J.W. Connington, of Ville la Salle, Quebec, wife of the settlement's male nurse.

That afternoon the geodesist, W.D. Forrester, of Ottawa and Oshawa, Ont., was flown to Salisbury Island to obtain an astronomic "fix". He was recovered the next morning and the *Labrador* proceeded to "fix" several rocks off the eastern end of the island. Here, as elsewhere during the voyage, all positions in which the ship anchored, or reefs and rocks discovered, were given names, the names to be submitted in due course for the approval of the Geographical Names Board.

On the 23rd, a helicopter visit was made to Ivugivik, on the northwest tip of Quebec, near Cape Wolstenholme. Medical treatment was given three Eskimos and here, as at Cape Dorset, fruit and canteen stores were left as gifts from the *Labrador.*

Progress from here on was slow, the ice being under considerable pressure. However, with the aid of helicopter reconnaissance, the thrust of six engines and favourable tidal streams, Coral Harbour, on Southampton Island, was reached on 28 June. An unbroken sheet of ice covered the inner and outer harbours, so the *Labrador* went to work. Carving out the ice in large arcs, the ship slowly ate her way into the anchorage.

Twenty-four hours later the harbour was sufficiently clear to permit landing craft and boats to proceed with parties to survey and clear the beach

and anchorage and set up navigational beacons. While this was going on, the ship assisted the last of the ice out of the harbour.

Leaving Coral Harbour on 3 July, the *Labrador* literally punched her way into Foxe Channel and by the 7th was in the vicinity of Cape Fisher, on the east coast of Southampton Island.

Here the helicopters particularly distinguished themselves. Cape Fisher had been selected as the site of a navigational control (EPI) station, to be installed and manned by personnel from the *Labrador.* Ice conditions precluded the use of boats and so the entire lift of personnel and equipment to shore was carried out by helicopter.

The first aircraft took off at 8.30 am on 8 July and was followed by the others in quick succession. From then on there was a constant stream of helicopters landing on, loading and taking off. Construction party and handlers went in first, then tents, Atwell shelter, tide gauge, lumper, generators, fuel, mast, EPI equipment and food.

Throughout the operation the *Labrador* "lay to" between three and four miles offshore in fairly heavy ice. The job was completed and the station operating at 5 pm on the 9th. It had taken 19.9 flying hours, involving a total lift of 28,640 pounds, and 290.5 man-hours on the beach.

These figures were compared with those reported by a US Coast Guard cutter which landed an EPI station on Banks Island by boat in 1954. That operation took 444 man-hours and 36 hours working around the clock. The *Labrador* took 21.5 hours working in two shifts.

Following the airlift operation, one of the helicopters required a minor inspection. The maintenance crew went to work at 8.30 am on Sunday, the 10th, and finished up at eleven o'clock that night.

On 12 July installation was begun of a second EPI station, at Cape Enauolik, Baffin Island, on the opposite side of Foxe Channel. This was a much more difficult task than the first, due to strong tidal currents and to shallow water that compelled the ship to remain at least eight miles from the beach.

Nevertheless, the operation was completely successful. The helicopters went to work at 1:30 pm on the 12th. Personnel were landed first, and after them came accommodation, equipment, fuel and food. The airlift was completed at 12:30 noon on the 14th and the station was operational at

5:00 pm. These navigational stations had a key role to play during the coming months. Up until the time the *Labrador* entered Foxe Basin, there were only two lines of soundings, indicating the depth of water, on the chart of an area extending 350 miles from north to south. A few coastal soundings were also on the chart but these were of little use to a ship the size of the *Labrador,* drawing 30 feet of water.

At both Fisher and Enauolik, the geodesist, Mr. Forrester, obtained astro-positions and once the stations were in service the *Labrador* was able, by taking bearings of the stations, to fix her position exactly.

Cape Enauolik operated continuously from 14 July until the evacuation of personnel by the USS *Atka* (of Antarctic fame) in September. Cape Fisher ran a close second. Bruce Grenfell of the US Naval Electronic Laboratory, San Diego, was in charge at Enauolik and Charles Richardson, also of the NEL, and Ldg. Sea. John A. Kirkland of Blenheim, Ont., and Dartmouth, N.S., divided the duties at Fisher. The stations were manned by eight naval personnel.

For two months these men kept their beacons working without fail, while living in isolated and uncomfortable circumstances aggravated by an absence of mail and little or no information on what was happening on the "outside" – "outside" in this case being the *Labrador*; "Southern" Canada was too remote to consider.

From Enauolik the ship sailed back to the Cape Fisher area, a signal having been received that a gale had blown down the tents and aerial at the newly-established station.

The storm damage was made good, the tents flown aboard, strengthened and repaired, and the *Labrador* turned her bow northward.

The next task was to commence surveying a possible route for the supply convoy, which would be arriving in about a month's time. This proved to be frustrating in the extreme as the southern portion of Foxe Basin was packed with ice under considerable pressure. Progress was slow and on one occasion high explosives were used to blast a way through the ice.

At this juncture the question being asked by all on board was how the convoy of unprotected merchant ships was ever going to get through.

Eventually the *Labrador* reached what was to be one of the main unloading sites for the DEW Line project in the eastern Arctic. In conjunction with the Foundation Company of Canada's engineers, who were already at the site, a survey of the proposed anchorage area was begun and a beach, suitable for receiving landing craft, was located and surveyed.

The *Labrador's* frogmen, or "madmen," as they became known, went to work in earnest, making a careful underwater examination of the beach approaches for rocks, reefs and other obstructions that might endanger landing craft.

Survey work was hampered by ice, snow and rain and it took more than a week to complete the job and prepare and produce charts of the area.

What may have been the most northerly softball game ever played took place during this period, when a recreation party was landed and defeated a Foundation Company team, 24 to 23. Local rules had to be invoked as the diamond included two ponds and a lake that encroached on left field.

At the end of the month the *Labrador* sailed to re-supply the EPI stations and rendezvous with the ships of the Task Group.

En route, she continued with her survey of the basin. This time she was hampered not only by ice but by walrus families which, when disturbed, insisted on swimming into the path of the ship. There was no alternative but either to alter course or stop the engines. During one four-hour watch, 52 walruses, in pairs or small groups, were counted on the ship's course.

After the EPI stations had been resupplied, in both cases by helicopter, the *Labrador* set course for Coral Harbour, running sounding lines and taking oceanographic stations on passage.

At Coral were met the first ships of the Task Group. Conferences were held, stores were transferred and two days later the *Labrador* and the survey ship, USS *Pursuit,* set sail for Chesterfield Inlet, at the northwest corner of Hudson Bay.

They had a rough trip and had to spend the better part of one day hove to in a 45 knot gale that blew up a steep, rough sea in the shallow waters of the bay. Commented the captain in his report of proceedings, "We rolled and pitched."

Off Chesterfield, the *Labrador* launched her motor sound boat, "Pogo" which proceeded, along with beach and hydrographic parties, to assist the *Pursuit* in surveying the beach and approaches. Pogo, a self-contained launch, carrying a crew of six, fitted with gyro compass, radar and echo sounder, and with a range of 250 miles at seven knots, operated on her own for two days before being recovered by the ship.

The matter of main concern throughout all this period was the forthcoming "big push." At the end of July, prospects had looked anything but good, with the ice in Foxe Basin forming a barrier penetrable only by icebreakers. In August, however, the outlook became much brighter. The ice began to break up and a strong northwest wind that blew steadily for a week helped to clear the convoy's proposed route.

Shortly after the *Labrador's* return to Coral Harbour, the decision was made to sail. The situation was still far from perfect, but with time running short and little hope of ice conditions improving, there was not much choice if the mission was to be accomplished.

All ships were supplied with charts and their captains thoroughly briefed, and on a gray August morning the convoy formed up in two columns, with the *Labrador* at the head of one and the US Coast Guard icebreaker *Edisto* leading the other. It was the beginning of what was to be, for the *Labrador,* a "nightmare week."

Shortly before midnight the convoy halted, due to darkness and heavy ice. At six o'clock the next morning they got under way again, with the icebreakers cutting the merchant ships out of the ice that had surrounded them overnight. Some idea of what the next few days were like may be obtained from Captain Robertson's report:

> Icebreakers got under way at 0600 with column moving by 0700. Ships repeatedly got stuck and had to be cut out. Stopped to examine sick man in Craig (freighter). Stopped for the night at 2200; after which rounded up stragglers. Made good 8.9 miles.
>
> Under way in fog at 0515. Stragglers were rounded up and the ships got under way in small groups and remained under way during night to maintain position against currents of approximately 4 knots. Made good 8.1 miles.

Some of the ships sustained superficial ice damage but this did not stop the convoy from getting through. Nor did it interfere with the unloading, which began as soon as the ships arrived.

A landing ramp had been prepared by the Foundation Company and landing craft soon were shuttling to and from the anchorage on a round-the-clock basis.

For the first time in more than two months, the *Labrador* had the opportunity to anchor and enjoy a moment of relative relaxation. It came at a particularly welcome time, for the preceding week had been one of considerable strain, and one in which sleep had become a progressively rare and precious thing.

During the stay at the unloading site, the underwater demolitions team was again employed at locating and blowing up troublesome boulders encountered by the landing craft skippers. This type of work became second nature to the "madmen," who were "hired out" to other sites as the operation progressed.

Toward the end of the month the *Labrador* located and surveyed a landing beach at another selected site, then returned to the anchorage to meet Vice Admiral Denebrink, Commander MSTS Arctic Operations 1955; Rear-Admiral R. Mason, USN, Commander Task Force Six and Commander MSTS Atlantic Area; Brigadier General F.T. Voorhees, US Army, Commanding General 7278 Transportation Terminal Command, and Mr. Lohman, vice-president, Western Electric Company.

Activity was at its height as August drew to a close. Unloading was well underway at one site and had started at another. Ten more ships had arrived in the area, and some of the original group, having discharged their cargoes, had left for the "outside."

Further surveys of routes, anchorages and beaches occupied the *Labrador* during the first part of September. On the 16th a distress call was received from the motor vessel *Calanus,* which was operating in northern Foxe Basin under the auspices of the Department of Fisheries. It transpired that the vessel had run out of fuel, a situation which the *Labrador* quickly remedied.

The balance of the month consisted of rounds of the various unloading sites, still more survey and hydrographic work and a variety of other duties, scheduled and unscheduled. The underwater diving team returned to the ship after having been "loaned out" to do demolitions work at various beach sites. Back on board, also, came the EPI station parties from Capes Fisher and Enauolik. They had been picked up by the USS *Atka* and were transferred from her to the *Labrador.*

September ended with the *Labrador* pitching and rolling in a gale and slowly heading northward to continue with hydrographic work in preparation for next year's operations. This time she was by herself. The 1955 sea-lift, involving the delivery of some 30,000 tons of cargo to several different sites, had been completed and all other ships had departed from the area.

On board the *Labrador* it was possible at last to return to "normal routine" after more than two months of working long hours under continuously high pressure. There was still the strain imposed by operating in uncharted waters, in steadily worsening weather conditions, but at least the ship no longer needed to be concerned about the safety of a dozen or more other vessels.

It would be invidious to single out one department as having had particularly heavy duties to perform. Two typical examples were the communications and medical staffs, both of whom found themselves carrying workloads far in excess of those normally expected of them.

As senior ship of a task group, the *Labrador* was the originator and recipient of a volume of traffic sufficient in itself to keep the communications staff more than fully occupied. In addition to this, however, the *Labrador* undertook to dispatch ship-to-shore messages for the

remainder of the task group when it was found the other ships had difficulty in getting their messages passed.

A tally on 30 September showed that since 1 June the *Labrador's* radio office had handled 4,420 ship-to-shore messages, 2,305 ship-to-ship within the Task Group, 115 to the Foundation Company ashore and 5,356 inbound messages.

The medical staff, consisting of the one medical officer and one medical assistant, likewise fell heir to added responsibilities that embraced the remainder of the Task Group and also included aerial visits to shore settlements to treat Eskimo and white patients.

In August alone the medical department dealt with 513 patients.

Whatever his department and whatever his job, every man in the *Labrador* "pulled his weight." The end result was that an operation in which the chances of disaster were always near at hand was carried out with complete success.

But it was not only to the DEW Line project that the *Labrador* made what Admiral Denebrink described as "a substantial contribution." In consequence of the extensive surveys and studies made by the ship, much has been added to the knowledge of the Canadian Arctic area in which she operated.

During the last week of October, while the *Labrador* was completing her 1955 survey work in Foxe Basin, Captain Robertson became ill. The medical officer decided that it would be best if he were hospitalized and arrangements were made for his evacuation. The ship proceeded to Coral Harbour and from there the captain was flown by RCAF aircraft to Montreal, where he was admitted to Queen Mary Veterans' Hospital. A successful operation was performed on 7 November, after which Captain Robertson was reported to be making a good recovery.

Commander J.M. Leeming, the executive officer, took over command and from Coral Harbour the ship proceeded to the western entrance to Hudson Strait for hydrographic and oceanographic surveys. As the Arctic winter began to close in, she worked her way eastward, until Hudson Strait was left astern and the coast of Labrador opened up on the starboard hand.

It was then that the *Labrador* sent the message reporting her intentions. In the same signal was a weather report which indicated the elements with which she had fought almost incessantly for five months had fired a full-fledged farewell salute to the ship. Said the report:

"Snow – wind 55 knots – whole gale – temperature 32."

It was a rugged finish to a rugged job.

Chapter Seven

Canada's Northern Deployments, 1970-89: Symbolism and Substance

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In 1969 the SS *Manhattan*, an American supertanker, transited the Northwest Passage to test the route's potential for shipping Alaskan oil to the eastern seaboard of the United States. The test was a functional exercise, totally unrelated to the question of Canadian sovereignty; in fact it was looked upon favourably by the Canadian government, which saw resource shipping as the first step in northern development.[1] Public perception of the transit was not so benign, however, and what had begun as practical experiment soon transformed into a public relations nightmare for the Liberal government of Prime Minister Pierre Trudeau. Opposition parties, the media, and academics warned of the consequences of an American vessel transiting Canadian waters without having requested permission to do so. Furthermore, the notion that the *Manhattan* and other supertankers might soon transport oil through delicate northern ecosystems raised the spectre of massive environmental degradation should there ever be an accident. As such, the voyage soon came to represent a serious threat to both Canadian sovereignty and to the Canadian environment.[2]

The public's reaction to the voyage of the *Manhattan* forced a fundamental rethink of Canada's approach to the Arctic. Opposition groups, academics, the media, and even the government's own Standing Committee on Indian and Northern Affairs called for a clear-cut declaration of sovereignty over the waters of the Arctic Archipelago.[3] While an outright declaration offered a simple solution, the government felt it needed to avoid an American legal challenge or possible economic sanctions, leading Cabinet to rule out this course in the spring of 1969.[4] Instead of explicitly making an internal waters claim at this point, the federal government advanced pollution control legislation that went beyond international legal norms and adopted a more aggressive stance on Arctic defence to demonstrate its resolve to protect Canada's Arctic interests.

Coupled with this legislative approach was a drive by the government to strengthen the country's physical presence and level of control over the Arctic, and over the maritime areas in particular. Being seen exercising sovereignty was a political imperative for which the government turned to the Canadian Armed Forces (CAF), and the Royal Canadian Navy (RCN) in particular.[5] From this political requirement, Canada's northern deployments (or NORPLOYs) were born. Over the course of two decades they remained a central element in the CAF's northern presence while evolving in both purpose and makeup. From early expressions of sovereignty, these deployments gradually became practical operations with real defence objectives. While the idea of presence as an end in and of itself retained political utility and was was never entirely dismissed, it was rarely as dominant an objective as is commonly assumed. The reality behind the NORPLOYs is not entirely in keeping with the traditional view of the sovereignty focused, flag-waving operation. Behind that façade lay a different, and less well understood, approach to Arctic sovereignty and security.

Presence and Sovereignty

In the wake of the *Manhattan*, the Canadian public demanded action and deploying the navy to the Arctic seemed an obvious move. Sovereignty is often tied to the maxim that possession is 9/10$^{\text{ths}}$ of the law and the Trudeau government was anxious to be seen exercising that sovereignty. This theory was questionable from a legal perspective and there was clearly no conventional military threat to the region.[6] Still, the federal government was less interested in such technical matters than they were in the battle for public perception. The image of Canadian warships cruising 'disputed' waters provided Ottawa with a valuable shield with which to defend itself against accusations of inaction or timidity. With this in mind, officials at External Affairs, Indian and Northern Affairs, and Fisheries recommended that such public pressure could be mitigated by sovereignty displays, like northern deployments.[7]

These political requirements were strong enough to force a fundamental revision of Canadian defence policy in 1970. Long focused on fighting the Soviet Union in Germany and the North Atlantic, the Canadian military was refocused inwards to emphasise national security and the protection of Canadian sovereignty—a pivot made clear by the Department of National Defence's new White Paper, *Defence in the 70s*.[8] This document marked a new focus on the North and effectively downgraded the threat of a military confrontation, while emphasising the 'threat' to Canadian independence and sovereignty from environmental degradation and foreign economic and maritime activity.[9] The result was a rapid and substantial increase in the CAF's northern deployments. The navy contributed to these through a series of NORPLOYs, sending warships and supply vessels into Hudson Bay and the Eastern Arctic roughly every other year.

While historians have held often up the Trudeau government's political response to the *Manhattan* voyage as far-sighted and innovative, the CAF's increased operational tempo has been nearly universally panned as an ineffective waste of resources, driven by political optics rather than a substantive understanding of sovereignty or security imperatives. To many observers, this application of military force—to what was essentially a political problem—was a wholly inappropriate response. External Affairs lawyer E.B. Wang arrived at this conclusion in 1971[10] and Leonard Legault, then Director-General of the Legal Bureau of External Affairs, wrote to the division's director, Alan Beesley, to mock the concept of military presence and situational awareness as a form of sovereignty. Legault observed that surveillance seemed to have been transformed into some sort of "mystic rite rather than a functional requirement to meet well defined needs."[11] Sovereignty had been separated from security in Canada's new policy approach and segregated into separate, even mutually exclusive, objectives.[12] Like Wang and Legault, many External Affairs officials felt that current functional needs, rather than demonstrations of sovereignty, should remain the touchstone of any rational policy.[13]

This linkage frustrated many military officials as well. Men who saw their task as preparing to defend Canada and her allies from the Soviet Union often perceived Arctic surveillance and patrol as a tertiary and wasteful activity. Admiral Robert Falls, Vice Chief of the Defence Staff from 1974-1977, and Chief of the Defence Staff from 1977-1980, wrote of his experience with northern deployments: "we conducted superficial acts. We flew aircraft in the north on monthly patrols … they never made contact … we flew in complete darkness, figuratively and literally, most of the time. We sent ships into the north and damaged their hulls, they weren't made for that type of action. It was a complete waste of time, but it satisfied the politicians."[14] It was unclear to many in the Department of National Defence (DND) if the government's new emphasis on Arctic sovereignty was actually intended to achieve a specific military objective or if it was purely political symbolism.[15]

Historians and security experts have largely supported this assessment in the years since the *Manhattan* voyage. In their study of Trudeau's foreign and defence policies, historians Jack Granatstein and Robert Bothwell conclude that "that the emphasis on sovereignty in the north … was a political and a military sham."[16] Kenneth C. Eyre has observed that these operations were little more than symbolic,[17] and the authors of *Arctic Front* referred to them as "transient and limited," likening the CAF's presence to that of the lonely Mounties sent into the Arctic as a token flag-planting gesture in the 1920s.[18] Most historians seem to concur that the NORPLOYs contributed little to Arctic sovereignty or security, while draining the defence budget and deflecting resources from practical defence requirements.[19] In making this point, several follow defence analyst Douglas Bland in citing Admiral Falls' criticism, holding this assessment up as a clear indication of the CAF's motivation and contribution to the North during this time.[20]

Many of the CAF deployments of this era were politically motivated and lawyers like Wang and Legault were correct in their early assessments: a larger military presence does not equate to "more" sovereignty, and the underlying legal and political dispute surrounding the Northwest Passage was not going to be solved by anything that the CAF did. In spite of this harsh assessment, the NORPLOYs were not entirely pointless political ventures. What is commonly overlooked is that most of these missions also had important operational objectives, stemming from legitimate security requirements. This operational utility was merely obscured by the level of secrecy imposed on certain elements of the NORPLOYs, and by the fact that they took place under the shadow of sovereignty politics throughout the 1970s and 1980s. Simply put, historians have placed too much emphasis on those elements that Admiral Falls called "superficial acts" and not enough on the practical contributions that these 20 years of naval activity made to Canadian security.

The Early NORPLOYs

From 1970 to 1989 the Navy undertook a total of ten NORPLOYs, as well as three separate surveillance and resupply operations into the Canadian Arctic.[21] These deployments occurred on a roughly semi-annual basis and ranged in size from a single supply ship to a small squadron of destroyers and replenishment vessels (AORs). The mission objectives varied from year to year, but were generally listed in planning documents as demonstrating military presence in support of sovereignty, performing resupply or scientific duties in the region, and gaining experience in Arctic operations.[22]

In the early 1970s, tensions were high in the wake of the *Manhattan* and in the face of ongoing Canadian-American negotiations over sovereignty and jurisdictional rights in the region.[23] During this period, these naval operations were highly political and geared more towards demonstrating a Canadian presence in the Arctic waters than achieving any practical security objective. On several occasions more ships were deployed than was necessary, and more time was spent on ceremonies and port visits than in training or defence research activities, all with an eye towards creating positive political optics.

In 1970, the navy deployed a task force into the northern waters consisting of HMCS *Protecteur*, *Skeena*, *Annapolis*, and *Okanagan*. These ships carried out port visits in the Hudson Bay and Strait area as far south as Churchill. The stated objective of the operation, according to Rear-Admiral H.A. Porter (Commander Maritime Command) was to allow sailors and airmen to gain experience in northern operations and provide a "tangible presence" in the Canadian North.[24] The ships were also joined by the submarine HMCS *Ojibwa* and the destroyers HMCS *Fraser* and *Terra*

Nova for anti-submarine warfare exercises in the Davis Strait and Goose Bay.

This deployment marked the first time that Canadian ships had ventured into Arctic waters since 1962. From a practical standpoint it accomplished nothing of any real significance. It had no impact on the stated American rejection of Canadian sovereignty, nor did it accomplish anything of any military significance—apart from routine training. Still, that was beside the point. With the government under pressure from all sides to assert Canadian sovereignty more forcefully, these ships provided it with something concrete to point to in demonstrating its commitment for domestic audiences.

The navy deployed ships along a similar track in 1971. That summer, HMCS *Preserver* and *Assiniboine* moved into Hudson Bay while HMCS *Margaree* made it as far as Hudson Strait. Like the previous year's depolyment, this mission was primary intended to support the government's stated aim of bolstering Canadian sovereignty through presence and surveillance.[25] Apart from delivering supplies to the local Canadian Ranger detachment, the ships achieved little of operational

importance to justify the cost and danger of sending naval vessels into the poorly charted and ice-infested waters.[26]

The navy learned a great deal about northern conditions from these early exercises, from the difficulties of maintaining communications in the North to the problems of complying with Canada's new pollution prevention regulations when disposing of waste.[27] Still, these ships were were thin-skinned and ill-suited to Arctic conditions and unlikely to accomplish much in the Arctic waters. After its 1973 deployment, the Commander of HMCS *Protecteur* told the *Globe and Mail*: "we move about in ice like a porcupine makes love, very carefully."[28] The destroyers and frigates were also hindered by their limited range and sustainment capabilities, requiring the assistance of the AOR HMCS *Protecteur* to maintain them so far from naval infrastructure and supply lines. The cost and effort invested was also out of proportion to their limited contributions, either in buttressing Canadian sovereignty or developing any new northern capabilities. These were show operations, conceived of and executed to achieve political ends, without any clear idea of what they might accomplish from an operational perspective, but this state of affairs was relatively short lived.

From Presence to Productive

While these early NORPLOYs fit well into the picture of waste and misguided political interference painted by men like Wang and Falls, what is often missed by historians is the real shift in the purpose and objectives which took place in the early 1970s. This shift moved the NORPLOYs away from politics, presence, and optics as the *principal* rationale for these missions and towards real operational requirements. While much of the documentation on these voyages remains classified, this evolution appears to have begun between 1972 and 1973 and continued until the end of the Cold War.

At the heart of these new operational objectives and requirements lay the construction and maintenance of the Defence Research Establishment's (DRE) experimental underwater sound surveillance (SOSUS) system.[29] This system was first conceived of during the mid-1950s and designed as a means of detecting and tracking Soviet submarines using the Northwest

Passage as either a firing position for submarine-launched ballistic missiles (SLBM) or as a transit route into NATO's Atlantic sea lanes of communication.[30]

The first prototype listening devices were deployed by the Defence Research Establishment – Pacific (DREP) in 1969. This test 'barrier' of sono-buoys (donated by the United States) was laid in Viscount Melville Sound and M'Clure Strait to determine how effective buoys would be in the icepack and whether or not they might be useful as an interim detection system.[31] In April 1970, the DREP deployed a similar barrier in the same area to measure ice drift and under-ice ambient noise. These buoys were deployed in the Beaufort Sea area by American forces, by Canadian aircraft in the Western Arctic, and by Canadian Coast Guard icebreakers east of Ellesmere Island. Results were disappointing as the harsh ice conditions destroyed 80% of the devices within five months.[32] Undeterred, DND included the development of such a system in its 1971 Defence White Paper.[33]

The Department of National Defence was motivated by the increasing Soviet presence and naval capabilities in the Arctic. In 1972, Soviet submarines could attack North American targets from the Arctic with the new SS-N-8 submarine launched ballistic missile.[34] By 1975 the development of the SS-N-8 model two, with a range of 9,100 km, meant the new Delta-class submarines could strike the entire United States from as far away as the North Pole. These new missiles also made the Arctic an ideal launch position and, in some cases, the only one from which Soviet submarines could attack both European and North American targets.[35] There is also evidence that the Soviet Navy was beginning to use the Arctic as a transit route, permitting Soviet SSNs and SSBNs to avoid the heavily monitored and defended GIUK (Greenland-Iceland-United Kingdom) gap en route to patrol stations in the Atlantic. In the mid-1970s this shift was confirmed by NATO listening posts in the gap as detections dropped sharply.[36] Detecting trespassing Russian submarines had become an important security issue and the NORPLOYs were quickly latched onto as a means of assisting the DRE in its program while continuing to provide the government with the presence still perceived in some circles as essential to demonstrating and reinforcing Canadian sovereignty.

In August 1972, the RCN undertook its third NORPLOY. Participating units included HMCS *Protecteur*, *Fraser*, *Yukon*, *St Laurent,* and *Onondaga*, as well as Argus aircraft from VP 404[37] and Tracker aircraft from VS 880.[38] The deployment included environmental training and tactical exercises enroute to, and through, Arctic waters, various scientific and biological experiments, the "establishment of a significant Canadian Forces presence in the North", and visits to Arctic settlements. NORPLOY 72 was still clearly focused on projecting the image of Canadian control and sovereignty (a fact made clear by the inclusion of three destroyers and a submarine in the operation), however it also represented a shift towards other, more practical applications. Of particular interest was the support for the DRE's SOSUS program. During the deployment, HMCS *Protecteur* undertook acoustic research, measuring under-ice and iceberg noises. Defence scientists aboard the AOR used air and surface platforms and bottom-mounted recording packages left for periods up to one year in channels of interest.[39]

By 1973 the political imperatives of sovereignty and presence had begun to fade and that year's NORPLOY was reduced from the previous year's five vessels to a single ship—HMCS *Protecteur*. *Protecteur* possessed the range needed for Arctic operations as well as the size and equipment (such as cranes) to serve as a research and general use vessel. With the warships stripped from the operation, *Protecteur* travelled into more dangerous waters—from Grise Fjord on Ellesmere Island to Resolute Bay in Barrow Strait. While port visits were still a priority (six were made) there was a new emphasis on support for the DRE's program of work. Available documentation on this expedition shows that the DREP had begun experimenting with a larger vertical line array (a sting of sensors placed on the seafloor), which it deployed in Barrow Strait that year. Work on sonar buoys was also continued in Baffin Bay, testing acoustic properties and sound transmission.[40] Some of this work may have been undertaken using other platforms, however the laying of a vertical line array requires a large ship and it was most likely accomplished by the *Protecteur* during its time in Barrow Strait.

After four years of northern deployments, it is clear that the navy was interested in making better use of its time in the Arctic. In a 1974 post-deployment report, M.H.D. Taylor, Commanding Officer of the Fifth Destroyer Squadron, saw the need to go beyond the community visits and flag waving, writing: "the quick visits with no stated aim other than being visits, while satisfying settlement visit requirements is not fully productive."[41] Brigadier General R. St. John of Maritime Command likewise saw the inefficiencies and risks of using combat ships in conditions they were not designed for and recommended that the navy stop deploying destroyers into the High Arctic.[42] This need for productive work over show meshed very well with the RCN's emerging focus and the DREP's requirement for large platforms to deploy buoys and lay arrays. As such, the NORPLOYs were adopted as a "vehicle of convenience"[43] by the Research Board and, from that point onwards, the construction and maintenance of these systems became one of the principal (if not *the* principal) objective of the NORPLOYs.

This shift is evident not only in the tasks undertaken during the NORPLOYs but in the composition of the fleets sent north. From 1970 to 1972 the ratio of warships to supply or science vessels was 4:1; from 1973 to 1990 it was 0.2:1.[44] This means that the AORs HMCS *Preserver* or *Protecteur* were undertaking the majority of these missions. These ships may not have conveyed the same image of power projection as their destroyer counterparts but they were far more useful. They carried more supplies and fuel and were able to travel farther, sustain themselves longer, while providing more versatile platforms for the kind of work that the DREP was undertaking.

The SOSUS System

By the mid-1970s the DREP's push to establish a prototype SOSUS system was gaining momentum. The experiments undertaken over the previous few years had resulted in much useful data and, in 1974 and 1975, Canadian AORs traveled to Barrow Strait and Jones Sound to begin laying these SOSUS nets. During NORPLOY '74, HMCS *Protecteur* assisted the DREP with its work in Barrow and Wellington Channel, installing a hydrophone array at Gascoyne Inlet. NORPLOY 75 was divided into two "phases", in a sense the old and the new. The first was the classical "presence" mission in Davis Strait and Hudson Bay and Strait which ran from 6-23 August. The *Protecteur* delivered ammunition to 15 settlements, fuel to three, and a research team from Acadia University to Arctic Bay for biological research. A visit to Churchill was considered but decided against in order to save time for the "critical" second phase. From 23 August to 19 September, *Protecteur* laid 30 miles of cable through the Barrow Strait and Wellington Channel, connecting shore stations to bottom mounted acoustic listening devices.[45] The cables laid by the DREP from Coast Guard icebreakers in previous years were inspected, four of which were found damaged and repaired.[46] New carbon-zinc batteries were then installed to power the shore instillations using the ship's Sea King helicopters to ferry the heavy packs. This operation also saw the first Arctic tests of the SDL-1 mini-submersible, which spent almost eighteen hours mapping the seafloor.[47]

Emphasis was clearly placed on the DREP work over the "presence" phase of the NORPLOY. Enhancing and repairing the fledgling SOSUS system was described as the mission's "primary objective" by the *Protecteur's* Commanding Officer, J. Kennedy. Concerns about media attention also appear to have declined. There was much less attention paid to disseminating information about the mission and, when the idea of funding a journalist to accompany the ship was put forward, Vice Admiral D.S. Boyle (Commander Maritime Command) wrote: "we certainly won't!"[48] Despite (or perhaps because of) the importance of the DREP's activities, they were classified and not included in NORPLOY 75's operational order.[49] Media attention was subsequently minimal. The *Globe and Mail's* coverage of the event, for instance, was limited to a single 38-word piece stating the date of the *Protecteur's* departure.[50]

In 1977, HMCS *Preserver*, *Ottawa*, and *Assiniboine* returned north. The one-year hiatus was due in part to the batteries in the SOSUS shore instillations having two-year lifespans.[51] This NORPLOY was undertaken in Barrow Strait and Jones Sound, two of the (potentially) important submarine transit routes through the Arctic Archipelago. Priorities for this mission were not sovereignty and presence: they were replacing fuel cells, cables, and hydrophones. At Gascoyne Inlet (in Barrow Strait) the vertical line arrays installed in 1973 and 1975 were inspected and/or recovered. In Jones Sound, the ship recovered and repaired more hydrophones. A seabed survey was then undertaken in Fram Sound and South Cape using Sea Kings and the SDL-1 submersible.[52]

The next operation took place in 1979, when HMCS *Preserver* returned to Barrow Strait and Jones Sound carrying two mini-submarines and Sea King helicopters. The program of work was similar to what it had been two years before. In Jones Sound, the focus was on Gascoyne Inlet, on the southwest coast of Devon Island, where cables from several offshore underwater systems brought electrical signals ashore for initial processing prior to onwards transmission to Resolute Bay via radio links.[53] The existing acoustic systems had to be updated and their power supplies replaced. A thorough bathymetric survey was also required in order to install a new hydrophone.[54] Batteries were again replaced and the system serviced in Barrow Strait.[55]

Work during NORPLOY 79 was interrupted by deteriorating ice conditions and engineering problems and *Preserver* was forced to return home early—while the diving support vessel HMCS *Cormorant's* presence was cancelled entirely. The navy sent these two vessels back in 1981. Work was routine but essential. A new array of electromagnetic sensors was placed in Fram Sound while the systems in Jones Sound and Barrow Strait were inspected and repaired.[56] In 1982 HMCS *Cormorant* and *Protecteur* were scheduled for another NORPLOY but the operation was cancelled owing to engineering problems abord the ships and a lack of helicopters.[57]

Post-*Polar Sea* Voyage

Operations in the early 1980s remain more heavily classified than those from the 1970s, making the charting of naval activities in the Arctic far more difficult. Still, there is enough information available to suggest that the operational pattern which emerged in the mid-1970s—centred on supporting the DRE's listening systems, hydrographic and scientific work—continued until the end of the Cold War. What is surprising is that this focus on the operational elements over political optics continued in the wake of the *Polar Sea* crisis.

In 1985, the United States Coast Guard Cutter (USCGC) *Polar Sea* transited the Northwest Passage without requesting Canadian permission, reigniting the political battle between Ottawa and Washington over the status of the Northwest Passage. This voyage was the result of a series of unexpected operational difficulties within the US Coast Guard (USCG), which was tasked with resupplying the Thule Air Force Base that summer. The North Carolina-based *Northwind* was tasked with making the trip but was forced to undergo unexpected repairs. Other USCG vessels were already tasked for the season and the only way to undertake the resupply mission was to deploy the *Polar* Sea and return it to the Beaufort Sea through the Northwest Passage.[58] This was an operational mission and not designed to challenge Canadian sovereignty but, like the *Manhattan* before it, the transit was seized upon by the media and opposition parties as an American political challenge to Canada's soveriegnty over its Arctic waters.[59]

In response to public pressure for action, the government of Prime Minister Brian Mulroney announced several policy initiatives. The most important was the declaration of straight baselines around the Arctic Archipelago—firmly enclosing the waters within the lines as Canadian. Like the Trudeau government before it, the Conservatives also saw the political value in a more public display of Canada's military capabilities in the region[60] and part of the Conservative's program called for more naval deployments into the Arctic waters.[61] While there are obvious parallels between the *Manhattan* crisis of 1969-70 and that sparked by the *Polar Sea* in 1985, the responses (from a naval perspective) were different. While the Trudeau government chose to use the navy in sovereignty displays, the Mulroney government was largely content to allow the CAF to continue its pattern of small, operationally-focused deployments. While some of the sovereignty rhetoric that had dominated the early 1970s resurfaced,[62] the actual deployments showed none of the aggressive demonstrations of "presence" that had been the norm in the early 1970s. Community visits were far less common and there were no destroyers sent on the post-1985 NORPLOYs (though consideration was given to sending a submarine).[63]

Logistics and fleet requirements took priority over politics. While planning NORPLOY 86, the navy stated that any deployment must avoid disruptions to the fleet's other programs, its international exercises, and the 1986 fuel budget. While a naval discussion paper preceeding the mission recommended that a destroyer and an AOR be deployed, only the diving support vessel HMCS *Cormorant* and the research vessel CFAV *Quest* were sent. These ships were ostensibly on "surveillance and support operations" in Davis Strait, Baffin Bay, Lancaster Sound, and Barrow Strait. In fact there was very little to surveil in those areas, and the ships were far more concerned with the support element.[64] In spite of the post-*Polar Sea* political tensions, NORPLOY 86 remained an operationally focused mission. In Lancaster Sound *Cormorant* laid a number of "Hydra Arrays"[65] south of Gascoyne Inlet while *Quest* deployed a miniature submarine on diving operations. The vessels then spent a week surveying the Northwest Passage between Devon Island and Somerset Peninsula.[66]

There were no operations in the Arctic Archipelago the following year, though the submarine HMCS *Okanagan* undertook a surveillance patrol in Hudson Strait. In 1988, *Cormorant* and *Quest* deployed to the Eastern Lancaster Sound area. The principal objective of this NORPLOY was scientific work and support for the DRE's ongoing acoustic research program. *Cormorant* used a mini-sub to support Defence Research Establishment – Atlantic's (DREA) objectives, including deploying sonobuoys, while *Quest* tested towed arrays in Arctic conditions while transiting Davis Strait. At various stations, *Quest* also deployed and recovered bottom sensors and conducted dives in support of both civilian and military scientists.[67]

Only three years after the *Polar Sea*'s transit there was a desire to maximize the political value of the operation and the planning documents stressed the need to push media coverage of the event. In stark contrast to the navy's stance in 1975 (when Admiral Boyle refused to bring along a reporter) the mission planners wrote that "extensive press coverage about *Cormorant's* operations in the high Arctic is an important objective of NORPLOY 88. Every opportunity to meet the media is welcomed."[68] How much effort truly went into this media push is questionable since newspaper coverage during the period was extremely limited.[69] In fact, NORPLOY 88 was not meant as a sovereignty display, but rather classified as "a typical research cruise with added command tasks." Those command tasks were undertaken by *Cormorant* in response to the needs of the senior scientists attached to the mission.[70] Port visits, the traditional method of demonstrating presence and sovereignty, were included in this mission but they were relegated to a place of secondary importance to take place only "within the framework of the above constraints [meaning fuel constraints and time spent on research tasks.]"[71]

In 1989, *Cormorant* and *Quest* undertook the last NORPLOY. The RCN planned a "pro-active" media campaign to garner attention, launching a public information plan to enhance Canadians' knowledge of the navy's activities in support of sovereignty through, press releases, community activities, on-site media liaison, pre-exercise press events, photo mail-outs, media visits to *Cormorant,* and broad engagement with media outlets and radio.[72] DREA acoustic research and Arctic operations training were both dubbed "supporting objectives."[73] As was the case in 1988, however, this focus on publicity and presence appears to have been largely limited to the planning stages—and never actually materialized in newspaper coverage. In fact, this public relations push seems to have been limited to a successful port visit to Grise Fiord, where the ship's crew challenged the town to a volleyball game (which the locals won) and 60% of the hamlet's population toured the ship. This one visit seemed to satisfy the operation's "presence" requirement, though it accounted for only three of the 22 day cruise.[74]

The remainder of the time was spent providing support to the DREA and undertaking other scientific work. From 21 August to 12 September, the two vessels conducted shallow water acoustic research in Baffin Bay, Navy Board Inlet, and Lancaster Sound. After a short stop at Grise Fjord, the ships moved onto Barrow Strait to undertake surveys of the HMS *Breadalbane*, a three-masted English barque that sank in 1853. The *Breadlebane* was of interest because it served as a unique time marker, showing the relative age and character of the ice scouring in the vicinity. Because the government was interested in the possibility of offshore oil production in Lancaster Sound, the *Breadaleane* was seen as an excellent opportunity to study the rate of sediment accumulation as a way of understanding the dangers posed to sea-floor pipelines and platforms from iceberg scouring.[75] Given that the DRE's under-ice listening arrays had also been suffering from ice-scouring, these studies undoubtedly had defence applications as well.

While in Barrow Strait the ships also undertook new surveys and support for DREP's listening array.[76] From 19 September to 5 October, mini-submersible dives and side-scanning sonar operations investigated iceberg scour sites. The main experiment during the NORPLOY appears to have been the continued testing of the previously mentioned "Hydra" arrays. These were placed on the seafloor at three different sites by *Quest* while *Cormorant* dropped charges to test the array's sensitivity and detection capabilities. These practical, operational requirements dominated the last NORPLOY, a fact made plain by the Commanding Officer in his after-action report, which assessed that the aim of demonstrating a military presence in support of sovereignty "was only adequately met" given that he DREA experiments consumed most of the ships' time.[77]

Conclusion

Canada's northern deployments have long been characterized as political displays of sovereignty, as "superficial acts", or "a complete waste of time."[78] This assessment is understandable. For decades the only information available to commentators has been the publically available media reports and navy press releases on these ships' sovereignty tasks such as their routes, port visit activities, and the importance of demonstrating presence to strengthening Canadian Arctic sovereignty. The question has therefore been: was the cost and trouble of sending thin-skinned warships into the Arctic every other year worth the ambiguous contributions to Canadian sovereignty provided by a naval presence? Historians have agreed that it was not.

An examination of newly available evidence reveals that presence and sovereignty displays were not the sole (or even the primary) objectives of the NORPLOYs. While the years immediately after the voyage of the SS *Manhattan* saw the RCN send warships into the Arctic to satisfy the political optics of sovereignty, this presence-driven approach was soon replaced by voyages with a focus on operational requirements.

The requirement for navy assistance in establishing Arctic acoustic detection systems gave the NORPLOYs new life and a new purpose. Beginning in 1973, and continuing until NORPLOY 88, naval vessels undertook hydrographic surveys, laid cables, replaced damaged systems, and tested new technologies. This activity was not aimed at contributing to Canadian sovereignty *per se*—although that may have been a happy side effect. It was undertaken largely in secret and in close partnership with the United States (the country most interested in disputing Canada's Arctic maritime claims).[79] It was undertaken in reaction not to political or legal challenges to sovereignty, but to a tangible threat presented by the Soviet Navy. The sovereignty scare instigated by the voyage of the *Manhattan* was the catalyst to launch the NORPLOYs, but they were sustained by real operational requirements—a fact commonly overlooked but essential to understanding the history of Canada's northern naval presence.

Notes

[1] Canada, Cabinet Conclusions, 11 September 1969, LAC, RG 2-A-5-a, vol. 6340.
[2] For the best accounts of the *Manhattan's* voyage see John Kirton and Don Munton, "The Manhattan Voyages and their Aftermath," *Politics of the Northwest Passage*, Franklyn Griffiths ed. (Kingston: McGill-Queens University Press, 1987) and Ross Coen, *Breaking Ice for Arctic Oil* (Fairbanks: University of Alaska Press, 2012).
[3] Kirton and Munton, 74 and "Claim Waters Now, MPs of all Parties Urge," *Globe and Mail* (17 December 1969).
[4] Kirton and Munton, 83-84, 93.

[5] On this evolution see: Adam Lajeunesse, *Lock, Stock, and Icebergs: The Evolution of Canada's Arctic Maritime Sovereignty* (Vancouver: UBC Press, 2016), chapters 7-8.
[6] Arthur Kroeger, "The Canadian Forces and the Maintenance of Canadian Sovereignty," 2 August 1968, LAC, RG 25, vol. 10322, file 27-10-2-2, pt.1, quoted from: P. Whitney Lackenbauer and Peter Kikkert, *The Canadian Forces & Arctic Sovereignty* (Waterloo: Wilfred Laurier University Press, 2010), 47-61 and Letter from Shenstone to PSI, 10 June 1970, LAC, RG 25, vol. 10322, file 27-10-2-2, pt.1
[7] Memorandum to Cabinet, 1976, LAC, RI 2069, vol. 145, pt. 8.
[8] Department of National Defence, *Defence in the 70s* (Ottawa: Queen's Printers, 1971).
[9] DND, Defence in the 70's, 6.
[10] E.B. Wang, "The Role of Canadian Armed Forces in Defending Sovereignty, 30 April 1969," P. Whitney Lackenbauer ed., *Journal of Military and Strategic Studies* 11:3 (2009).
[11] L. Legault to J.A. Beesley, 2 February 1971, LAC, RG 25, vol. 10322, file 27-10-2-2, pt. 2.
[12] External Affairs draft paper on defence policy, 18 January 1971, LAC, RG 25, vol. 10322, file 27-10-2-2, pt.2.
[13] L. Legault to J.A. Beesley, 2 February 1971, LAC, RG 25, vol. 10322, file 27-10-2-2, pt. 2. For more on this subject see: Lackenbauer and Kikkert, *Canadian Forces & Arctic Sovereignty*.
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[15] Shenstone to PSI, 10 June 1970, LAC, RG 25, vol. 10322, file 27-10-2-2, pt.1.
[16] Jack Granatstein and Robert Bothwell, *Pirouette: Pierre Trudeau and Canadian Foreign Policy* (Toronto: University of Toronto Press, 1990), 257.
[17] Kenneth Eyre, *Custos Borealis: The Military in the Canadian North*, Ph.D. Dissertation (University of London -King's College), 1981
[18] P. Whitney Lackenbauer et. al., *Arctic Front: Defending Canadian Interests in the Far North* (Toronto: Thomas Allen & Son Ltd., 2008), 106-07.
[19] Harriet Critchley, "Canadian Naval Responsibilities in the Arctic," *The RCN in Transition*, W.A.B. Douglas ed. (Vancouver: University of British Columbia Press, 1988), 286 and Douglas Bland, *Chiefs of Defence*, 232-33.
[20] Douglas Bland, *Chiefs of Defence*, 232-33. See also: Lackenbauer and Kikkert, *Canadian Forces and Arctic Sovereignty* and Nicholas Tracy, *Two-Edged Sword: The Navy as an Instrument of Canadian Foreign Policy* (Montreal & Kingston: McGill-Queen's University Press, 2013), 161.
[21] For the most comprehensive list of these activities see: Michael Whitby, "Deployments by Ships of the Royal Canadian Navy into Canadian Northern Waters, 1949-2014," *Canadian Naval Review: Broadsides Forum* (22 November 2014).

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[25] Department of National Defence, *Defence in the 70s* (Ottawa: Queen's Printers, 1971), 10.
[26] David A. Cossette, "Warship Wonders," *Sentinel* 7:9 (November-December, 1971), 4.
[27] R. St. John, "Arctic Operations," 6 December 1973, LAC, RG 24, file 3250-2, vol. 2 (1973)
[28] Lyndon Watkins, "Ship will Visit 13 towns in Eastern Arctic to Conduct Research, Reinforce Sovereignty," *Globe and Mail* (1 August 1973).
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[31] J.H. Granton to Chairman, Defence Research Board, "Sonobuoys for Arctic Use," 11 December 1969, LAC, RG 24, vol. 24033, file 3801-06.
[32] Note from Stan Toole to 'Miss. Johnson,' 19 April 1972, LAC, RG 24, vol. 34033, file 3801-26.
[33] DND, Defence in the 70s, 18.
[34] For more on this subject see: Bryn Ranft and Geoffrey Till, *The Sea in Soviet Strategy* (Annapolis: Naval Institute Press, 1983) and Bruce Watson and Susan Watson eds., *The Soviet Navy: Strengths and Liabilities* (Boulder: Westview Press, 1986).
[35] Critchley, 842.
[36] John Honderich, *Arctic Imperative: Is Canada Losing the North?* (Toronto: University of Toronto Press, 1987), 92.
[37] VP is a US/Canadian military designation applied to long-range, land-based, anti-submarine, maritime reconnaissance aircraft.
[38] VS is a US/Canadian military designation referring to a Navy Air anti-submarine squadron. VS 880 was shore-based at RCN Air Station Shearwater and continued to fly ASW, pollution, surveillance and fishery patrol operations until it was re-designated as a maritime reconnaissance unit in 1975. D.H. Tate, Canadian Aviation Museum Aircraft: Grumann CS2F/CP-121 Tracker," www.aviation.technomuses.ca/assets/pdf/e_GrummanCS2F-CP121Tracker.pdf.
[39] DND, "Submission for Inclusion in the Advisory Committee on Northern Development Annual Report," *Government Activities in the North* (1972-1973).

[40] A.M. Patterson (Deputy Chief, Canadian Defence Research Staff) to Chief of Defence Research Establishment Pacific, LAC, RG 24, vol. 34033, file 3801-26.
[41] M.H.D. Taylor, "Post Deployment Report – NORPLOY 74 Phase I," 21 August 1974, LAC, RG 24, vol. 3, file 3250-NORPLOY.
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[43] Memorandum by D.M. Murray, 14 December 1973, LAC RG, 24, vol. 2, file MARC 3350-2 (1973).
[44] Michael Whitby, "Deployments by Ships of the Royal Canadian Navy into Canadian Northern Waters, 1949-2014," *Canadian Naval Review* - Broadsides Forum (November, 2104).
[45] Letter from J.A.F. Wilson, to ship repair unit, Halifax, 25 February 1975, LAC, RG 24, file 3250-NORPLOY 2 (75).
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[47] J.D.R. Cole, "Memorandum: SDL-1 Operations," 31 October 1975, LAC, RG 24, file 3250-NORPLOY 2 (75).
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[49] Maritime Command, "NORPLOY 75 Operational Order 20/75 (1975)," 1975, LAC, RG 24, file 3250-NORPLOY 2 (75).
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[51] J.A.F. Wilson, "Scientific Tasks - NORPLOY 79," May, 1979, LAC, RG 24, file 3250-NORPLOY 1 (79).
[52] D.N. Mainguy, "NORPLOY 77 Support for Operation Kimono," 24 December 1976, LAC, RG 24, vol. 1, file 3250-NORPLOY.
[53] J.A.F. Wilson, "Scientific Tasks - NORPLOY 79," May, 1979, LAC, RG 24, file 3250-NORPLOY 1 (79).
[54] Ibid.
[55] Ibid.
[56] H.L. Grant, "NORPLOY 81 Preliminary Requirements," 22 May 1980, LAC, RG 24, file 3250-NORPLOY 1 (85).
[57] Whitby, "Deployments by Ships."
[58] Ted L. McDorman, "In the Wake of the Polar Sea," Marine Policy 10:4 (1986), 243. See also: Rob Huebert, Steel, Ice and Decision-Making: The Voyage of the Polar Sea and its Aftermath: The Making of Canadian Northern Foreign Policy, unpublished Ph.D. Dissertation (Dalhousie University, 1993).
[59] Rob Huebert, Steel, Ice and Decision-Making.
[60] In 1985 the government promised a polar class 8 icebreaker and increased surveillance flights. Two years later in the 1987 Defence White Paper, *Challenge and Commitment*, the government promised a wide array of Arctic hardware

including nuclear attack submarines, new patrol craft, and a number of other projects designed to assert Canadian control in the North.
[61] External Affairs, "Policy on Canadian Sovereignty," *Statements and Speeches*, no. 85/7, Statement by the Right Honourable Joe Clark in House of Commons, Ottawa, 10 September 1985.
[62] See for instance the sovereignty elements in the mission objectives in: J.W. Barlow, "NORPLOY 86 Discussion Paper," 11 September 1985, LAC, RG 24, file 3250-NORPLOY 1 (85).
[63] J.W. Barlow, "NORPLOY 86 Discussion Paper," 11 September 1985, LAC, RG 24, file 3250-NORPLOY 1 (85).
[64] Ibid.
[65] These are acoustic listening systems designed for shallow water environments.
[66] Cormorant ships logs August and September, RG 24, vol. 22228, file CORMORANT – September 1986.
[67] Colonel A.G. Sinclair, "NORPLOY 88 Item – General," 1 June 1988, LAC, RG 24, file 3350 –NOR 88; Telex, "Norp88," 27 April 1988, LAC, RG 24, file 3350 – NOR 88; and A.G. Sinclair "NORPLOY 88/Quest Cruise Q164 Proposed Plan," 22 February 1988, LAC, RG 24, file 3350 –NOR 88.
[68] "Minutes of the Second Planning Meeting NORPLOY 88," 1 June 1988, LAC, RG 24, file 3350-NOR 88.
[69] Based on a ProQuest historical newspapers database search.
[70] A.G. Sinclair, "NORPLOY 88/Quest Cruise Q164 Proposed Plan," 22 February 1988.
[71] A.G.D. Perusse, "NORPLOY 88 – Proposed Plan," 18 December 1987, LAC, RG 24, file 3350-NOR 88.
[72] W.J. Chipchase, "Exercise NORPLOY 89 Public Information Annex," 15 March 1989, LAC, RG 24, file 3350-NOR 88.
[73] "Commanding Officer's Comments – NORPLOY 89 Report," 31 October 1989, LAC, RG 24, file 3350-NOR 89.
[74] There was also a stop in Nanisivik, however this was only to supply the ships with fresh provisions and transfer personnel. "Minutes of the First Planning Meeting NORPLOY 89," 10 March 1989, LAC, RG 24, file 3350-NOR 89.
[75] "Scientific Program HMS BreadalBane [sic] Wreck Site," 22 August 1989, LAC, RG 24, file 3350-NOR 89.
[76] E.S.C. Cable to Dr. MacInnis, 2 December 1988 and J.B. MacInnis to Comm. Charles Westropt, December 1988, LAC, RG 24, file 3350-NOR 90.
[77] "Commanding Officer's Comments – NORPLOY 89 Report," 31 October 1989, LAC, RG 24, file 3350-NOR 89.
[78] Bland, 232-33.
[79] For a fuller description of Canadian-American cooperation in this respect see: Adam Lajeunesse, "A Very Practical Requirement: Under-Ice Operations in the Canadian Arctic, 1960-1986, *Cold War History* 13:4 (November, 2013).

Chapter Eight

Patrouille Nocturne

Captain Rick Michon, reprinted from *Sentinel* vol. 8, no. 4 (April 1972)

In early February [1972,] Captain Rick Michon, editor of *La Sentinelle*, spent a week in and around frigid Frobisher gathering material for the following vignettes on arctic warfare...

From the Defence White Paper "Defence in the 70s"

"More emphasis is being placed on training the Armed Forces to live and operate in the Arctic. A Northern Region Headquarters has been established at Yellowknife, and there is a military liaison staff at Whitehorse. Consideration will be given to establishing other small bases in the North, particularly in the Arctic Islands, and to the desirability of reconstituting the Canadian Rangers. National Defence is also examining the desirability of establishing a special training school for all personnel assigned to the North. The adequacy of existing equipment is also being studied, with particular emphasis on over-snow vehicles."

The Situation Deteriorates

Our forces have been put on alert. Bombers of the Fantasian Air Force have been observed flying in Canadian airspace and Fantasian ships have intruded into our territorial waters.

The situation worsened as Maritime Command surveillance flights detected an enemy lodgement at Lake Amajusk, 80 miles northwest of Frobisher Bay. Enemy strength was not immediately known but our pilots reported sighting some communications equipment and several over-snow vehicles.

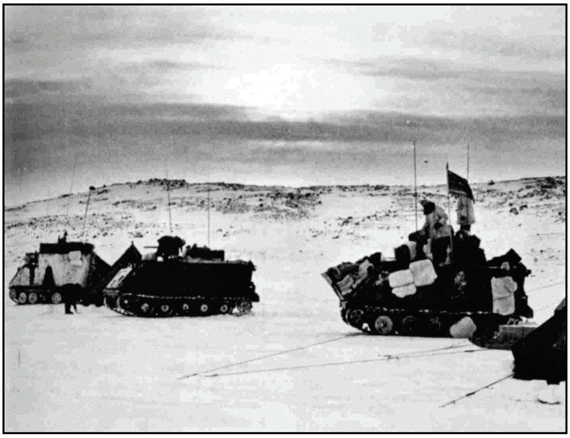
The Canadian government has issued an ultimatum to Fantasia giving their forces 72 hours to withdraw from the Canadian North.

Mobile Command has ordered 5e Groupement de Combat to make ready to deploy to Frobisher Bay. Troops of the 1er Commando of the Canadian Airborne Regiment, 433e Escadrille tactique of Bagotville, 450 Heavy Transport Helicopter Squadron of Uplands, as well as a communications detachment have been placed under the command of Brigadier General B.J. Archambault who has been appointed commander of the Frobisher Force.

The reasons for the presence of the Fantasians in Canada are not yet known but it is believed that their aim is to disrupt communications between the Distant Early Warning Line and NORAD headquarters.

Finally Fantasia refuses to withdraw its forces and the deployment order goes out.

The Exercise Area



The terrain is hilly, rocky and difficult except for a valley approximately ten to 15 miles in width northwest of Frobisher. This valley extends to Sylvia Grinnell Lake and is bounded by two ridges. It is characterized by three rivers flowing in a southeasterly direction into Frobisher Bay.

Navigation is difficult when snow blankets the lake-dotted landscape and masks its few good landmarks.

Crevasses impede movement making wheeled vehicles useless. Even tracked equipment travels mainly along streams, rivers or over frozen lakes.

The coastline is very irregular, broken by long, narrow inlets many of which are true fjords.

Night comes early to Frobisher.

Paratroops Establish a Bridgehead

"Whisky Jack, this is Alouette. You're cleared to jump."

One hundred men of the 1^er^ Commando aéroporté, dive into the incredibly cold air over Frobisher and float down to establish an airfield defence. On the ground two Eskimos of the Canadian Rangers await them with a report that an enemy force has been sighted: their position is just south of Lake Sylvia Grinnell, about ten miles northwest of Frobisher.

The 1^er^ Commando deploys tactically around the airfield until the 3^e^ Battalion du R22eR. arrives in the Hercules "heavies" of Air Transport Command.

Once the main force has landed the commando will cover the battalion's flanks until the time comes for another drop, this time beyond the enemy to cut off his retreat.

In cross-country movement the commando is split into two groups and moves on foot across the difficult terrain. Lightly equipped, they must stop from time to time to allow the battalion—a larger formation with more equipment—to catch up in the centre.

Jumping into a region like this can be particularly dangerous. The terrain, badly broken up and rocky, is thinly masked by about a foot of hardened snow. But Major Jean-Guy Dion is proud of his commando's record: not one injury requiring medical evacuation.

Maybe that's because the airborne regiment has had lots of practice. They had only just returned from another exercise, further north at Resolute Bay, when the Fantasians invaded.

Closing with the Enemy

The tight security measures normally applied to field operations were relaxed to give visiting press a summary of events in the first few days of "hostilities" in the eastern Arctic.

Progress notes for the first three days went something like this.

Feb. 1 – In spite of a chill factor equivalent to -80°F, the 3^e^ Bataillon du Royal 22^e^ Régiment began advancing against the enemy.

The first troops left the assembly area at 8:30 am but severe cold slowed the advance. Several cases of frostbite were reported and vehicles and other equipment did not hold up under the Arctic conditions.

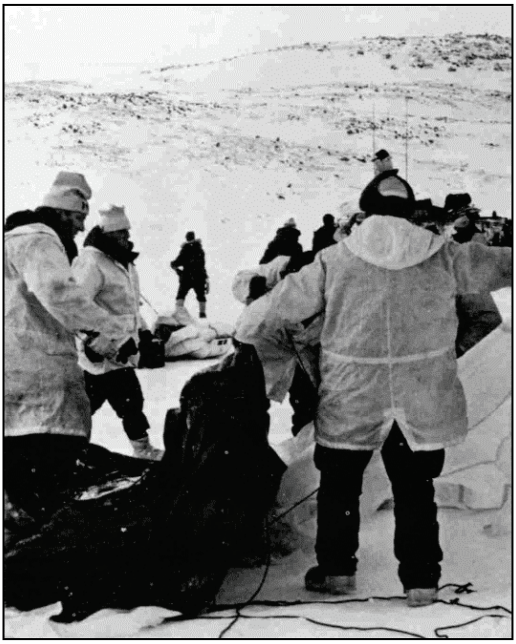
Communication problems were encountered. To ensure a link between the front line and rear echelon a radio rebroadcast station had to be deployed.

Considerable effort has been made to improve the lot of the combat soldier and many lessons have been learned. Among them are the need for:

- adequate ventilating of tents by opening the flaps every two hours and by limiting the height of snow-wall windbreaks so that the tent top is exposed to the wind
- placing tent heaters on some insulating surface such as cardboard to prevent them from sinking or spilling
- regular checking of heaters for proper functioning
- cutting openings in camouflage tent covers
- burning candles to purify air inside tents
- closing tent vents on the windward side

On the air side of operations today twelve sorties were flown. All were resupply or tactical reconnaissance. Late in the day operations froze to a halt as the equivalent chill temperature hit 102°F.

2 February – The weather remains cold with chill factors varying between -60°F and -95°F.



Lieutenant General Gilles Turcot, Commander of Mobile Command, visited the troops.

Towards the end of the afternoon a helicopter-borne infantry company established contact with the enemy and a short skirmish ensued. The enemy retired leaving three dead and two wounded. One over-snow vehicle was captured.

During the evening contact was re-established with the enemy and our troops took two more prisoners.

Air activity intensified today as rotary and fixed wing aircraft flew resupply, air photo, visual recce and medical evacuation missions.

3 February – Troops of the 3e Battalion R22eR are fifteen miles from their starting point.

A tactical airstrip has been cleared on a frozen lake for use in aerial resupply. The number of missions has been increased and the enemy is being subjected to constant air surveillance.

The press visited our positions today. They seemed impressed by the high morale and ingenuity of the troops who are making the best of their austere conditions.

Considering the speed of our movement and the professionalism displayed by our troops it is expected that the enemy will be defeated in a few days.

Tactics

In the barren wastes of the Great North there's no room for the flanking movements of classical warfare. Up there it's better to encircle the enemy, pin him down and polish him off with air support.

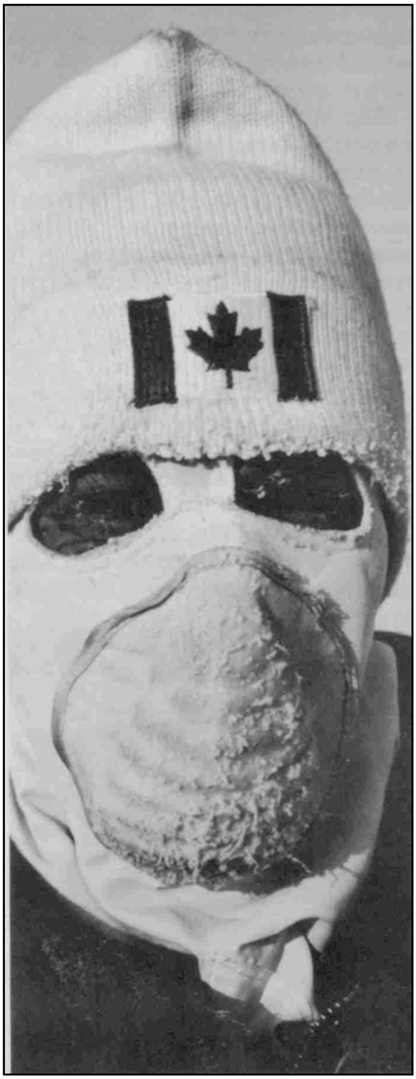
Trying this tactic out with a force as large as a combat group was one of the aims of *Patrouille Nocturne*. It had never before been attempted north of the 60th parallel.

Before the enemy can be engaged, of course, he has to be found, contact has to be established. This means the friendly force must advance and this in itself can present problems. The distances involved can be too great for a single leap forward and unusual care must be taken not to overextend the supply lines. The combat group, therefore, advances in stages, establishing bases as it goes along, until it is in close to the enemy.

Typically the advance is made in three columns with, for example, a battalion in the centre and recce units on its flanks. When the enemy is located he is encircled and his retreat is cut off by paratroops.

Once the enemy has been neutralized the friendly forces return to their main base sweeping the terrain as they go and mopping up any remaining pockets of resistance.

Units and Men



Progress of the exercise is controlled by headquarters 5ᵉ Groupement de Combat. Its 200 men include the commanding general, his staff officers, the assistant exercise director and the men of the 5ᵉ Escadron des Transmissions. This nucleus of 5ᵉ Groupement de Combat also looks after rations and quarters, visitors and transport in what can only be described as particularly difficult circumstances. It also finds time to publish a journal called Patnoc for Frobisher Force troops in the field.

Supporting the Frobisher Force is a battery of 80 men from the 5ᵉ Régiment d'artillerie légère (Light Artillery Regiment). Their L-5 pack howitzers have come a long way from the sunny clime of Italy, where they were made, to exercise in the Canadian Arctic.

Besides providing fire support for the Frobisher Force the battery is also testing a twin-track, go-anywhere vehicle developed by the Defence Research Board Establishment at Valcartier.

The 12ᵉ Régiment Blindé (Armoured Regiment), playing the part of the enemy force as always, is in better form than ever. Its members take their part seriously: they occupy friendly territory and jam communications.

"Unfortunately for us," says Major Paul Addy who commands the Red Tuques, "we can never win. It's that way in the exercise plans."

But the men of the 12e Régiment Blindé deserve a better fate. After all they've been in the frigid field under canvas, a week longer than any of the friendly force.

The Frobisher Force has air superiority in its region.

Five CF-5s of Bagotville's 433e Escadrille tactique fly recce missions and pin down the enemy. Their activities are co-ordinated by 5e Unité du contrôle aérien from Valcartier.

In this kind of Arctic operation air support plays a vital role.

Three CH-113 Voyageurs of 450 Heavy Transport Helicopter Squadron are on hand to air deploy one of the companies of the 3e Btn du R22eR. When they're not busy doing that, these twin-rotor choppers fly forward resupply missions from the base camp.

From Valcartier, 430 Tactical Helicopter Squadron brought one of its new Twin-Hueys to Frobisher for trial purposes. Capable of airlifting a 2,500-pound payload the CUH-1N proved itself an ideal helicopter for this type of operation and wasn't grounded once by the cold weather during the exercise.

An element of the 5e Escadron du Génie (Engineer Squadron) is deployed at Frobisher and the sappers busy themselves making life a little more bearable for the 3e Battalion du R22eR. Their equipment consists of a gas drill for piercing the ice, explosives and a bulldozer.

While one section of sappers tests the safety of lake and river ice for the passage of tracked vehicles another section of about ten men clears a landing strip for use by resupply aircraft. Work begins as soon as the enemy has been cleared from the area. Next day a Buffalo of 424 Transport and Rescue Squadron, Trenton, lands on the ice.

The two doctors and 35 medical orderlies of the medical services unit of 5e Groupement de Combat were kept busy with the type of work they prefer—preventative medicine. They had no serious medical cases to deal with but about 20 men had to be evacuated for routine causes. Lung problems were the most frequent and were caused by the extremely cold air. Frostbite cases were less frequent and only two or three second degree cases occurred.

The thankless task of providing logistic support for the exercise was handled by the 5e Bataillon des services.

"Lies! All lies! You notice that everything from down south is frozen solid!"

Even in normal climates the importance of efficient supply services in winning battles has long been recognized. North of the 60th parallel adequate supplies are essential to survival, let alone to the winning of battles. It was the task of the 180-man service battalion detachment under the command of Major John Pratt to see that nothing was lacking.

Rations, clothing, gasoline, everything had to come in from the far south. And seeing to it that supplies were brought in wasn't the end of it for the men of the service battalion: they were daily called "up front" to install spares and make repairs to keep the numerous vehicles on the move.

To Air Transport Command fell the task of deploying the troops in a massive airlift involving 90 trips by C-130 Hercules. Each of the four-engine planes carried up to 35,000 pounds of materiel in the strategic airlift.

For tactical resupply missions "up front" 424 Transport and Rescue Squadron of Trenton provided a Buffalo.

Although they're inside, in the warmth of the kitchen and close to the larder, the cooks don't lead an enviable life. They are the first to be criticized. But Sergeant Emile Sauvé and his men perform culinary miracles,

"You realize, of course, that you are violating the zoning by-laws."

varying menus, preparing different dishes and making sure left-overs aren't wasted.

It has been said, and justly so, that northern operations are largely a matter of survival. In this respect the cooks certainly play a big part.

Ecology and the Caribou

As soon as plans to hold exercise *Patrouille Nocturne* northwest of Frobisher were announced the local Eskimo trappers' association voiced concern. They knew that any activity affecting the life style of the caribou could drive the herds miles away – and travel spells trouble for the northern hunter.

Exercise planners listened to the hunters' pleas and limited the exercise area accordingly.

The planners also took into account the fact that pollution in the Arctic can be far more serious than it is in the south. Throwing anything away in the North is like putting it into a refrigerator: the cold preserves it almost indefinitely and the permafrost will not absorb it.

Just think for a moment. A box of RP4 rations weighs five pounds and half of that weight is nothing but packaging. A thousand men on manoeuvres for fifteen days would go through 15,000 boxes of rations, leaving 37,500 pounds—almost nineteen tons—of garbage. And that's just one item among many: there are ammunition cases, oil and gasoline barrels, burned-out batteries and so on.

Strict anti-pollution measures were therefore built into the exercise plans by 5e Groupement de Combat and those plans were translated into firm action. Troops of the Frobisher Force behaved in an exemplary fashion: they collected every scrap of refuse in sacks, bags or boxes and toted it back to base camp for disposal. Respect for the Arctic ecology, the key to Eskimo survival, was one of the lessons they'd already learned in the New Viking series of small-scale northern exercises.

American Observers

Among the many visitors observing Exercise *Patrouille Nocturne* were five officers from the United States Army's Alaskan Command (USA-RAL). They were flown in from Fort Wainwright (same latitude as Frobisher Bay) and from Fort Richardson (about 300 miles south of Wainwright).

The senior officer was Lieutenant Colonel Looney, an infantry battalion commander. With him were Captain Cloe, assistant plans officer at USARAL; Captains Bohannon and Ortiz, assistant operations officer of the two brigades in Alaska; and Captain Blanks, logistics officer of the brigade at Fort Wainwright.

As soon as they joined the headquarters of 5e Groupement de Combat on 24 January, the Americans familiarized themselves with the exercise plans, the task force organization and the equipment and resources for use on Baffin Island.

Seeking information which could benefit their own units in Alaska, the group focused its attention on the operations of the battalion in its efforts to locate and destroy the enemy force. In particular they observed survival techniques and studied Canadian methods of deploying troops in the frigidly hostile environment.

From the outset they were highly impressed by the morale and esprit of the members of the 5e Groupement de Combat and supporting units and felt that these qualities reflected the professional nature of Canadian training and leadership.

Chapter Nine

SAR HARTWELL

Alan Phillips, reprinted from *Sentinel*, vol. 9, no. 4 (1973)

In the radio room at Yellowknife airport the wall clock read 7:33. Again the operator hunched in front of his console and intoned, his voice now slightly edged: "RLD, RLD. This is Yellowknife Radio 5680. Do you read me?"

Again, silence.

The operator hesitated. The guy could be flying around the weather, flying with earphones off … He looked at his flight plan copy, teletyped from Cambridge Bay, dated that day, 8 November [1972], with a 7:03 ETA. Then he picked up his direct-line phone to Air Traffic Control in Edmonton, and set off the costliest, most controversial search for aircrash survivors in the 26 years since the RCAF formed the Search and Rescue Service.

Search and Rescue has four nerve centres—Rescue Coordination Centres, called RCCs—at CAF bases in Halifax, Trenton, Edmonton and Victoria. Though *saving* lives, when you think of it, is an odd military concept, SAR centres are open day and night to calls for help from isolated areas. Their plane crews and ground patrols look for missing children and lost hunters. Their helicopter pilots and paramedics evacuate hurt climbers and sick Indians. Their high-speed launches and crash boats aid sinking ships and capsized pleasure craft. But their biggest category is "distress-air," the kind of call now coming in from Air Traffic Control's night supervisor to the RCC at Namao, outside Edmonton.

"We have an overdue for you," the supervisor said.

"Just a minute." The corporal on duty at RCC switched on his recorder and patched in his duty controller's home telephone.

Captain Fred Siminoski picked up a pencil and checked the time: 8:35. "Okay," he said. "Go ahead with your information."

"CF-RLD. A *Beech 18* on wheels. Cambridge Bay to Yellowknife on a flight plan, three and a half hours. Estimated time of arrival 7:03. Six hours fuel. HF and VHF" – RLD's two radios.

"Three passengers, a nurse and two Eskimo patients."

"Did the DEW line radar track him?"

"He faded from Cambridge on course 71 miles out, his last known position."

"Equipped with ELT?" —an emergency locator transmitter.

"Yeah, he had a Dart 2."

"About the only places he could land on wheels would be Coppermine and Contwoyto."

"We haven't raised Contwoyto yet but he's not at Coppermine." The supervisor hung up to complete his communications check, his radio-telephoning of airports or strips where a pilot might wait out bad weather. This was routine for Air Traffic Control, they made checks every couple of days, for two-thirds of all searches start and end here, in this first or "uncertainty" phase.

The corporal was still on the line. "Ask the *met section* for the weather between his takeoff and ETA," Siminoski said. The weather office was just down the hall. "I'll be there in 20 minutes."

The RCC Namao is on the second floor of a hangar. Siminoski came in and stood behind the long counter studded with phones. He looked at the big map behind him, gave two numbers to the corporal. The corporal pulled two maps from a filing cabinet. Siminoski laid them out on the plotting table in the next room, set a plastic overlay on them and drew in the track, the route RLD had given in his flight plan.

Siminoski didn't like it. Forty minutes after takeoff, at 160 miles an hour, the plane would be over hills rising 2,000 feet in the Bathurst area. He looked at the weather report for Bathurst that afternoon: "...strato cumulus cloud with base at 1,500, tops at 5,000 ... light snow ..." To Siminoski, a navigator, this meant icing conditions in clouds almost meeting the ground. "He'd either have to climb up on top or go around," he said, "or he'd build up ice and go down like an elevator."

Siminoski had had five years with west coast rescue. He knew that RLD could be sitting comfortably at Contwoyto, the radio station midway between Cambridge and Yellowknife, and be unable to make radio contact—the ionosphere plays queer tricks in the north: a pilot may be able to tune in Australia loud and clear and not be able to raise the next airport. But Siminoski also knew that he had to assume the worst. If this guy was down he was stranded in some of the worst country in the world, the Barren Lands, a snow-covered desert strewn with Ice Age rubble, bare except for the ancient willows thrusting stunted limbs through the snow-crust, uninhabited except for an Eskimo winter camp at Contwoyto Lake. Stiminoski decided to step the search up to its "alert" phase, to send a plane over RLD's track with an electronic listening device, tuned in and able to home in, on the Dart 2 emergency beacon—if RLD had remembered this, and if he had switched it on, and if it was operating, if, if, if ...

The RCC has a Hercules on two-hour standby. But even at 300 knots the Herc would take two more hours to reach the search area. "Get onto the Herc crew. Tell them it's go," Siminoski told the corporal. Then he himself called the base operations officer at Yellowknife.

Yellowknife now is what Edmonton called itself after World War II: Gateway to the North. The Con and the Giant Yellowknife mines are still digging gold but the town's biggest cash flow comes from the government: the territorial administration, Indian Affairs and Northern Development, Transport, Health and Welfare, Energy, Mines and Resources, Environment Canada, and the Northern Region Headquarters of National Defence. In eight years the population has jumped from 3,200 to almost 8,000, while air traffic these past three years had almost quintupled, for all the government specialists, all the transient oil and mining men, all the Canadian servicemen, travel by air.

Northern Region, under Brigadier General Ramsey Withers, takes in everything north of sixty, as he puts it, from Hudson Bay to Alaska and north to the pole. He has 65 people maintaining sovereignty and collecting information, while helping build airstrips and bridges and meeting emergencies: fires, floods, lost planes. But to patrol and supply his stations, and fly a growing number of searches—29 planes in his area crashed last year—he has only a detachment of Namao's 440 Transport and Rescue Squadron: two Twin Otters.

"Both Twins are out," the ops officer, Major Howard Baxter told Siminoski. "I'll try the RCMP. Maybe they can do a track crawl for us."

When the telephone rang at 9:20 Inspector Lorne Fletcher was in bed. He called his flight engineer to ready and fuel their Twin Otter, then alerted his co-pilot. By 10:40 he was airborne in intermittent moonlight, heading for Contwoyto, 270 miles north.

With his VHF tuned to 121.5, the distress frequency, Fletcher flew past the treeline and over the barrens at 9,000 feet, high enough to pick up an ELT signal a hundred miles away, yet low enough for survivors to hear his engines and start transmitting. At Contwoyto he saw lights through the cloud but he couldn't wake the station. He had heard through Yellowknife Radio that two Hercs were enroute from Edmonton for an electronic prowl of the Bathurst-Contwoyto leg. So still listening for that urgent wail of the Dart 2, he flew back. From the hangar he shared with Northern Region he called Baxter: "Sorry, no results."

At RCC Siminoski was still on the phone. Air Traffic Control had now passed on names: Marten Hartwell, the pilot, 47; Judy Hill, the nurse, 27; Neemee Nulliayok, a pregnant woman who could be already in labor; and 14-year-old David Kootook, who might have appendicitis. Siminoski had studied the weather cross-section brought him by forecaster Ron Nutton, then called the Air Regulation Division of the Ministry of Transport (MoT).

Drag the file on Hartwell," he said. "Total flying hours. Hours on type. Time in the north. Everything you've got." If Hartwell was instrument rated he could have easily climbed clear of the weather, but if he couldn't navigate without reference to the ground … well, when ATC called at three am to say that the Beech wasn't at Contwoyto, it looked as if four people were facing death.

Every half-hour the Hercules pilots on the track crawl were calling in: "Have nothing. Ops normal." A big one seemed to be shaping; Siminoski needed planes. He had pulled his second Herc off a Winnipeg search not winding down. At four am he called Trenton, headquarters of Air Transport Command, controlling CAF aircraft around the world.

"Sorry, three Hercs are tied up on a tactical exercise," said Captain Ken Duncan. "And the exercise is behind schedule already."

It was always a fight for badly-needed planes. Two people were sick and the area was huge, Siminoski argued. "Two planes are absolutely useless."

"All right," Duncan said. "I'll try to spring more."

By morning Siminoski had another Herc, he had Northern Region's two Otters, and a helicopter from 450 Squadron, Edmonton. Two 436 Squadron Hercs, he was told, would be pulled off overseas service. And between phone calls Siminoski was planning how all these planes could be used.

By six am, the captain in charge of the centre, Gord Moore, came in, just as the first reporter, Steve Hume of the *Edmonton* *Journal*, called from Yellowknife where he had been listening in on the CAF frequencies. At 6:30 Siminoski reached Neil Murphy, Yellowknife manager for Gateway Aviation, Hartwell's employer. Hartwell had been hired last spring, said Murphy. "He flew a single-engine Otter all summer for the Geological Survey. He did a good job, so I asked him to stay. He had 25 hours on the Beech."

"So he's flying a fairly unfamiliar beast. Was he instrument rated?"

"He had the training, but not the final ride. He flew out of Sachs Harbour and Banks Island last winter. That's tough country." Murphy wasn't sure what survival gear was on board.

At 7:30 the search planes were back, and while being checked and refueled, Moore briefed two fresh crews on a visual-electronic search. "Remember, you've got only four hours daylight, and at ten below time runs out fast."

At eleven o'clock Doug Rae, Gateway's Edmonton manager, called. The Beechcraft had carried five sleeping bags and two engine covers, and enough rations—corned beef, raisins, oxo cubes, tea and sugar—to last four people eight days. Rae also said that Hartwell had changed his name from Leopold Herrmann, that he had a wife and son in Germany, and a friend at the University of Alberta.

Moore called the German and British trade officials in Edmonton, who agreed to notify Hartwell's son and Miss Hill's parents. The RCMP were letting the Eskimo passengers' families know. Moore called the friend, Susan Haley, for information.

"O my God!" Miss Haley said. "What was he flying? What are you doing about it?"

"He was flying a medevac, a mercy flight. We're doing everything possible." Unwittingly Moore had stumbled into an emotional situation. Tactfully he tried to extricate himself.

All day, while fielding calls from the press, and briefing unit commanders, and logging negative reports from the Hercs and the RCMP's Twin Otter, now joined by planes from Gateway and Northward Aviation, Moore was on the phone, attempting to reconstruct what might have happened, the jigsaw puzzle of weather, pilot and plane. The search was not in its final or "distress" phase, which called for an on-scene headquarters and a search-master.

Two other searches were on or ending and that left only one pilot, Keith Gathercole, who had passed the search-master's course. He was at home in his PMQ when Moore phoned at seven pm to ask: "How'd you like to take over the Hartwell search?"

"Yes, of course." With tension mounting, Captain Gathercole packed his Arctic gear and went over to RCC for instructions. He was 26, and this was his trial run as search-master.

Next morning, 10 November, with his big red search-master's box, he stepped off a Herc in the clear sharp air of Yellowknife. Captain Trevor White of Northern Region, who was to act as assistant search-master, introduced him to the airport manager, Ken Williams. Williams gave them the training room beneath the control tower. By six o'clock the red box, a mobile office, had been unpacked. A search map had been drawn and hung, a phone list compiled, a telephone installed, and hotel rooms and transport for aircrew laid on. They told RCC they were ready to take control.

Reports from all planes were still negative. They plotted their prime search areas—some 90% of downed planes are found within 20 of track—and divided it into squares for a painstaking grid search. There was ground fog south of Contwoyto, dangerous flying and poor visibility. "We'll work the north end of the grid first," they told the Twin Otter commanders when they radioed in from Cambridge Bay. "You can set up base there." Then White went home and Gathercole went to bed in the Yellowknife Inn, dead-tired, but aware as a pilot that "it could be me out there."

At 6:30 he and White were back at the airport, checking with the forecaster and then with their two mechanics to see if they had any sick birds on their hands. Then they briefed the Hercules pilots and gave them their search squares, with alternates in case the weather changed. The barrens in winter has some of the world's most stable flying weather, but in fall with the ocean open, fog forms without warning.

Below in the lobby some 40 searchers had gathered: nurses, clergymen, doctors, miners, housewives, office workers, all answering a radio station appeal for help. Gathercole's clerk, Chuck Charlebois took names, then assigned and briefed them:

"Remember, if the plane can be seen at all it may not be recognizable. You may only catch a glint of sun off wreckage, or a black spot that doesn't quite fit in. Watch for movement, a fire or smoke, a flare in the air or on the ground. Look for a flashlight blinking, a mirror reflecting the sun, a message stamped out in the snow or printed with rock. If you think you see something, don't be bashful—sing out and don't take your eyes off it."

For the pilots a grid search means keeping within a hundred yards of track, straining to pick up landmarks in a landscape with few reference points, adjusting power to the gusting wind to maintain an even slow speed, banking tight on the turns to keep from overshooting the track; nerve-tightening vigilance.

On each side of the cockpit a spotter stood, eyes ranging out and back, three miles out and three miles back, methodically, monotonously. On the lowered rear ramp on mattresses, three other spotters lay strapped, peering straight down through the clear air with the wind curling cold round their faces. Susan Hume of Yellowknife recalls that her cheekbones began to freeze: her eyes watered, slush formed, and her mind began to wander. She felt "terrible—people were out there and in those few seconds you could miss them."

Sometimes a spotter would call out excitedly: "I see it! Left side, a mile out!" And the plane would orbit a dark spot that looked like an aircraft impact until on a close pass they saw it was where wolves had torn apart a caribou, pulling the entrails out in a kind of fan shape. Sometimes a spotter would see a reflection, wonder, then let it go; no one wants to make a fool of himself. But conscience would gnaw: "I-I think I had a sighting back there," he would say. And the pilot would turn a sharp 180 and go slanting back and down to chase a glint of sun off rock or ice.

Spotting takes concentration. Every 30 minutes, shifts changed. By 3:30, experienced aircrew, whose minds had formed pictures of what they were looking for, would begin to see images everywhere in the dusk. At the end of each day Mrs. Hume had "a splitting headache." But still so many Yellowknife volunteers were calling Gathercole that he had to change his telephone number to get on with his job, already hampered by lack of a radio set. To get word to pilots working north he had to phone south to RCC, or run downstairs to the now-overloaded MoT operator.

At Cambridge Bay, Major Bob McLarnon and Captain Al Weekes were flying Twin Otters with Eskimo spotters through patches of ice crystal fog, refuelling with a hand pump at 20 degrees below zero, when the chill factor on the treeless barrens drops to 50 below, freezing exposed flesh in just over a minute. They were joined by a veteran bush pilot, Rocky Parsons, flying for Northward, while out of the beacon station on desolate

Contwoyto Lake, Jim McAvoy, who quit counting his flying hours, he says, at 20,000, was following the river routes where a pilot might fly low under the weather. McAvoy is one of that breed who give bush pilots status in Yellowknife, but flying at 50 feet in a whiteout was nerve-racking even for him. It's like flying, he says, "inside a bottle of milk."

At Yellowknife, private pilots were coming in, saying, "How can we help?" Gathercole hated to dampen their ardor but their light planes hadn't the range or the navigational gear to fly a grid. He tried to work them closer in, but often the weather was too bad. "I can't ask these guys to fly a river system," he told White. "I'd be risking their lives."

By 12 November, the third day, they had finished their first fast coverage. By now, Gathercole knew that the missing plane had two automatic direction finders, de-icing gear for the carburetor and prop, but no boots (rubbers that fit on the leading edge of the wings and inflate to break ice), and the Beech wasn't called the Wichita Ice Magnet for nothing. It was a good but sensitive plane, a hot plane, no plane for an amateur. But Susan Haley, a tall brunette of 23, now in Yellowknife, assured Gathercole that Hartwell was a good pilot. She had lived and flown with him, she said, and found him mature and experienced.

Gathercole had also learned what happened prior to take-off. Hartwell had flown Grenville Thomas, a mining engineer, to a Perry River minesite. Cloud had closed in, forming ice on the plane. Short of fuel, they diverted to Cambridge Bay. Ten minutes later, another Gateway plane, a Twin Otter piloted by Ed Logozar, arrived from Spence Bay with nurse Judy Hill and her two Eskimo patients, a pregnant woman on a stretcher and her 14 year-old nephew. A doctor visiting Spence Bay, an isolate Arctic settlement, had said that both patients needed hospitalization.

While Miss Hill and the head nurse from Cambridge stood by, the two pilots discussed who would fly them to Yellowknife. Hartwell was reluctant, but he couldn't match Logazar's argument. The Beech had a range of 900nm, the Otter 630; if Logozar ran into head winds he might not make it. And Logozar could go on with his charter while Hartwell couldn't go anywhere until the weather cleared at Perry Bay to the east. Airline competition was tough, Northern Health was a valued charter, and Logozar, a senior pilot, wanted him to go. Then too, Hartwell's flying bonus of eight cents a mile was the biggest part of his annual pay, and Thomas had said he would pay for a half-trip if Hartwell would bring back some anti-freeze.

But Hartwell was tired, he had just flown five and a half hours in partly-bad weather. It was 3 PM, almost dusk, he'd be flying in darkness and cloud with no instrument rating, and his boss, Doug Rae, had warned him against night flying. And although a southbound Dakota was due in about three hours, the nurses were saying that time was critical, and the woman was lying there helpless. A tough decision, Gathercole knew, for Hartwell.

He was still trying "to psyche the guy out," put himself in Hartwell's mind, by talking to pilots and passengers who had flown with him, and these latter views were contradicting first reports. In 1969, flying for Parsons Airways, Hartwell had crashed near Flin Flon and was fired. He'd been lost or at least disoriented a couple of times before, he wasn't too good a map reader, and failed at times to fly around bad weather. In a crisis, paradoxically, he was said to be overly tense. "Perhaps," White said, "we should be looking farther out."

Air Transport Command flew in a single side band radio with operators, and Gathercole began searching outside his prime area, especially to the east where most bush pilots thought he'd gone down, because other lost pilots had gone down east—except Gauchie, except Janson; the "excepts" kept creeping in. At the same time, within the prime area, he began his detailed coverage: scanning a half-mile on each side of track while flying at 500 feet, a long slow tedious process, and, for the pilots, exacting.

The weather was still the worst it had been in years. Scouring the Bathurst area, dipping in and out of the canyons, Captain Arnold Vaughan found his Hercules fighting turbulence. With peaks looming above him, his air speed needle would fluctuate wildly. At 160 knots he'd pull power, the needle would drop to 130, and he'd hastily put on power to avoid a stall. He was flying in the same conditions as Hartwell had, he thought, but he had the power, he could almost stand the Hercules on its tail, he wouldn't want to be flying this in a Beechcraft...

On the 14th, three Hercs picked up ELT bleeps, five short bursts in the Contwoyto area. "They're too short to give us a fix," a pilot reported. "The longest was five seconds."

Excitement keyed up the search teams and the search-masters. They put all their Hercs in the area and sent in an Argus that night, an impractical plane in sub-zero weather because its engines seize overnight, but a noisy plane (thus easier for a survivor to hear) with a sensitive homing device. No more bleeps were heard.

They checked to see if a pilot had been testing his ELT but not even an Eskimo hunter had been in the area. Feeling let-down, they went on with their detailed coverage, moving south.

As the search widened, publicity mounted. The telephone jangled all day: TV and radio reporters, editors of dailies, wire services and magazines from as far away as London, England and Hamburg. Clairvoyants were calling, describing the area in which they "saw" the crashed plane. None were given high priority but none were disregarded; when the area could be found on the map it was checked.

Pressures were mounting: problems of maintenance, pay, supplies. Ron Cree, who ran Gulf Oil's line operation, was away, leaving an inexperienced man on the fuel truck. The Hercules were coming in between four and 6:30 pm and some were still waiting for fuel at eleven o'clock.

White phoned Cree's wife. "When's Ron coming home?"

"Well, he went to a conference in Calgary, and he's taking his holidays at the same time."

"Try to get through to him, will you? We're having problems."

In the morning Cree phoned from Victoria. "Do you think I'm needed back there?"

"I don't know, Ron. But remember, Esso has fuel too, and we can't have aircraft standing around all night."

"I'll see you soon." Cree said. Next morning he was on the job with a Gulf supervisor from Edmonton, and by working day and night for three days had the fueling running like clock-work.

Gathercole was now working 16 hours a day, eating poorly, sleeping little, and growing tired. And Susan Haley, obsessed by hope that the beacon contacts had been the survivors', was pressuring him to keep on searching an area already combed. Believing her wrong but not totally sure, he asked for help from Mace Coffee, a leading expert on Arctic survival once known to Eskimo friends as "the arctic fox," and now scientific adviser to Northern Region.

Dr. Coffee called Defence Research Board in Ottawa. Within an hour he had five groups of scientists working on five questions. What was the power output of the three sets of batteries the plane had carried? If the batteries were low what part of the beacon would fail first? What are the characteristics of a Dart 2 beacon signal? A defective beacon signal? Signals from a beacon with failing batteries? In three hours he had the answers. He worked up "models" to meet different circumstances, and concluded that the signals most likely came from a Hercules beacon accidently activated by a short circuit.

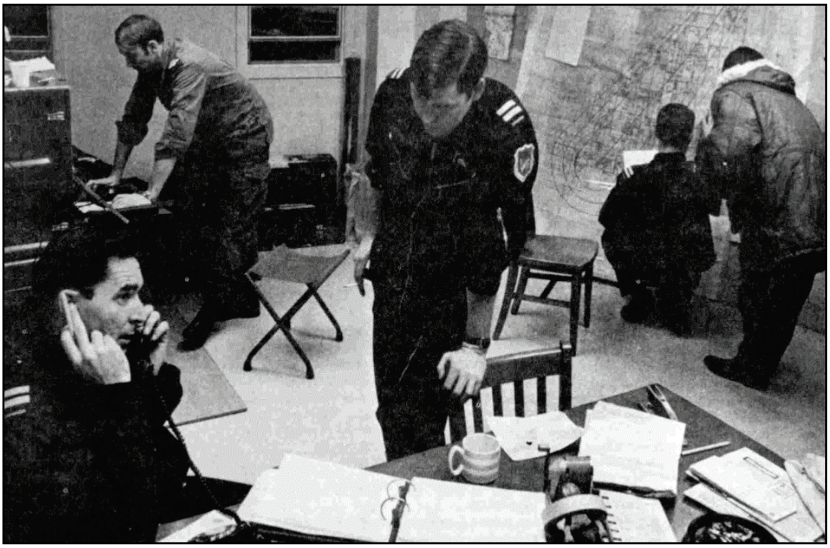
Miss Haley continued her pressure. She wanted Argus aircraft brought in. She tried to get pilots and airlines to form a private light-aircraft search force. She tried to persuade the RCMP and the Territorial government to send out a ground search party—to search 9,000 square miles. She complained about search procedures to the press. By the third week, Gathercole would busy himself when she came in the office, ignoring her so that he wouldn't lose his temper.

Normally mild and sympathetic, concern was fraying his nerves. The days that had once begun with hope were distinguished now only by false sightings: flashing lights, a marine beacon; a plane that proved to be an old wreck; oil drums that looked like a signal; a rock shaped like a leanto. Each one had to be carefully, sometimes dangerously checked out. In town and in his office now the talk was of survival. Temperatures on the barrens had dropped to the minus-thirties. As he wrote up his 25 November sitrep—his situation report—hours flown: 952; area covered: 80,500 square miles – Gathercole knew that he faced the most painful decision a search-master can make.

He thought it out. He had checked all leads, covered hot areas once, some twice. Flown out 130 miles on either side of track. Within his prime search area, he was sure, there was no one alive. Outside it, well … But where did you stop? From Hartwell's last known position, he had five and a half hours fuel left … 900 miles in any direction … two and a half million square miles ... an impossible area to even contemplate searching.

That night, a Saturday, he wrote a message to N.D.C.C. – National Defence Command Centre: "YOUR CONCURRENCE IS REQUESTED FOR THE SUSPENSION OF SAR HARTWELL AT END OF DAY'S ACTIVITY 27 NOV/72."

The decision left him depressed and troubled. For two hours, alone, he reviewed it. Had he made it because he knew that planes would be needed for other searches, because cargo was piling up, courses suspended? "Was there really nothing more he could do? ... No. And yet ... I feel," he told White, "as if I'm committing four people to eternity."



The decision was approved by the well-informed: most bush pilots and Yellowknife citizens, the RCC, the NDCC, the chiefs of staff and the deputy minister of defence. But it was not approved by Susan Haley. Almost daily she had been phoning her father in Wolfville, N.S., where he chairs the mathematics department of Acadia University. And while Gathercole was packing up to report back to Edmonton, Dr. David Haley was composing a letter to the *Globe and Mail* protesting this abandonment of the search.

The letter was a passionate pointed censure of Search and Rescue, its planes, methods and "half-hearted manner." South of Yellowknife, where both papers blasted its "ignorance" and "untruths," many people found it moving. CBC radio picked it up. In the late afternoon of 30 November, the Minister of Defence, a newly-appointed westerner, James Richardson, called in Lieutenant General Stan Waters, deputy chief of defence staff for operations, and Major General Dave Adamson, chief of air operations, and told them he thought the search should be resumed.

At four pm that day Colonel William Houser, Edmonton base commander, received a teletype: "THE MND HAS DIRECTED THAT SAR HARTWELL BE REACTIVATED." Houser called Keith Garthercole, who had already heard rumors. "We want the same team back there," Houser said, "or people might think we don't believe you did a good job, and we do."

By 1:30 the next morning Gathercole was back in Yellowknife with five military planes and instructions to "recover areas of highest probability." Richardson had swiftly defused a political situation, but technically, Gathercole had been right. Whether or not the search had resumed, the end would have been the same.

On 7 December, a Thursday, a routine CAF Yellowknife flight picked up a distress signal south of Great Bear Lake, homed in, then lost it. After failing for a day and a half to pick it up again, Gathercole and White were sitting glumly in front of their radio on Saturday morning when the voice of Ken Moody, captain of Hercules 325, came in: "Have sighted aircraft crashed in tree beside hillside clearing. One survivor waving a red fusee (a flare)."

Gathercole, galvanized by excitement, told Moody to orbit the clearing and direct the rescue team when it arrived: a helicopter and a Hercules with two paramedics aboard, Corporals Al Williams and Harvey Copeland.

The Hercules captain, Neil Toby, came in under lowering cloud to drop camping gear, food and a medical kit in the clearing, conscious that this was how, only a year before, a CAF Dakota had crashed, killing eight. Toby found a hole in the ceiling and the paramedics dropped through. As they struggled through waist high snow to the clearing, Austin Hayes was landing the helicopter.

A bearded man was wolfing canned pears from the food drop. "Welcome to my camp," said Marten Hartwell to Major Hayes. "I'd just about given up hope."

The "camp" was a leanto made of two sleeping bags slung across a spruce pole, a stretcher, engine cover and hospital blanket. Hartwell had

broken his nose, a knee and both ankles, but by now he was able to hobble around. The others were dead: Miss Hill when the plane struck the hillside, Mrs. Nulliayok five hours later, David Kootook after surviving 22 days. Hayes radioed for instructions, was told not to touch the bodies. They bundled Hartwell into a sleeping bag, onto a stretcher and into the helicopter, where he smoked and talked nonstop to Harvey Copeland.

He had been on course when the Cambridge beacon had faded out, he said, and with poor reception because of frost he couldn't raise Contwoyto. Cloud had closed in and wind nudged him west until he broke into starlight. Hoping to get less static he'd dropped to 2,500 feet. Then "monkeying around with the ADF" —automatic direction finder—he brought in Fort Wrigley loud and clear and knew he was far to the west. He reached for his map, switched on a light, and he must have been losing altitude.

He owed his life, he said, to fourteen-year-old David Kootook, who under Hartwell's instructions had built the shelter, collected firewood, and an edible rock moss called lichen. From the hill, Hartwell said, they could see a lake. When rations ran out he sent David to fish it. The boy came back two days later emptyhanded, lost heart, and died.

In Gathercole's office some 20 excited reporters were clamoring for facts, while Gathercole, chain-smoking and nursing a headache, was secretly arranging for an ambulance that met the helicopter on the tarmac and drove Hartwell unseen to hospital. Frustrated, one reported snapped: "DND will pay dearly for this!" But Gathercole, impenitent, wanted next-of-kin to be notified before they learned of the deaths through public headlines.

It was just the first of the media's frustrations. Hartwell refused all interviews (granting only one short press conference 12 December). And his reticence was accompanied by unusual security precautions, for after the RCMP collected the bodies and MoT investigators examined the crash site, the Yellowknife coroner, Walter England, ordered it cordoned off. Further details should not be publicized, local publishers were warned, until after the coroner's inquest and the MoT report. But no one could stop the rumours spreading through Yellowknife bars and coffee shops and the little plane-linked settlements of the north. Cannibalism, it was said. Hartwell had eaten the flesh of the nurse (an inquest later proved the rumors right).

Back at Namao on the eleventh some aircrew were having a drink in the mess. "You risk your neck and what do you get?" said one. "Criticism!" At RCC Gord Moore was reckoning the cost of the search for a journalist: "Very roughly, $1,500,000." Gathercole, who had lost 15 pounds, was making out his reports. Siminoski, who had been on the phone recording and listening, hung up. "Looks like we got another one," he said.

Chapter Ten

Operation Morning Light

Major Bill Aikman, reprinted in *Sentinel*, vol. 14, no. 2 (1978)

At 4:40 am on 24 January, 1978 at NORAD'S Space Defence Centre deep inside Cheyenne Mountain, Colorado, Captain David Tholen, Chief Orbital Analyst receives a message from a telescopic camera station at Maui, Hawaii. The trackers there report that a Russian satellite on a trajectory towards Canada's Queen Charlotte Islands is glowing with heat and is beginning a fiery re-entry into the earth's atmosphere.

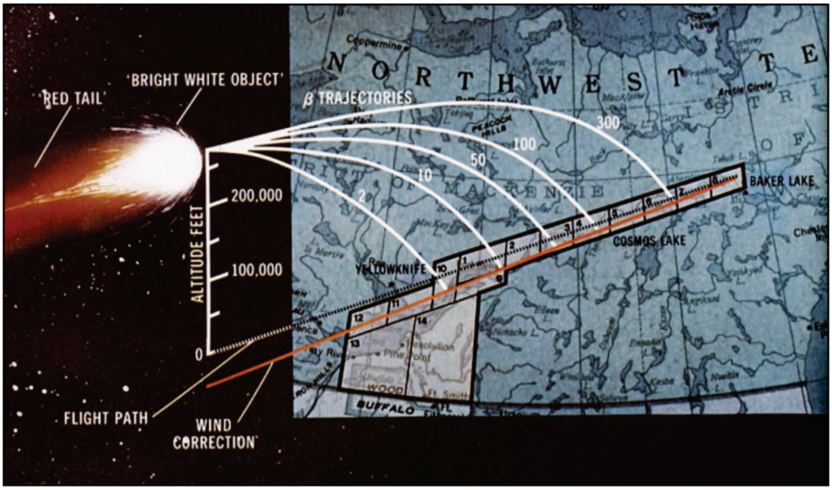
Captain Tholen reaches for his emergency phone to notify his NORAD superiors.

Fifteen minutes later, a patrol car carrying two RCMP constables along the darkened wintry streets of Yellowknife, NWT skids to a halt. They stare in amazement as a bright red, incandescent object streaks in a north-easterly direction across the black sky. As it plunges towards the earth dozens of little pieces break off and tumble over and over on their way to the ground. The constables immediately radio their headquarters.

Cosmos 954, a nuclear-powered Russian satellite, has disintegrated and fallen to earth in Canada's Northwest Territories.

The plunge to earth of this maritime surveillance satellite was not unexpected. Launched on September 18, 1977, the Russian satellite began behaving abnormally within weeks. Soon NORAD's computers were predicting that the satellite would fall in April, 1978.

However, in early January the computer predictions were revised to 23 January, plus or minus 48 hours. During this critical period, Cosmos 954 would orbit the earth several times, and would overfly Australia, New Zealand, and North America. On 19 January, the American government notified all nations potentially involved of the developing danger, and offered American assistance.



The next day, senior Canadian government and military personnel discussed the situation. After the meetings, National Defence Headquarters sent warning orders to all regional commanders and Nuclear Accident Support Teams (NAST) at bases across Canada.

The conferences continued for several days. Still no one could be certain of where the satellite would re-enter the earth's atmosphere.

DND was assigned the lead role in the potential search for the radioactive debris, and the Atomic Energy Control Board (AECB) was assigned responsibility for the recovery of any debris.

Then came the fiery re-entry of Cosmos 954 somewhere over the Northwest Territories.

Fourteen minutes later, President Jimmy Carter of the United States telephoned Prime Minister Pierre Trudeau to advise him of the situation, and to repeat the offer of American assistance.

The Canadian government was now faced with several urgent questions. Had the intensely radioactive core disintegrated while re-entering the earth's atmosphere? Or had it crashed, with its potentially lethal fragments radiating from the depths of the all-encompassing snow? Or had both occurred?

Operations Begin

President Carter's offer was accepted. Soon the wires between the two capitals were humming as commanders made their initial contacts and plans. Operation Morning Light, the search for the radioactive elements of Cosmos 954, had begun.

Operational responsibility was assigned to the Commander of Air Command, Lieutenant-General William Carr. He in turn assigned on-scene command to the Base Commander of CFB Edmonton, Colonel David Garland.

The first search efforts were directed towards identifying major radiation sources, particularly in inhabited areas. NORAD's calculations indicated that the satellite, after a 15 minute re-entry through the earth's atmosphere, had crashed somewhere between Yellowknife on Great Slave Lake and Baker Lake, 800 km to the northeast. This was in a sense fortunate, for the land between the two points consists of the Barrenlands; for the most part a treeless, uninhabited area.

South of the computed track on Great Slave Lake lay the communities of Fort Reliance, Snowdrift, Hay River and Pine Point.

Col. Garland immediately dispatched 25 members of the CFB Edmonton NAST team to Yellowknife, 1,000 km farther north by air. They were to check the city (population 10,000) and the other smaller communities for radiation.

Under the command of Captain John Lyne, the NAST team departed shortly after noon for Yellowknife, and arrived in time to carry out a detailed survey of the town that evening. The normally easy-going citizens of Yellowknife were startled by the sight of yellow-garbed troops walking the streets, reading radiation meters and taking air samples. Tension dropped when negative results were announced.

By noon that day, American search activity had begun. One U-2 and one KC-135 jet aircraft with special radiation monitoring equipment aboard were winging their way north to check the upper atmosphere along the satellite's path, to ascertain whether or not a radioactive cloud had been created by the disintegration of the nuclear reactor and its Uranium 235 core. The results were negative.

The first search efforts had provided no hint as to what had happened to Cosmos 954.

Search Force Organizes

Meanwhile, back at Edmonton, the entire base prepared itself for the onslaught of technicians and scientists, both Canadian and American, and for extended search operations. The Morning Light Operations Centre was set up, and supply technicians, transport drivers, cooks and telephone operators readied themselves and their equipment for days or weeks of round the clock operations. At the same time aircrew, ground-crew and maintenance personnel for 435 Squadron's Hercules, 408 Squadron's Twin Hueys and Kiowas, 440 Squadron's Twin Otters, and 450 Squadron's Chinooks went on standby for search operations.

Far to the south the Americans were mobilizing their search effort. Several years ago, the US Department of Energy (DoE) organized Nuclear Emergency Search Teams (NEST) to search for and locate lost or stolen radioactive materials. The NEST expertise proved to be tailor-made for the Cosmos 954 search.

The NEST system is based at DOE's Las Vegas, Nevada operations office (the same office that runs the Nevada nuclear test site). Under the direction of Brigadier General (ret'd) Mahlon Gates, the NEST organization had been preparing itself for the plunge of Cosmos 954 for several weeks. Team members had been detailed, equipment had been selected and loaded on pallets, and by 22 January five fully-loaded C-141 Starlifters were sitting on the ramps at McCarren International Airport near Las Vegas, at Andrews AFB Washington, D.C. and at Travis AFB, California, all ready to go.

Since there was no reliable information on where the satellite would land, many of the scientists had two bags packed; one with summer clothing, the other with winter clothing.

By mid-morning of 24 January, arrangements between Canada and the US were falling into place. It was agreed that the NEST organization would operate out of Edmonton under the direction of Colonel Garland. Two C-141's lifted off from McCarren and Andrews just after noon with over 70 Americans aboard, and by suppertime were touching down at Edmonton's Namao Airport.

At almost the same time, Dr. Bob Grasty of the Geological Survey of Canada arrived at Edmonton from Ottawa. Dr. Grasty, a specialist in aerial survey for radioactive materials, was the first of approximately 30 Canadian scientists and technicians from the AECB; Energy, Mines and Resources, and Environment Canada who would work with the CAF and the Americans in the search and recovery organization.

That night the Americans moved their equipment into a hangar at Namao, picked up CAF winter clothing, and met with the Canadians to work out the plans of operation.

One of the first points resolved was the search area. Using computer re-entry predictions, the scientists plotted a 50 kilometer wide zone starting at a point on Great Slave Lake 80km southeast of Yellowknife and running 800 kilometers northeast towards Baker Lake. The potential "hit" area was huge, approximately 40,000 sq km. For planning purposes it was divided into eight equal sectors.

Hercules Search

Search procedures were also clarified. First, there would be a general search of the area, using the C-130 Hercules of CFB Edmonton's 435 Transport Squadron. Each Hercules would carry a gamma ray spectrometer, a device designed to determine the amount of radiation emitted from a ground source. Each aircraft would fly a grid pattern 1,000 ft over the suspected satellite crash area, with the lines of the grid one nautical mile apart. If the equipment detected a hit (the search teams' term for a suspicious reading on the spectrometer), the location would be noted for detailed checking later by helicopter-borne recovery teams.

The Canadian gamma ray spectrometer (designed for uranium exploration and geological mapping), was shipped from Ottawa. In the meantime, the American NEST organization arrived with three. Two spectrometers were already mounted in two Hughes 500 helicopters, which had been transported to Edmonton by the Starlifters.

However, the limited range of the helicopters precluded their use in the vast North. Rather than waste time dismantling and transferring the equipment, one of the helicopters was pushed into the back of a CAF Hercules, and at 1:30 am on 25 January, the first search flight was airborne.

Three Hercules carried out five search missions that day. Soon the rhythm of the search developed. An aircraft would take off for a 12 to 14 hour mission. Upon return it would refuel and take off again with a new crew and team of technicians. Fourteen hours later the cycle would begin again with another crew.

In the air, the work was tedious. The aircrew took meticulous care to keep on course as the aircraft lumbered up and down the imaginary lines one mile apart across the tundra.

Navigation was a major problem. South of the treeline (which cuts across the projected satellite track just northeast of Great Slave Lake) there were clear reference points. North of the treeline the pilots looked out on a white featureless land where only instruments could assist in maintaining accurate lines. In an area with few navigational aids and a reputation for compass unreliability, the aircrew and scientists had cause to worry about their ability to pinpoint a hit.

Meanwhile, back in the cargo compartment, the scientists took turns watching several needles as they slowly swayed up and down across a piece of graph paper, waiting for the telltale swing that would indicate a hit.

Late Wednesday night they had their first success. A Hercules with an American team aboard reported a hit in sector five, approximately 300 km east-north-east of Great Slave Lake. But, when the tapes from the gamma ray spectrometer were run through a computer in Edmonton, the proportions of uranium, thorium and potassium were not what could be expected from a Uranium 235 core. The scientists faced one of the classic problems of this search. The rocks of the North are full of uranium, thorium and potassium in varying concentrations. Was this hit an outcropping of natural uranium, or was it a piece of the reactor core so dense that it had buried itself deep into the tundra? Or was the search equipment simply miscalibrated? Exhaustive discussions on this matter continued for the next few days.

Baker Lake

It soon became clear that if downrange hits were to be checked out, a forward search detachment had to be set up nearer that end of the search area. On 26 January, the centre of the search shifted to the east when Lieutenant-Colonel Donald Davidson flew into Baker Lake with a mixed American-Canadian scientific team, a photographer, a rescue specialist, and communications personnel.

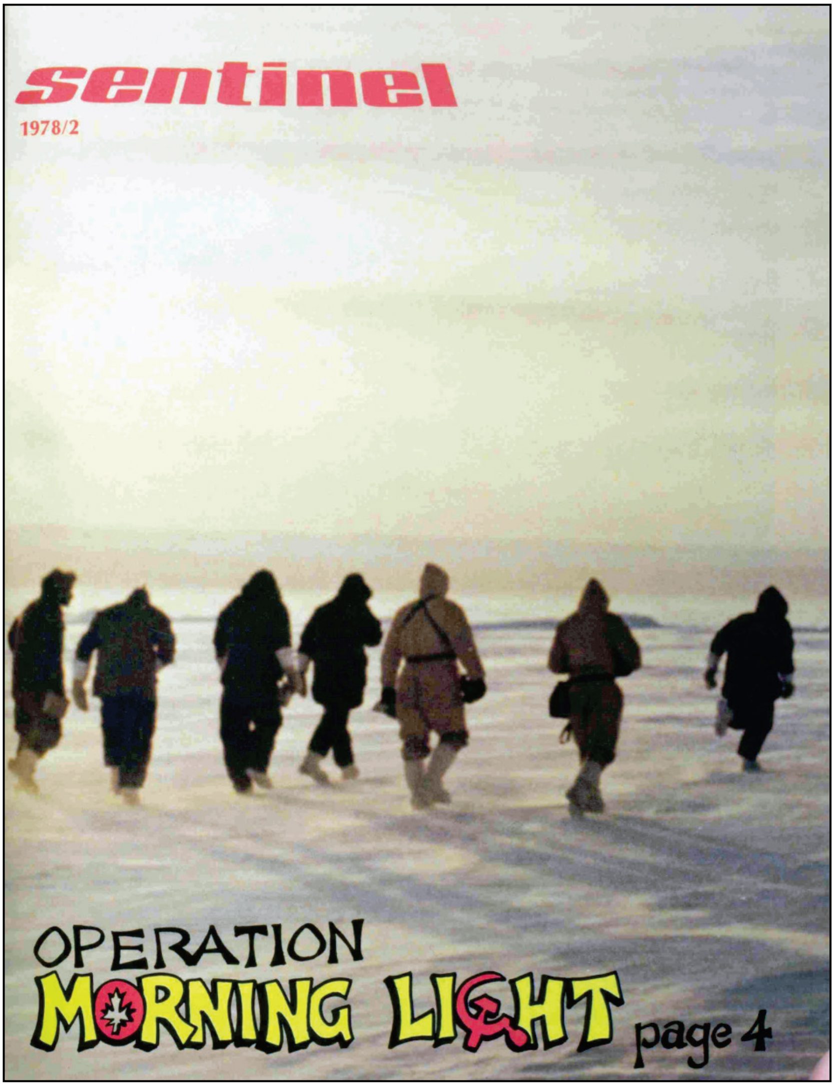
The same day a 450 Squadron *Chinook* helicopter arrived from Yellowknife with three NAST team members. The Chinook had flown 3,000 km directly from an Army exercise in the Chilcotin area of British Columbia.

That night, the detachment carried a radiation check of Baker Lake, a community of approximately 1,000 Inuit. Operations were set up in the Iglu Hotel, a large quonset hut. During the next two days, in -40°C temperatures, they carried out the first helicopter searches at the far end of the search zone, with negative results.

Hits Confirmed

At the operations centre in Edmonton, resources available for the search continued to increase. The Canadian gamma ray spectrometer arrived on the morning of the 26th, and was quickly installed in a fourth Hercules. The Canadian scientists were keen to watch its performance, as the spectrometer had been designed and built only last year by Quentin Bristow of the Geological Survey of Canada.

A US DoE Convair turboprop aircraft arrived the same day to begin flying infrared search and photographic runs over the satellite track. On 29 January, two Argus maritime patrol aircraft arrived from CFB Summerside to assist in the search. The Convair's infra-red searches were to prove fruitless, but its photographic runs plus those of the two Argus provided invaluable aerial photos of hit sites and the entire search area. In the afternoon a team of AECB scientists arrived in Edmonton to round out the initial Canadian-American search team.



At this point, the tally of CF aircraft now involved in Operation Morning Light included four Hercules, four Twin Otters, three Twin Hueys and two Chinooks.

On the night of the 26th, a Hercules carrying the Canadian spectrometer loaded up with its crew and technical team plus a dozen journalists, eager to observe the search activity. The aircraft lifted off and headed north to search a section near the eastern end of Great Slave Lake.

Soon everyone aboard was experiencing the monotonous search routine as the aircraft began the steady, laborious job of tracking along grid lines.

On the 17th and final pass, reporter Sid Handleman from the Toronto Star leaned over the shoulder of spectrometer operator Bob Grasty and asked why the needle was swaying so much. Grasty replied enthusiastically "I think we've got a hit." As everyone crowded around, the scientists and aircrew pinpointed the radiation source on near Great Slave Lake, just off the mouth of the Hoarfrost River, 27km north of Fort Reliance.

Computer analysis confirmed the hit. Two days later a second aircraft not only reconfirmed it, but also found several more hits in the same area. Operation Morning Light had its first unqualified success.

Thelon River

However, these discoveries were all but forgotten with the news that two young men had found pieces of metal at a site farther east. On 28 January, the Yellowknife meteorological station received a radio message from six men camping for the winter at Warden's Grove on the Thelon River, halfway between Yellowknife and Baker Lake. They reported that pieces of metal were protruding from the frozen surface of the river, 12 kilometers from their camp.

Two of the men, John Mordhorst and Mike Mobley, had left the campsite on 25 January to travel by dogsled north along the Thelon River to learn more about the barrenlands. That morning they saw nothing as they passed the crash site along the far side of the river. Returning on 28 January, the men turned off their trail to discover more about the area to the west of the Thelon. As they mushed around the river bend, they saw several pieces of metal extending out of a re-frozen crater. Mike Mobley walked up to the crater and touched the strange metallic structure. Not knowing exactly what he was dealing with, he backed off. The two men cut their trip short, and returned directly to the camp at Warden's Grove.

The four other campers had already learned of the satellite's crash on their radio, after querying Yellowknife about the frequent overflights of search aircraft. The group immediately reported the discovery.

An incredible chain of unlikely events had occurred. A satellite with little likelihood of coming down on land or of surviving re-entry through the earth's atmosphere had done both. It had then broken up and spread across hundreds of kilometres of almost totally uninhabited snow-covered land. And two men, in the midst of that vast expanse, had stumbled upon several pieces within four days of the fiery crash.

The immediate effect of this report and the Hoarfrost River area discoveries was to bring the centre of the search back to Yellowknife. For the past few days, the staff at Northern Region Headquarters had monitored the search activity, but apart from a NAST check of Fort Reliance which revealed negative radiation readings, there had been little activity.

All this changed within hours. Under the command of Lieutenant Colonel Alex Bialosh, a combined Canadian-American scientific team flew north, arriving in Yellowknife late in the night of 28 January. By the next morning the new forward search detachment was functioning out of the NRHQ operations room.

The main objective that morning was to get into Warden's Grove and get the six adventurers out for a medical examination. The Thelon hit site was dead on the predicted satellite track, and the men's description of the crater gave the impression that something large and dense (perhaps the nuclear core) had penetrated the ice. If Mobley and Mordhorst had been exposed to enough radiation, they and their friends could be in grave danger.

A Chinook helicopter at Baker Lake lifted off for Warden's Grove as soon as the technicians could warm it up enough to start (a major problem at 40 below), and a Twin Otter flew east from Yellowknife carrying NAST members and Dr. Savino "Beanie" Cavender, MD, an American nuclear medicine specialist. From Edmonton a Hercules took off carrying a gamma ray spectrometer, to check the hit site and to provide navigation assistance if required.

The Twin Otter picked up the four men who had not been to the crash site, and returned directly to Yellowknife. Mobley, Mordhorst and Dr. Cavender climbed aboard the Chinook for the short trip to the crash site, soon to be known as "Satellite One."

Faced with a radiation source of unknown strength, the search team was extremely wary of landing at the site. The helicopter came down on a small rise 500 metres away (where, a week later, a military camp would rise). Lieutenant Colonel Davidson, NAST member Pte Mona Wilson, two American scientists and a photographer then waded through hip-deep snow towards the hit site, carefully monitoring their radiation meters.

The tree line extends north here, following the protection of the river valley. The search team gamely floundered through the snow and scrub brush until they reached the hard-packed wind-swept surface of the river. Then they slowly moved forward. The radiation readings remained relatively low. The protruding metal produced readings of ten to 100 milliroentgens per hour; not the several hundreds of roentgens per hour that the solid core would produce.

Had a major piece of the satellite crashed through the ice and imbedded itself in the river bed? The scientists could not immediately resolve that question. Time was running out.

The team was experiencing one of the major problems of the search. Satellite One was 400 km from the nearest airport (Baker Lake), and a one way trip took two and a half hours. Coupled with the extremely short Arctic day (approximately seven hours in late January), possible on-site time was a maximum of two hours.

Soon the helicopter pilots were urging the team to pack up and return. There was just enough time to photograph the site, take basic measurements, collect samples for later analysis, and leave.

As the Chinook flew back to Baker Lake, the team learned that the gamma ray spectrometer in the overflying Hercules had discovered several more hits in the area.

The search force did not know it at the time, but fortune had been with them. The Arctic high pressure area which had brought frigid cold but calm weather to the area since the beginning of the search was about to end. By next morning, high winds would obliterate the Satellite One site. The opportunity to take detailed photos of the splash pattern (so valuable later in analyzing what had happened) would have been gone.

That night, Mike Mobley and John Mordhorst were flown from Baker Lake to Edmonton and placed in hospital to be tested for radiation exposure. The doctors soon concluded that they were perfectly healthy, with no more radiation exposure than one would receive from one or two x-rays.

The next day at a news conference they cheerfully related their experience to the world. When asked how he felt, Mike jumped and kicked his heels.

Upon their release from hospital, the two men were hired by the CAF to act as guides in the Thelon River area. When that job ended they returned to their small campsite at Warden's Grove.

That night the CAF became concerned about the security of the Satellite One crash site. The radiation situation was still not clear, and there were rumours that members of the news media were chartering aircraft to fly into the primitive Warden's Grove airstrip.

The media flight never materialized. Instead, before dawn on 31 January, four paratroopers from the Canadian Airborne Centre in Edmonton parachuted into Warden's Grove to set up a guard and take care of the dog team left behind when the men flew out.

Great Slave Lake Search

As the scientists analyzed the puzzling results of the Satellite One find, and reporters from around the world scrambled to interview the adventurers, operations out of Yellowknife continued. Lieutenant Colonel Bialosh flew in with several NAST members and scientists to the Fort Reliance area to pinpoint the initial hits.

At this point in the search, the Hercules crews could give only an approximate position of the hits they discovered. Twin Hueys carrying radiation monitoring equipment then flew low over each hit site, circling until the hit was confirmed and its general location narrowed down. Then the scientists accompanied by NAST members would disembark from their Chinooks, spread out across the ice, and sweep the area. When the meters started to indicate a reading, the team would home in on the signal until they found the source. It was a process which demanded long hours on the wind-swept ice, in the bitter cold of the Arctic winter.

In this manner a 20 R/hr piece was located at hit one. It was a small metal bar, only a few inches long. The site was marked with flags and tape so that recovery crews could return with a lead-lined cask to pick up the

piece. Later the radioactive material would be shipped to the Atomic Energy of Canada Ltd.'s Whiteshell Nuclear Research Establishment at Pinawa, Man.

On 30 January, the search teams returned to the eastern end of Great Slave Lake. This time they took with them two RCMP constables and two NRHQ military policemen to guard the hit sites. Aware that the radioactive pieces were only a short snowmobile ride from Fort Reliance, they were determined to prevent casual visitors. The weather had changed for the worse, forcing the site guards to pitch their tent out of the wind in the lee of a point of land 200 metres away.

With this job complete, the searchers turned to the task of checking hit two, a short distance away. Out on the open ice, with winds now so high that the wind chill factor was dropping below 100°C, the team set up their search pattern.

As they started to walk towards the suspected hit site their personal radiation dosimeters began emitting a high pitched chirping sound. Soon the air was filled by what sounded like a field of crickets. Suddenly needles on handheld instruments began to bounce off the low range scales. The team had located a small piece of metal emitting 200 R/hr.

The search team carefully marked the site, and, again faced with limited onsite time, returned to Yellowknife.

There the scientists puzzled over the problem of recovering the 200 R/hr source.

None of the normal AECB lead-lined casks were designed to provide protection against such a powerful source, and a man exposed to only two hours of such radiation would probably die. The only solution was to manufacture an appropriate container. The job was given to technicians at the University of Alberta, while the search teams continued with other search and recovery efforts.

That same day, a NAST element flew to Snowdrift, to check the 90 Indian residents for radiation. As the team disembarked from its aircraft and spread throughout the village, the natives fled indoors. They didn't know what was happening, and they didn't like it. The next day NRHQ commander BGen Ken Thorneycroft flew to the village to explain the situation, and advise them that no radioactive sources had been found in Snowdrift.

On 31 January, the Yellowknife-based recovery teams flew by helicopter over the ice of Great Slave Lake to recover the 20 R/hr source at hit one. As they flew eastward, they received a radio message from a nearby CAF Twin Otter. Something had been spotted on the windswept ice of the lake.

The helicopters landed. This time the dosimeters did not break into their peculiar chirping. Instead the searchers came across a large stovepipe-shaped tube, charred from re-entry. Lying about in snow were a large number of smaller pieces. All were non-radioactive, and were quickly bundled up for transport to Yellowknife. The markings on these fragments furnished conclusive proof that Operation Morning Light had located parts of a Russian satellite.

The team then continued on its mission to recover the 20 R/hr source. Using long tongs, an AECB scientist carefully picked up a small metal rod and dropped it into a lead-lined cask.

But something in the area still emitted radiation. The 20 R/hr source had masked the presence of other radioactive pieces. After a brief search the team found another fragment, and it too was deposited in the cask.

Multiple sources were to become a common discovery over the next few weeks.

Properly sealed, the lead-lined cask was flown back to Yellowknife, and later to Pinawa.

Recovery teams and aircrew were checked for radiation after every mission. NAST members carefully monitored their clothing for contamination. Frequently the snow around a hit site was contaminated by minute radioactive particles, and mukluks or pants could be easily contaminated. Any item of clothing which produced a reaction on the meters was immediately removed. Wrapped in plastic for security during transport, the material was later shipped to WRNE in Manitoba for disposal.

Progress Assessed

The scientific team had recovered satellite fragments. Now, the first steps could be taken towards completing the jigsaw puzzle that Cosmos 954 had become. Each fragment, when studied and analyzed, told more of the story of how the satellite re-entered, burned and broke up. This information improved the search team's ability to predict the locations of other satellite debris.

Simply stated, the probable position of a satellite fragment depended on its density and its shape. The scientists expected the lightest pieces with the largest surface areas to have the greatest resistance against the air, and to fall short in the westernmost section of the re-entry zone. Dense pieces with minimal drag would have travelled farther downrange, to the vicinity of Warden's Grove or farther.

The military commander now decided to enlarge the search area. With so many small hits in Sector One, two more sectors (numbered nine and ten) were added to the search area at the westernmost end.

By 31 January the Hercules search aircraft had completed their general search of all ten sectors, and all hits created a "footprint" within a narrow ten kilometre wide strip, right down the centre of the predicted re-entry path.

However, neither the aircrew nor the scientists were satisfied with the accuracy of the grid patterns flown by the Hercules. The navigation problem was just too great to guarantee a properly spaced search pattern over the entire area. On 1 February the commanders attempted to resolve this problem by flying three Hercules in a "V" formation, with the aircraft 200 metres apart. The planes flew up and down the entire length of the prime search area, in the hopes that all the prime terrain would be covered without any troublesome gaps.

The results were mixed. The spectrometers detected several more hits that day, but the pilots found that the strain involved in keeping such a tight formation for hours on end was extremely tiresome. The experiment was abandoned.

On 2 February, the Americans flew in the solution to the navigation problem – a microwave ranging system (MRS). The MRS consists of directional beacons which are placed on two high points of land 20 to 50 kilometers apart. A receiver/computer mounted in the aircraft receives the two signals and, using triangulation principles, monitors the exact position of the aircraft and enables the pilot to fly along a specific path.

Accurate coverage was now assured, and hits could be pinpointed to within 200 metres.

The beacons were placed in position in Sector One by helicopter, and on 3 February the MRS went into operation. From that point on one MRS-equipped Hercules aircraft flew a 20 to 50 kilometers square area each day. It would clearly take weeks to cover the entire search area at this rate, but at least it would be covered accurately and completely.

Search and recovery operations continued at the eastern end of Great Slave Lake throughout the first week of February, and on 4 February the scientists were ready to recover the 200 R/hr fragment. The U of A technicians had constructed a lead container (nicknamed "the pig") weighing more than half of a ton.

That morning, with Defence Minister Barney Danson and 30 members of the media observing, a recovery team dragged the pig from a helicopter and using tongs quickly put the source into the pig.

The observers obtained a clear idea of the problems involved in the search. They spent one and a half hours flying to the site, then stood in the open in -40°C temperatures and high winds to watch the recovery operation. Cameras froze, and when bare flesh touched metal, it stuck. It was not an enjoyable experience.

Riddle Solved

During this week, the Baker Lake search detachment was experiencing its share of problems. The scientific team had flown into Satellite One again on 31 January. Through the winter's worst blasts of icy cold and wind, the scientists dug out the drift-filled crater in an attempt to find out what was below. Gas-powered ice augers froze in the bitter cold, and the team reverted to Inuit ice chisels to chip through the metre of ice. Underneath the scientists found a few centimetres of water and then sandy river bottom, but no sign of radiation.

This left them thoroughly puzzled. The only way the light strut-like rods found on the surface would have been dragged so far downrange was by something dense. But where was the dense object?

The search commanders had already considered this question, and plans were in the making for a detailed search of the entire area. There were even thoughts of damming the Thelon River in order to study the river bottom.

With an extensive search in mind, Col Garland directed Lieutenant Colonel Davidson to pick a site for a landing strip and a forward base camp.

As the scientists continued taking their measurements on the river, Davidson checked a nearby backwater-cum-lake (soon to be known as Cosmos Lake) for its feasibility as an airstrip. Then time ran out. Leaving Master Corporal Pat Callaghan, a rescue specialist, and an RCMP constable to guard the site, the team flew back to Baker Lake.

The next day 450 Squadron maintenance crews fought the bitter cold to keep the Chinook serviceable, and a day later the team returned to the site to take more measurements.

On 3 February, a Twin Otter and a second Chinook (recently arrived from 450 Squadron headquarters in Ottawa) carried the scientific team into Satellite One. After more hurried measurements, the scientists packed up and returned to the shut-down helicopter.

With everyone loaded in, the pilot attempted to start up. One rotor turned; but the other would not budge. Eighteen people faced a night outside in the middle of the Arctic winter.

This sort of predicament was exactly why rescue specialist Pat Callaghan was there. As darkness enveloped the scene and the temperature plunged, Callaghan had instructed the Canadian and American scientists, the aircrew and NAST member Private Mona Wilson to quickly erect a second Arctic tent (Callaghan and the RCMP constable already had one set up).

Soon the search team divided into two groups (smokers vs non-smokers) and settled into their tents to a meal from the aircraft survival pack. It was a memorable experience for everyone, particularly for the American scientists, who had been working in balmy Las Vegas ten days before.

The aircraft breakdown was a blessing in disguise. It meant the scientists could spend all of the next day at the site, while Davidson completed his ice thickness tests and plans for the airstrip at Cosmos Lake. By the time a Twin Otter returned to pick up the search team, the scientists had confirmed that nothing lay beneath the ice.

That night Defence Minister Barney Danson flew in to Baker Lake with senior officers from Edmonton to assess the situation. The search commanders also brought the results of laboratory tests conducted in Edmonton on Satellite One snow samples. It contained lithium, an element used in the shielding of nuclear reactors. When it contacts water, lithium reacts violently (in the same manner as sodium). The violent reaction of lithium and snow had created a large puddle which when refrozen caused the huge crater at Satellite One. The lithium then dissolved in the reaction. The mysterious crater was explained.

Camp Garland Begins

The Thelon River area was becoming the focal point of search activity, particularly as the MRS search completed its survey of the western Great Slave Lake area and moved downrange. It was clear that a camp and airstrip at Cosmos Lake were essential not only for logistics support, but also as an operating base for the recovery teams and the Twin Hueys they used to check the hit sites.

On 5 February, Operation Morning Light moved into a new phase. The Baker Lake operation began to close down, and Cosmos Lake began to build up. That day, ten pioneers and a medical assistant from the 1st Battalion, Princess Patricia's Canadian Light Infantry, plus a bulldozer driver from 1 Combat Engineer Regiment flew in by Chinook from Yellowknife to set up the first tents of what was to become Camp Garland.

The bulldozer needed to clear the 1,600 metres of ice airstrip on Cosmos Lake arrived next; dropped from a low flying Hercules by Low Altitude Parachute Extraction System on 6 February. Cat driver Master Corporal Sid Behme immediately went to work. Snow, wind-driven until it packed like concrete, slowed the operation. Another bulldozer and two more drivers would be required before the strip would be completed on Valentine's Day.

When the first 424 Squadron Buffalo aircraft touched down on the ice strip on 15 February, three scientists were aboard keen to unpack their equipment and get on with the detailed search of the area. Camp Garland was about to become operational.

During the next six weeks, up to 100 people made Camp Garland their home. Twin Huey helicopters operated from an inflatable hangar, carrying out detailed searches for hits in the area and taking scientists to them.

In addition to normal military communications systems, DND contracted with Telesat Canada to provide a satellite communications terminal at the camp. The 955 kilogram dish-type antenna was flown into Cosmos Lake on 3 March, and within 48 hours the scientists and military commanders at Camp Garland could discuss plans and problems with Edmonton (or anywhere else in North America) simply by picking up a phone.

New Dimensions

In the meantime, there had been dramatic developments elsewhere.

Even before Camp Garland officially opened, the search had taken a new direction. On 10 February, a 408 Squadron Twin Huey with a two-man scientific team was diverted from the search area to the western end of Great Slave Lake to check a peculiar hole in the ice. After inspection, scientists attributed the hole to natural causes, and the helicopter returned to the main search zone. But as it flew above the Snowdrift area, the radiation monitoring equipment started to register hits.

Circling low, the crew soon discovered a dozen hits on the ice of Great Slave Lake, five to eight km northwest of Snowdrift. The low flying helicopter had discovered radiation sources in the low milliroentgen range, too weak to be picked up by the higher flying Hercules.

That afternoon, recovery teams flew to this new site. They discovered many tiny particles, ranging in size from microscopic to peppercorn.

Later testing indicated that these minute pieces were fissionable material – the reactor core.

Over the next few days search missions along the south shore of Great Slave Lake turned up more low-range hits.

At last the searchers had an inkling of what had happened to Cosmos 954's reactor. It had possibly burned up on re-entry, but without complete combustion. Instead, minute pieces had fluttered down from the upper layers of the atmosphere. These radioactive particles, caught in the northerly winds of the night of 24 January, had drifted southwards to "dust" a huge area south of the predicted re-entry path.

The search effort was now aimed at defining the boundaries of the area of dust contamination. On 21 February, helicopters discovered low level radiation hits near Hay River and Fort Resolution. By the end of February the boundary of the additional contaminated area was defined. It contained 80,000 sq km from Hay River in the west to Buffalo Lake in the south, and east to a line drawn roughly from Snowdrift to Fort Smith.

The commanders of Operation Morning Light now faced a new problem. A huge area was contaminated by a fine sprinkling of radioactive particles, spread in random fashion, frequently hundreds of metres apart.

With the prospect of spring break up in early May, neither time nor resources would permit clearance before the snow melted and the particles settled into the soil or the water of lakes and rivers.

AECB scientists recommended the search of all inhabited areas with ground teams to remove all contamination. In addition, Twin Hueys, capable of flying low and picking up lower radiation levels than the Hercules, would survey and clear all transportation routes within the area. Finally, the entire area would be divided into sectors and searched using the radiation detector-equipped Twin Hueys.

During the early part of March, Pine Point, Hay River, Fort Resolution and other southern Great Slave Lake communities were surveyed. In the vicinity of most of the communities the NAST team and scientists discovered a few dozen particles in the micro-roentgen range. There was no question of isolating each particle; a small amount of snow was simply shovelled into a plastic bag and carried away for disposal.

During March the search continued. There were some exciting moments when Inuit hunters on Baffin Island reported discovering a huge re-frozen crater on a lake 25 kilometers northwest of Cape Dorset. The site was on the satellite track, and trajectory experts concluded that it was possible for an aerodynamically-shaped piece of Cosmos 954 to skip along the upper layers of the atmosphere and crash to the earth that far away from the other debris.

A Twin Huey helicopter was quickly dismantled and airlifted to Cape Dorset, where it flew a military/scientific team to check the site. No radiation was discovered in the area. After studying the site carefully the scientists (including ice experts from the National Research Council) concluded the refrozen crater was a natural phenomenon.

Winding Down

Along the main satellite track itself, several more hits (including one of 500 R/hr) were made between Great Slave Lake and Cosmos Lake. These were quickly picked up. By late March, it was apparent that the Cosmos Lake area was cleaned up, and the time had come to close Camp Garland. On 29 March, the last flight departed from the ice strip that had been built with such great effort seven weeks before.

Even before this, the American element of the Operation Morning Light team had started winding down. At its peak, the American contingent numbered 115 people. Their knowledge and assistance had been invaluable, particularly during the early stages of the search. The last American scientist left Camp Garland on 7 March, and the last American gamma ray spectrometer was flown out on 21 March.

The next day the Canadians bid farewell to the last group departing for their home base at Las Vegas. Canada's appreciation was expressed that day in a message from Prime Minister Trudeau to President Carter.

During April, a complete assessment of the operation took place in Edmonton and Ottawa. The search objectives had been met: all radioactive debris identified by the Hercules search aircraft had been picked up (from more than 60 sites); all communities and campsites plus their environs had been cleared, as had all transportation routes in the search zone. Radiation sources being recovered were now in the same strength range as the earth's background radiation. In addition, the scientists calculated that the radiation from the satellite core pieces was decaying rapidly.

The danger to human and animal life had been minimized, and the search effort was now producing limited results. The time had come to reduce the military recovery operation.

On-going monitoring programs will continue throughout the spring and summer of 1978. As has been the practice thus far, DND and other federal departments and agencies will continue to support AECB, which is responsible for protecting the health, safety and security of Canadians with regard to nuclear energy.

Operation Morning Light has been an expensive venture for Canada. At the time of writing, DND expenses alone stood at more than nine million dollars.

There are hidden costs as well. CAF aircraft flew more than 4,700 hours on search and resupply missions, taxing aircrew and the people who support them, and disrupting long-planned exercises and maintenance schedules.

In return, everyone involved has gained superb operational experience under extremely difficult conditions.

Baker Lake: The Search Moves Downrange

How do you explain the concept of a nuclear-powered satellite to people who have no words to describe a satellite, let alone nuclear radiation?

The task demands some effort and imagination, as Lieutenant Colonel Donald Davidson discovered when he spoke to several hundred Inuit people in a Baker Lake school gymnasium last winter.

Davidson was at the school to tell the native people about the potential danger of Cosmos 954, the Soviet satellite that had crashed in the north. Pausing frequently while an interpreter translated his words into Inuktitut. Davidson explained why military personnel and scientists had descended upon the community population 1,000, and why airplanes and helicopters were constantly flying overhead.

His audience was concerned. They wanted to know what radiation would do to the caribou, to the fish and to them. In the end they accepted his explanations and welcomed the strangers into the community. It was an excellent example of community operation at work.

Three days later, the entire search team was back in the gymnasium, this time to watch a native drum dance put on in their honour.

Such was life at Baker Lake. During twelve days of operations, the Morning Light detachment developed a character all its own.

The detachment was set up 26 January with the arrival of Davidson, three NAST members and a mixed Canadian-American scientific team.

They began operations in the only place in town big enough to accommodate them—the Iglu Hotel.

The Iglu Hotel is a large quonset hut owned by the village. It contains double rooms and bunkhouse-style sleeping quarters. No alcoholic beverages are sold, at the request of the Inuit community.

The new customers were surprised by the $63-a-day room and board charge, until they realized that everything they ate had to be brought in by air freight. Later, as the search team grew and overtaxed the hotel's resources, a CAF cook joined the staff to help prepare meals.

The scientific team began their search 27 January, leaving behind Captain John Lyne, of the NAST team, and team member Private Mona Wilson to talk to school children about all the puzzling activity. Their school visit sparked the request for an explanation to the whole community.

Private Wilson's presence intrigued the Inuit girls, who were astonished to discover that women serve in the Forces. The young Edmonton servicewoman spent more time answering personal questions than queries about satellites.

On the same day Davidson spoke to the community, word was received that pieces of Cosmos 954 had been found on the Thelon River. The Baker Lake detachment was ordered to investigate the site, and the next day Davidson headed the search party to the edge of the mysterious crater.

The Baker Lake group travelled 400 km to the hit site in a Chinook helicopter.

Initially, 450 Squadron's powerful helicopters provided the best means of getting people and equipment into Satellite One. However, the long distances required that each helicopter be outfitted with three rubber fuel bladders; a situation which reduced the load capacity.

In addition, the Chinooks were operating to the limits of their capabilities in the cold Arctic environment. Helicopter serviceability problems and harsh weather plagued the operation for the next week.

The Chinook is a complicated aircraft. It has five transmissions and three hydraulic systems, which in cold weather require fourteen to sixteen man-hours of maintenance for every hour flown. In the Arctic winter, where rubber seals deform and oil freezes solid, the strain was just too much.

It was tough on the maintenance crews as well. Working without a hangar in temperatures that dipped below -100°C with the wind chill, the technicians were restricted to two and a half minutes work in the open at a time.

Even simple procedures such as starting the aircraft engine were extremely difficult. The heat from a Herman Nelson heater had to be directed into the engine and transmission compartment for three hours before a cold-soaked engine could be started. Any less time would damage the seals.

Such maintenance difficulties restricted flights to Satellite One to every second day.

While the technicians performed their heroics at the Baker Lake airstrip, the scientists developed methods of photographing underneath the ice in preparation for the search to come on the Thelon River.

Private Wilson was busy as well; gathering souvenirs for the cub pack she leads and arranging pen pal relationships between children in Baker Lake and Edmonton. She even acted as an impromptu recruiting officer, making a return trip to the village school to explain more about life in the Forces.

But Pte Wilson never allowed these activities to interfere with her NAST duties. She was one of three people who made the trip to Satellite One on every expedition up to the formation of Camp Garland.

With the decision to open up a base camp at Satellite One, the Baker Lake detachment lost its raison d'être. The detachment closed shop with a grand finale—a visit by Defence Minister Barney Danson.

While detachment members rushed to buy souvenirs and thank the Inuit people for their hospitality, Private Wilson got ready to leave with something extra. She had been "adopted" by 450 (West) Squadron and she proudly displayed the squadron crest to prove it.

Chapter Eleven

“This is no ‘Milk Run’”: Operation *Boxtop*, 1956-2015[1]

Daniel Heidt and Richard Goette

In September 1958, Lieutenant E.H. Heavens assumed command of what was then a fledging wireless station near a separate weather station jointly operated by Canada and the United States at Alert, Northwest Territories. During his stay, Heavens oversaw the station’s resupply and was struck by its historic inaccessibility. There were “no Eskimos this far north.” Few explorers, he continued, ever reached the northern tip of Ellesmere Island. Even the modern icebreakers sent to establish the weather station in 1950 only offloaded their stores “after much difficulty.” Aircraft were the sole reliable means for resupplying Alert. Yet the wireless station’s locale ensured that even this option was not without danger. “The wrecked aircraft in the hills around … Alert and the Aircrew Cemetary [sic] off the end of the strip,” his report concluded, “convinces me that this is no ‘milk run.’”[2]

Alert was originally established as a weather station. Forecasting for flight and naval operations in the North Atlantic during the Second World War underscored the need to operate observation stations on the Canadian Archipelago. This experience, combined with the rise of transatlantic commercial aviation, the desire to improve forecasting for southern Canada and the United States, as well as the Arctic’s rising importance as a strategic theatre of operations during the early Cold War, led Canada, the United States, and Denmark to agree to construct several High Arctic weather stations. The Canadian Department of Transport (DOT) and United States Weather Bureau operated the stations, conducted synoptic surface and upper air observations, and transmitted the data they collected south for integration into forecasting models. When the weather station at Alert was established in 1950, it became the most northern permanently inhabited place in the world—a distinction that continues today.

The formation of NATO in 1949 and the outbreak of the Korean War in 1950 highlighted the importance of collecting signals intelligence from the USSR. In 1955, the United Kingdom, United States, and Canadian Northern Site Surveys Conference recommended looking into establishing a signals collection site at an existing base with an airstrip, such as Resolute Bay, Alert, or Station Nord (Greenland). The following year, the Royal Canadian Air Force (RCAF) established a one-hut signal intelligence unit 500-yards north of the weather station at Alert. In 1957, Canada agreed to construct a permanent listening post at Alert and grew the post to five General Purpose huts. Further expansions during the next two years added over a dozen additional structures, and the Army assumed command of the wireless station in 1959.[3]

According to historian Rachel Lea Heide, "routine operations are difficult to study because they are not named. Hence, many valuable lessons … are lost."[4] Operation *Boxtop*, as a notable exception to this nomenclature, provides an opportunity to study annual airlift operations. Over the years, the regularity of *Boxtop* operations has led many of its participants to assume that the mission should be routine and free of hiccups. Modern technology has lessened air power's traditional sensitivity to environmental conditions, yet aircraft tend to be more fragile than surface vehicles and thus require very specialized handling and safety precautions to keep them operating in the Arctic.[5] They are often difficult to start in cold conditions and de-icing at remote bases remains challenging while frigid temperatures can also complicate loading and unloading. Likewise, flights are often grounded by unpredictable fog or high winds and the Arctic's proximity to the magnetic North Pole creates significant navigational challenges. The tragic loss of a CC-130 Hercules (tail no 130322- call sign Boxtop 22), during Operation *Boxtop* in October 1991 only emphasizes the continuing hazards and unpredictability of these operations.[6]

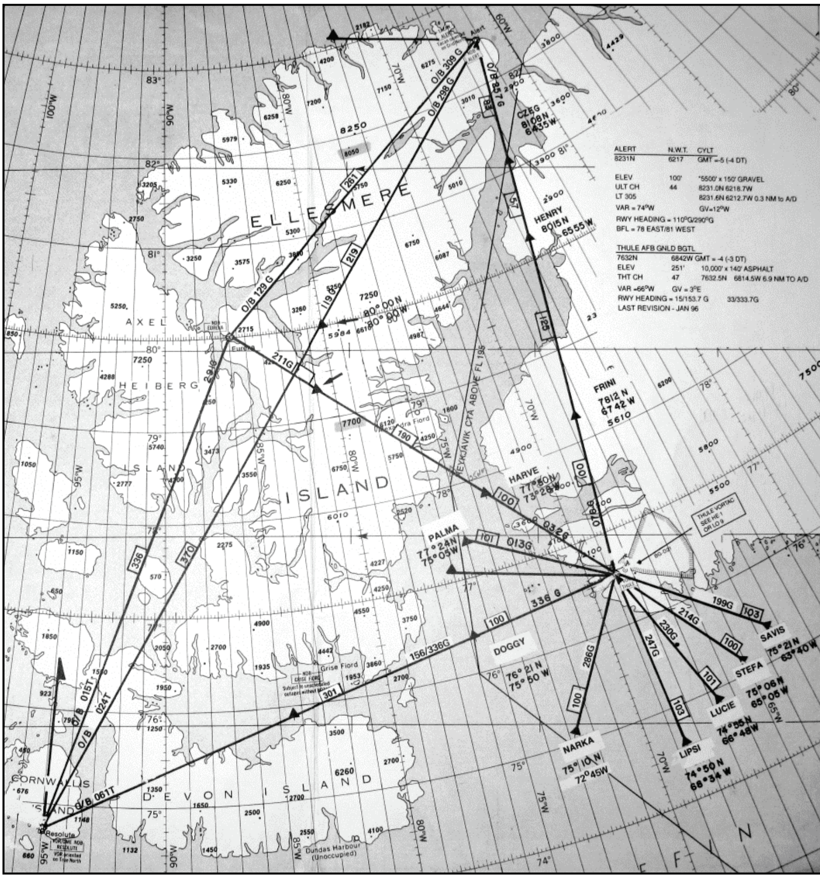
Given its lengthy flights and exposure to the elements, Operation *Boxtop* is a prime opportunity to explore the historical and contemporary environmental limits of modern technology. As Canada's largest annual aerial Arctic operation, *Boxtop* has provided important operational experience opportunities for generations of RCAF air mobility personnel. *Boxtop* flight crews, maintenance personnel, Mobile Air Movements Sections (MAMS), and Airlift Control Element (ALCE), for example, all gained valuable experience working in the Arctic and learned to expect the unexpected and cope with limited resources. The introduction of new airframes and equipment also repeatedly created unforeseen challenges, and adverse weather frequently grounded flight operations or forced aircraft to divert from Alert and Thule.

Operation *Boxtop* also straddles the traditional distinction between domestic and expeditionary operations. Experienced RCAF air mobility officer Lieutenant-Colonel Darwin Ziprick notes that "in many respects, the challenges of operating in the North are similar to an expeditionary deployment such as the mission in Afghanistan."[7] Due to the long distances, largely desolate landscape, lack of infrastructure and communications, and difficult weather conditions experienced in Canada's Arctic region, Operation *Boxtop's* annual re-supply of Canadian Forces Station (CFS) Alert should be considered a "domestic expeditionary operation." This claim is borne out by the Canadian Armed Forces' (CAF) definition of an 'expeditionary operation' as "the projection of power over extended lines of communications into a distant operational area to accomplish a specific objective."[8] Despite its location within Canada, Alert's extreme remoteness isolates it from the RCAF's southern spare parts network and forces *Boxtop* maintenance crews to treat the mission as an expeditionary operation. In addition, the RCAF's use of the United States Air Force Base (AFB) at Thule as a base of operations exposed Operation *Boxtop* to equipment conflicts. The Americans, Danes, and Greenlanders at Thule have been extremely supportive of Operation *Boxtop*, but the imperative of seeing to their own countries' operational requirements has sometimes restricted Canadian activities. Analyzing Operation *Boxtop* as a domestic-expeditionary operation calls attention to all of these challenges and provides important lessons learned for future *Boxtop* planners and personnel.

Flying At the Top of the World

Canada did not always resupply Alert. When it was established as a Joint Arctic Weather Station (JAWS) in 1950, the United States Navy (USN) shipped supplies to Alert. The voyage was harrowing, and subsequent attempts by icebreakers to reach the station affirmed the hazards of sailing at such high latitudes. Instead, Alert became completely reliant on aerial resupply. Initially, the United States Air Force (USAF) fulfilled the semi-annual resupply airlift from its massive airbase at Thule, Greenland. Growing fears of superpower nuclear exchanges over the Arctic led the USAF to convert Thule into an extensive forward operating base for American bombers in 1951. The resulting airbase's sea accessibility, 10,000-foot runway, numerous large hangars and accommodations, and close proximity to Alert ensured that the RCAF continued to use the base after it assumed responsibility for resupplying CFS Alert in 1956.[9]

A semi-annual airlift, however, was insufficient to satisfy Alert's requirements for mail, spare parts, and perishables. Thus, the RCAF also flew seasonal and, as the years passed, increasingly regular resupply flights every six, two, or one weeks.[10] Over the years, these flights have been designated Service Flights (SF) 21/22, SF 85/86, and more recently as CANFORCE (CFC) 85/86 (though most still refer to the flights as SF 85/86). These flights are not part of Operation *Boxtop*, but they occasionally contributed to its success and remain integral to Alert's resupply.



Flying to Alert was hazardous, and two aircraft crashed during the first few years of operations. On 31 July 1950, RCAF Lancaster no. 965 from 405 Squadron took off from Thule to perform ice reconnaissance and airdrop desperately needed bulldozer parts at Alert. When the crew released the package out the door, the parachute caught in the aircraft's tail and caused the plane to crash and explode about 600 metres from the station. All nine people aboard, including the JAWS program's visionary Lieutenant Colonel Charles Hubbard (retired), were killed. The men were buried at Alert and the cemetery noted by Lieutenant Heavens commemorates their sacrifice. A second accident followed on 11 October 1952, when an American C-54D crashed on landing while carrying a load of aviation fuel drums. None of the crew were injured, but the plane was beyond repair. Remnants of both aircraft remain visible at Alert to this day.[11]

In the early years of the RCAF's re-supply of Alert, 426 Squadron used its North Star aircraft for the mission, but 435 and 436 Squadrons' CC-119 "Flying Boxcar" aircraft subsequently became the operation's workhorse.[12] The Fairchild CC-119 was among the first generation of purpose-designed military cargo aircraft. Its tricycle undercarriage afforded a level cargo deck that allowed loaders to move materials around much more easily than in tail-dragging aircraft like the C-47 Skytrain/DC3 Dakota The CC-119's twin tail and large rear clamshell doors facilitated rapid loading and unloading, as well as the carriage of bulky items and vehicles that could not be accommodated by the previous generation's side cargo doors.[13] It was these "Boxcars," flying at the "top" of the world, which led planners to dub the mission "Operation *Boxtop*" in 1956 when Canada assumed full responsibility for the mission. Initially, it appears that the RCAF based some of Alert's resupply at Resolute, where it also conducted operations for the other Joint Arctic Weather Stations. It also flew supplies to Alert via Thule. Working out of these bases during the spring and fall of each year, 435 and 436 Squadrons flew their twin-engine Boxcars to and from Alert for several weeks. As the decade drew to a close, the CAF based the entire operation at Thule and sought a new airframe.[14] Despite the CC-119's important design innovations, the aircraft's limited range, underpowered engines, and inadequate payload, made it a less than ideal platform for resupplying Alert.[15]

In 1960, the RCAF began replacing its Flying Boxcars with the CC-130 Hercules aircraft. Over the next two decades, Canada purchased several dozen of these aircraft. These four-engine medium-lifters had a much improved payload volume and weight, significantly longer range, and unprecedented short and rough field capabilities.[16] RCAF aircrews would ideally rotate on twelve-hour shifts, flying up to three chalks to Thule from Alert. Unforeseen problems, such as bad weather or (un)loading difficulties, sometimes limited aircrews to two chalks per day. For most of the 1960s, two Hercules aircraft and multiple crews flew mainly fuel from Thule to Alert for one week to ten days between late March and late April, and transported fuel as well as bulk supplies for another one to two weeks between mid-July and mid-August. Between 1969 and 1970, Alert's expansion necessitated increasing *Boxtop* to three airlifts that each required approximately two weeks, three CC-130s, and multiple air and ground crews working around the clock to complete. The first operation began in April-May, when the Canadian Air Force performed "*Boxtop* 1"—a "wetlift" of diesel and jet fuel to Alert. The "drylift," or "*Boxtop* 2" moved construction supplies, dry goods, and equipment to Alert in late July-early August. An additional "wetlift" during the second-half of October or November, known as "*Boxtop* 3," finished off the year as perpetual darkness began.[17]

The CC-130's short takeoff and landing capability, its heavy payload, and ability to operate from Alert's gravel runway made it an ideal aircraft for Operation *Boxtop*. Alert and Thule's remoteness, however, created unique maintenance challenges that often hampered the Hercules' reliability. Each aircraft carried flyaway kits of spare parts, but the high operational tempo, a shortage of Hercules parts within the RCAF, and the sheer distance from southern bases made aircraft maintenance problematic. In May 1966, Squadron Leader (S/L) D.H. Kuhn's post-operations report for the resupply of the JAWS network and *Boxtop* suggested that the operations:

> pointed up this problem most dramatically. The few critical spare items that it was possible to take away from the home base were soon exhausted. Only due to the fact that the a/c [aircraft] were changed and additional spares could be brought up for the operation via the 'fresh' a/c could the pace of the operations be continued. For future operations of this nature the provision of a spare a/c should be considered; this would enable the continuance of flying while waiting for a critical component to be delivered.[18]

A second report, issued a month later, agreed that "flyaway kits should be provided which can be used on operations away from base. These should be of sufficient magnitude to ensure that the aircraft can be kept serviceable."[19] *Boxtop*, however, continued to suffer from reliability problems. During *Boxtop* 1/69 and *Boxtop* 2/69, for example, CC-130s had to be replaced to ensure operation completion.[20] *Boxtop* 3/69 also lacked adequate spare parts and "required three separate airlifts from [RCAF

Station] Uplands [Ottawa]."[21] According to the servicing detachment report, the first two flights replaced spare parts that maintenance crews found to be unserviceable, while the third flight brought a new rudder actuator. This third failure, the same operation's servicing detachment report noted, "could not be foreseen," and the report cautioned against overburdening positioning aircraft with spare parts because "forecasting snags is an extremely hazardous undertaking." Instead, the report suggested that the CAF continue to dispatch aircraft when needed. "There appears to be no other way of dealing with the problem," it glumly concluded.[22] Like its predecessors, the report recommended adding a third CC-130 to *Boxtop* operations.[23]

The addition of a third aircraft the following year appears to have improved operational reliability. *Boxtop* planners and personnel nevertheless accepted that the operation's remoteness and the unpredictability of mechanical failures entailed some inefficiency. After *Boxtop* 1/76, for example, the post operations report matter-of-factly noted "Aircraft unserviceabilities. Flying time was lost because unique parts were not carried in fly-away kits. Spares were robbed from other aircraft and/or flown in ASAP." Rather than suggest an alternative strategy, the airlift commander wrote "Nil" in the blank space allotted to recommendations.[24] Subsequent post-operation reports continued to describe "unserviceabilities," but it appears that the additional capacity afforded by the third Hercules, in addition to greater maintenance flexibility, generally overcame these challenges. In 1984, for example, planners envisaged reducing the drylift to two CC-130s, but had to send a third aircraft when "aircraft unserviceabilities" and fog at Alert threatened to delay the operation's completion.[25] That fall, the wetlift's three CC-130s suffered 56 "major unserviceabilities." The "extra effort by all ALCE personnel at Thule and Alert," however, ensured that the operation wrapped up four days ahead of schedule after completing the majority of its tasks. The airlift commander recommended that future *Boxtop* flyaway kits "contain all items which may be needed," to ease the strain on maintenance personnel.[26] This reporting pattern persisted. The airlift report for *Boxtop* 3/87 suggested the addition of a propeller and "prop fly-away kit" to *Boxtop's* spares and noted that additional parts could be flown in by pre-existing SF 85/86 flights.[27]

The archival record for the early 1990s is extremely thorough and does not mention any significant aircraft reliability problems, and it appears that *Boxtop* planners continued to rely on SF 85/86 flights for parts. According to Lieutenant-Colonel Brent Hoddinott, who was a CC-130 navigator on three wetlift *Boxtops* between 2000 and 2005, the operation continued to lose flights to reliability. "You can only bring so many props. You can only bring so many engines up," he explained. When parts were unavailable the airlift commander avoided ordering a separate flight from Trenton or Winnipeg or Greenwood. Instead, "they would just wait for the weekly SF 85/86 mission and they would throw that part … on … so there was no operational urgency to get spare parts or urgent critical parts up to *Boxtop*." Hoddinott acknowledges that this strategy sometimes limited the number of wetlift chalks but, when speaking about his subsequent command of CFS Alert in 2010, he pointed out that the Station always had an adequate fuel reserve and affirmed the wisdom of not "bending over backwards" to reach wetlift goals by sending additional spare part flights from the south.[28]

Aside from mechanical reliability, harsh and unpredictable weather has always been a concern during *Boxtop*. Despite the deployment of an Airlift Control Element and more recently the 8 Air Control and Communication Squadron and their ability to guide incoming aircraft to within less than a hundred feet of Alert's runway in low-visibility conditions by deploying Quadradar (and more recently the MPN-25 radar), the weather still sometimes necessitated grounding flight operations.[29] Eight to twelve-hour flight suspensions were not uncommon. CC-130s sometimes returned to Thule with their loads on board. Given the great distances involved in Arctic flights, aircrews avoided diversions when possible, but they were occasionally necessary.[30]

Planners tried to schedule operations when clear and calm weather as well as high visibility generally prevailed, but strong winds, fall darkness, and fog nevertheless threatened (and continue to threaten) flight operations at Thule and Alert.[31] Flying in these unpredictable and adverse conditions contributes to force readiness. Major William Snyder, for example, learned several important lessons while participating in *Boxtop* as a CC-130 navigator. While heading back to Thule on a "beautiful day" in 2001, he recalls:

> we decided that we would cut off the standard flight plan that cuts across a peninsula in Thule and … fly around the edge of it to take a look at the glaciers and the big fjords … So we descended out of our normal flight, which was around 18,000 or 20,000 feet and we went down into a few thousand feet … Sure enough coming around the corner there was a big fjord and it was just like the hand of God reached out and grabbed the airplane. We dropped about a thousand feet straight down … We hadn't taken into account the fact that, with the winds that day, we were going to get slammed as we went around the corner … I was standing behind the co-pilot so my feet were off the ground and I'm hovering in the airplane … And I looked down and the co-pilot has got his glass of water on his lap and I watched the water come up out of the glass and then fall down and soak the whole lap of the co-pilot. After that we decided that we decided 'well, that's enough excitement for the day, we'll just climb up and head on back to Thule.[32]

Despite the increased capabilities that the CC-130 brought to Operation *Boxtop*, it struggled to entirely fulfill the operation's transportation requirements, and forced the RCAF to recognize the need for additional flights by other aircraft. A few days before and after *Boxtop's* flights to Alert, the RCAF pre-positioned and de-positioned an Airlift Control Element, MAMS crews, other support personnel, as well as their equipment and vehicles. Personnel movement was initially completed by Hercules flights, but the introduction of the bulk fuel delivery bladders during the early 1960s (see below) complicated this important task. The CC-130s, one reported noted, became "very over crowded [sic] when all personnel, spares and bag tanks are lifted together." This overcrowding made the tasking of an additional aircraft "almost a requirement."[33]

Beginning in 1966, Transport Command resolved this overcrowding by tasking a 437 Squadron CC-106 Yukon with a positioning and de-positioning chalk. These aircraft transported ground personnel and flight crews to and from Trenton and Edmonton to Thule. The practice continued when the CAF replaced its aging CC-106s with the CC-137 (military versions of the venerable Boeing 707) during the early 1970s. The latter aircraft typically flew in a full passenger configuration, but they could also carry a three-pallet freighter if ten personnel flew on one of the CC-130s.[34] They were highly effective in this role, and were tasked with the job throughout nearly all of their service lives. The only exception came in the mid-1980s, when *Boxtop* planners experimented by using the empty space on a returning weekly service flight to Alert to de-position 45 of *Boxtop*'s personnel while sending the remaining personnel home aboard a returning Boxtop Hercules.[35]

A few subsequent *Boxtop* commanders repeated this strategy, but the practice of using service flights as a substitute for the CC-137 was ultimately discontinued.[36] The operational flexibility afforded by de-positioning the vast majority of *Boxtop* personnel at the end of operations, rather than sending a significant portion of them home when a weekly flight happened to depart, appears to have ensured the continuation of the passenger de-positioning chalk.[37] The CC-137s continued this work until their retirement in 1996. Today, the same task is undertaken by the CC-137's replacement—the CC-150 Polaris—or in rare cases, the CC-144 Challenger.[38]

The pattern of two wetlifts and one drylift continued into the 1990s until a series of new practices and observations gradually led to its curtailment. First, beginning in the late 1980s, *Boxtop* crews began reconfiguring the Hercules aircraft for a wetlift after completing the drylift, and transported an additional 134,000 to 336,000 gallons of Arctic diesel, as well as a smaller volume of JP-4 jet fuel, to Alert.[39] This practice acclimatized planers and technicians to mixing the varied requirements of mixed dry-wet operations. Second, the Airlift Commander for CFB Edmonton's post operations report for *Boxtop* 2/92 noted that Alert's recently expanded petroleum, oil and lubricants (POL) storage capacity exceeded six months plus reserves and suggested that "we should be able to do with two *Boxtops* per year" staggered six months apart. To avoid the "extreme bad weather months," he recommended a wetlift in March/April and a "dry/wet lift" in September/October.[40] Third, the Logistic & Airlift Coordinator for 8 Wing's Alert Management Office, George Stewart, noted that the CAF's decision to reduce the number of personnel at Alert from a peak of over 200 to well under 100 during the 1990s curtailed the base's fuel consumption. These considerations led the CAF to reduce *Boxtop* back to a twice-annual operation beginning in 1996.[41]

Today, *Boxtop* aircraft fly around the clock, five days a week. Each April/May and September, just under 100 personnel from the 821st Mission Support Group at Thule Airforce Base (AB), and another 40 RCAF personnel at CFS Alert, load and unload the cargo, maintain the aircraft, and control the airspace around their respective runways.[42] The operations utilize two or three of the latest Hercules type—the CC-130J—and in April 2009, Canadian aircrews began using one of Canada's new CC-177 Globemaster III and performed the type's first landing on a semi-prepared runway at Alert.[43] Canada's acquisition of the Globemaster initiated a new series of opportunities and adjustments. The CC-177's cargo bay is ten metres longer and 2.37 metres wider than the CC-130J's and can deliver 55,747 kgs more payload. The CC-177's additional capacity simplifies the transportation of bulky items. In 2010, for example, Alert required several hundred metres of pipe for a new wastewater treatment system. By using a CC-177 to transport this materiel, the pipes arrived in much larger pieces, thus reducing the number of metallurgical technicians required to construct the pipeline.[44]

The deployment of CC-177s and CC-130Js to Operation *Boxtop* also simplified Arctic navigation. The region's close proximity to the magnetic pole had always made navigating with a traditional compass extremely hazardous. Until this century, CC-130 navigators had to chart their position using a grid system map and a directional gryro (the latter had to be constantly adjusted using sextant readings of celestial objects). The inclusion of GPS navigation systems on CC-130Js and CC-177s has significantly simplified polar navigation, but Alert's location beyond the horizon of most geostationary satellites can still create complications.[45]

Despite its impressive capabilities, the CC-177's introduction to Operation *Boxtop* created unforeseen problems and delays. Alert MAMS, for example, had traditionally used a small K-loader to offload Hercules aircraft. When the first CC-177 arrived at the station, however, the sheer bulk of its dryload overwhelmed the K-loader and its crews, greatly reducing operational efficiency. The problem persisted until George

Stewart, who has been involved with *Boxtop* for more than 30 years, learned about the problem and arranged for a large K-loader to be flown to Alert the next day.[46] Unexpected problems with the aircraft itself have also delayed operations. During *Boxtop* 2/15, for example, intermittent software glitches grounded the operation's only CC-177 for approximately half of the operation, and cut the total fuel delivery by approximately two-thirds. The base was not in danger of running out of fuel and the CAF plans to make up the difference by employing CC-177s on 85/86 service flights. Nevertheless, the setback, which Captain Michel Charron joking referred to as "Operation Boxflop," provides a persistent warning against expecting the resupply of CFS Alert to be routine.[47]

Moving Fuel

In addition to new aircraft, new fuel delivery and storage technologies repeatedly forced *Boxtop* planners and personnel to learn and adapt. For most of its existence, the wireless station used diesel fuel to power its generators and vehicles. It also required sufficient aviation gasoline (Avgas) to support flight operations throughout the year. Since *Boxtop* has long been the RCAF's largest wetlift operation, it often drove the development of POL transportation capabilities. The RCAF employed a variety of POL delivery systems for *Boxtop* over the years and, while each system improved the resupply process, their introductions created new workflows or revealed defects that often complicated initial operations.

During the 1950s, Operation *Boxtop* planners packaged Alert's fuels in 45-gallon drums filled with fuel from American stocks at Thule. The receptacles, which were used extensively by the RCAF and USAF, were inexpensive and plentiful. When filled with fuel, each weighed approximately 300 lbs. Alert's initial requirements were modest. In 1958, for example, a planning document indicated that Alert only required 10,000 gallons of diesel fuel and 3,500 gallons of gasoline.[48] As the station grew, however, it developed a strong thirst for diesel. By 1962, Alert required approximately 284,000 gallons of POL every six months.[49] Each CC-130 carried roughly 72 drums or 3,240 gallons of fuel per chalk. After landing, the aircraft taxied to the ramp near waiting RCAF MAMS and DOT weather station personnel. These eight-man crews, working in shifts around the clock, met the aircraft in vehicles towing a ten-ton sleigh which could hold 40 drums and/or stone-boats which each accommodated a further eleven. Some crews prioritized rapid aircraft turn-arounds by pushing the drums onto the snow before loading them onto the nearby stone-boats. With this method, each aircraft was "on the ground for fifteen minutes (including taxiing)."[50] Other crews preferred to back the sleigh up to the plane. This delicate additional step slowed the unloading to ten or 15 minutes and initially frustrated flight crews, but it saved time "in the long run." The procedure allowed the unloading crews to transfer 40 drums directly onto the sleigh. They then rolled the remaining drums onto the ground to be "manhandled" onto three stone-boats using a ramp. This combined method facilitated the complete handling of a planeload of drums in 30 to 40 minutes.[51]

The drum system of delivery suffered from several flaws. Cleaning the empty drums was a time consuming and dirty job that few personnel relished. The RCAF, moreover, does not appear to have prioritized transporting the empty drums back south. As a result, the barrels tended to pile up around all of the JAWS.[52] In addition, pumping the fuel from each drum into Alert's 10,000 gallon storage tank was also a laborious chore for station personnel. The "back breaking" work of moving the drums from the aircraft to the base also produced a number of injuries.[53] One Non-Commissioned Officer (NCO), for example, suffered a broken ankle when it was crushed by a 45 gallon drum in 1962.[54] A similar incident occurred the following year while another individual bruised his hand "when he jumped sideways to avoid a rolling barrel."[55]

In February 1962, the Canadian military noted the USAF's recent use of rubber bladder tanks "to overcome the handling of large quantities of drums" for its wetlift activities, and elected to also retool its aircraft for resupplying all of the JAWS.[56] Each CC-130B carried five Canadian-made 1,000 US gallon bladders laid in sequence down the fuselage. Each bag was connected in serial, and the loadmaster could balance the load's weight by shifting the contents from one bladder to another.[57] The bladders could not be deployed, however, until Alert and the other JAWS possessed bulk fuel storage tanks. The system installed at each weather station had several sections. When aircraft arrived at the station, they taxied to the defueling area located at the end of a pipeline connected to two 5,000-gallon tanks. Ground crews then connected a hose from these tanks to the bladders and used a portable gasoline powered pump to transfer the fuel from the aircraft at 400-500 gallons per minute.[58] The operation only required about fifteen minutes to complete.[59] Once the aircraft departed, a slower pump emptied the airfield tanks down another pipeline into the station's tank farm. Alert initially received six 60,000 gallon tanks for diesel fuel storage.[60] The entire system, a DND memorandum concluded, required significantly less personnel, much less physical exertion, and would create "very considerable annual savings" for Operation *Boxtop*.[61]

Construction of the tank farms began in 1962, and progressed sufficiently for trials to begin at various JAWS the following year. Very few records of these trials survive, but there were some problems. The defueling crews, for example, had difficulty gauging the volume of fuel transferred, and their initial reports underestimated the transfers by 50%.[62] On the whole however, the tests went well. Indeed the Air Officer Commanding applauded the "smoothness and efficiency with which this operation was completed," commended the ground crews for resolving the "many small problems associated with the initial installation and testing program," and celebrated "the beginning of a new era in fuel delivery to arctic weather stns [stations]."[63]

In subsequent decades, the bladders proved their effectiveness. Post-operation reports generally reserved praise for their personnel, rather than equipment, but the increased efficiency of the bladders as well as the ability of *Boxtop* personnel to manage the system is apparent. In the spring of 1966, for example, Operation *Boxtop* moved 315,000 gallons of diesel by flying eight-two chalks from Alert to Thule in eight days.[64] In the fall of 1983, the Air Force performed the "largest ever" *Boxtop* wetlift by moving approximately 4,722,464 lbs (or well over 7,200,000 gallons) of diesel fuel to Alert in 15 days. The only problem ground crews encountered was some ice in "a few" of the bladders. As soon as the problem was identified, crews took greater care, Edmonton shipped three extra bladders to Thule to ensure their availability, and subsequent fuel samples tested negative for water contamination. The airlift ultimately finished six hours ahead of schedule.[65]

Yet the bladder system was not without quirks. Alert's defueling tank, for example, was uphill of the defueling station, and the station's pump was chronically underpowered. For several decades, many MAMs crews sped up defueling by jumping on the bladders to force the fuel out of the system.[66] In addition, Sergeant (ret) Chuck Arnsten, who worked several *Boxtops* as an augmentee, planner and CC-130 loadmaster in the 1970s and 1980s, contends that the bladders were not "the safest system in the world."[67] When moving around the cargo bay, he explained, "you had to be careful where you stepped because you could knock a valve open … it was hard to get around when the bladders were full."[68] Even without such accidents, the bladders and their linkages often leaked, endangering both personnel and aircraft. While the leaks do not appear to have significantly delayed flight operations, several post-operation reports complained about coping with this problem.[69]

The smell of the bladders also made them unpopular with ground crews and aircrews. Arnsten recounted several of the bladders' shortcomings during an interview. "The airplane," he recalled, "reeked of diesel fuel all the time … all of our clothes smelled like diesel fuel."[70] He was not the only airman who noticed the smell. In 1990, 436 Squadron complained that the fumes produced by releasing overpressure in the relief hose were "dangerous and uncomfortable for the aircrew and passengers." The Airlift Commander, who was likely aware of the system's imminent retirement, suggested swapping the open pails for buckets "with lids" and distributing vapour masks to those who found the smell to be "excessive."[71]

By the beginning of the 1990s, the Air Force decided to replace the bladder system. This time, it purchased the Bulk Fuel Delivery System (BFDS) manufactured by Edmonton's Barber Industries. The 4,000-gallon tank's simple design consisted of two steel chambers and a baffling system. The BFDS was not new; the company already produced similar systems for commercial airlifters that operated C-130s.[72] The Canadian BFDS underwent its first operational trial on one CC-130 tasked to *Boxtop* 1/91. According to post-operation reports, the new system performed "very well" and only encountered a "few minor problems." [73] The fuel quantity gauges, for example, were too fragile, and the lack of an alternative method for checking the tank's contents contributed to a few defueling mistakes. On one occasion, Alert ground crews sent an aircraft back to Thule with 9,000 lbs of fuel still in the tank. On another occasion, Thule MAMS assumed that the tank was empty and subsequently overfilled it. In addition to this gauge problem, the BFDS's vacuum breaker valves released "large quantities of acrid diesel fumes" when it pressured during ascent.[74] Nevertheless, the BDFS was a "tremendous improvement over bladders," and promised to be "an effective, safe vehicle to transport bulk fuels to austere destinations."[75]

It took time to perfect the new system and the trials continued to complicate operations. *Boxtop* 3/91 revealed the need for further improvements to a few sub-systems. Despite Barber Industries' attempted to reinforce the fuel gauges, they still failed when imperfect seals allowed tank condensation to enter the gauge and freeze during *Boxtop* 3/91. The continued operation of soft bladders on other *Boxtop* CC-130s during these trials also created some difficulties. The bladders and BFDS required different defueling couplings and the use of the wrong connections, in addition to Alert's weak pump, created insufficient pressure to keep the valves open. MAMS familiarity with the new system was the most significant BFDS hurdle. The Airlift Commander recommended more training and the distribution of BFDS manuals "when they became available," but recognized that "as with any new system all personnel are not always proficient. It is considered that in time this problem will resolve itself." Air Transport Group Headquarters (ATGHQ) agreed, and repeatedly advocated patience for the "learning curve" that accompanied the introduction of new systems.[76]

Resourcefulness and energy, however, overcame these difficulties. Until crews affixed the right couplings to the bladder aircraft, for example, MAMS again "resort[ed] to jumping on the bladders in order to get the valves open and speed up defueling."[77] The system's simplicity, combined with an improved loading system at Thule, allowed MAMS crews to "compress the flying schedule on wet lifts by one hour per crew shift." This cleared time for an additional two chalks per day, and spawned a request for planners to add an additional flight crew to carry out these additional flights

on future wetlifts.[78] This increased efficiency, in addition to Barber Industries' attentiveness to remaining design problems, led the RCAF to promise that "all aircraft" would use the BFDS system on subsequent wetlift *Boxtops*.[79]

Boxtop 1/92 was the first all-BFDS wetlift, but its crews still had to overcome several difficulties. The fuel quantity gauges now worked correctly, but were not sufficiently accurate and could not adjust to the ramp incline. As a result, both gauges showed "full" when aircraft sat at Thule with a slightly "nose up" incline, and displayed "empty" when aircrews parked the same aircraft on Alert's declined ramp. General "unfamiliarity" with the new system also created some delays. A "suggested BFDS refueling procedure" did exist, but the operation Commander, Colonel M.A. Wansink, noted that the checklist was not available in sufficient quantities to ensure readiness. He did not, however, bemoan this "lack of knowledge," because he recognized that the situation would "in time … rectify itself."[80]

Wansink's expectations have proven accurate. Subsequent *Boxtop* post-operations reports do not mention problems with the BFDS system. George Stewart confirms that the system has proven to be rugged and reliable. In fact, the RCAF continues to use all but one of the tanks that Barber

Industries delivered during the 1990s. Stewart expects that Canada's new fleet of CC-130Js will continue to use these tanks for some time to come.[81]

Expeditionary Conflicts

In addition to requiring RCAF personnel to traverse great distances that belie "domestic" labels, Operation *Boxtop*'s agreement with the United States to utilize the USAF base at Thule Greenland adds to its "expeditionary" flavour. These agreements have not always satisfied expectations. Over the decades, Thule support for *Boxtop* waxed and waned. Danish and American personnel usually fulfilled or exceeded Canadian expectations, but personnel changes or other duties sometimes complicated or delayed the resupply mission. These experiences reinforce that Operation *Boxtop* cannot count on the normal amenities that characterize domestic activities.

Canadian post-operation reports generally praised American and Danish cooperation at Thule. During the 1950s and early 1960s, Thule consistently provided communications personnel, bus transportation for aircrews, loading equipment, and helped the RCAF to resolve unexpected problems whenever possible. *Boxtop* 2/63, for example, could have been seriously delayed when the Canadian cargo ship carrying supplies for the operation, *Sir John Crosbie*, arrived one day late and the American authorities at Thule were unaware of their duty to assist unloading the vessel. The "most cooperative" Americans, however, agreed to help. "We were," as a post-operations report explained, "fortunate … that there were no other commitments at this time; if there had been, the 'Sir John Crosbie' would have had to wait its turn and accept the delay."[82]

Misunderstandings occasionally arose. Although *Boxtop* was a decade old in 1966, the USAF's decision to limit its presence at Thule forced inexperienced Danish civilians to assume a greater portion of the support burden. When writing his post-operation report for *Boxtop* 1/66, the Operation Commander S/L D.H. Kuhn complained that:

> complete base support at Thule AFB is becoming more difficult each year. The number of USAF personnel is steadily decreasing and their duties are being taken over by Danish nationals. The USAF personnel co-operated as much as humanly possible but it

> is difficult to communicate and to impress the Danes as to the extent and urgency of the operation.[83]

Despite travelling to Thule a week before *Boxtop* began to proactively "liase [sic] personally" with Thule's officials, "many administrative problems" arose during the operation. Twenty-four hour operations, for example, were complicated by limited staff availability during "non-working hours." These challenges, it is worth noting, did not prevent the RCAF from completing *Boxtop* two days early. Kuhn attributed this achievement to the "airmen NCOs and officers" and their determination to "get the job done."[84]

RCAF planners heeded Kuhn's warning and were prepared to cope with similar difficulties during *Boxtop* 2/66 three months later. Fortunately, that Operation Commander's report noted a very different experience and enthusiastically acknowledged that:

> both the USAF and Danish civilians at Thule provided excellent and willing support. The anticipated difficulty in dealing with Danish civilians did not materialize. The refuelling organization which provided both aircraft fuel and the diesel oil, was completely staffed by Danish civilians and they became quite imbued with the Boxtop spirit, co-operating to the fullest in order to make the operation as fast and efficient as possible."[85]

Such praise was not exceptional. The following April, another Operations Commander noted that the base provided "outstanding" support "despite the added complication of arranging for the resupply of NORD." Having also visited Thule the week before the operation began to discuss base transportation, accommodation, and other arrangements, he recommended that the practice become a standard part of the *Boxtop* schedule.[86] His advice was heeded. *Boxtop* continues to require close cooperation between Canadian, American, and Danish personnel, and preparatory meetings remain an important part of the operation to this day.[87]

Despite the strong and healthy Canadian, American, and Danish relations that help to make *Boxtop* possible, relying on foreign aircraft loading vehicles sometimes contributed to unforeseen problems. Canada's reliance on Thule vehicles has waxed and waned over time. *Boxtop* operations during the 1950s and 1960s relied heavily or entirely on Thule's vehicles to load RCAF CC-119s and CC-130s. During *Boxtop* 2/66, for example, USAF provided three forklifts and a L23 Loader.[88] For reasons that are not described in the archival record, but which may have coincided with SAC's withdrawal from Thule in 1959,[89] the RCAF began bringing its own loading vehicles during the late 1960s.[90] By 1980, Air Command adopted a more hybrid approach by bringing some of its own vehicles to Thule and relying on local resources to make up the difference.[91] All of these arrangements appear to have worked well.

In 1983, the CAF and USAF Space Command signed a memorandum that formalized resource sharing and committed Americans and Danes to supplement Canadian equipment on an "as available basis." The USAF retained the right to "decide the priority of support requirements," and it was "the responsibility of the CF" to fill any gaps.[92] This new understanding limited Canadian access to Thule vehicles. For drylifts, the RCAF required at least two forklifts at Thule to load pallets. In 1985, Arnsten recalls, his crew required a forklift that could lift 10,000 lbs without tipping over, but the vehicles that the Canadians brought to Thule were not heavy enough to lift this weight. Thule's vehicles, however, were unavailable. Arnsten's crew consequently adapted to the situation by strapping "a novelty engine in a crate" to the Canadian forklift. This counterweight solution "worked fine until the battery shorted out one day and the thing started on fire and we had to quickly get that engine off." The operation consequently compensated for this problem by downsizing their pallet loads to 8,000 lbs and flying more chalks.[93]

Despite possessing more capable forklifts at its southern bases, the RCAF continued to hope for Thule forklift support and subsequently suffered repeated vehicle conflicts. According to the *Boxtop* 3/86's post-operations report, the exercise marked the "fourth consecutive Wet Lift [sic] that has been hampered by having to wait to borrow a fork-lift from Thule resources," and waiting periods ranged from "one to 24 hrs depending on the availability of Thule personnel to authorize the loan." ATGHQ, however, did not support the Operation Commander's request for the Canadian Forces to pre-position a 10,000 lb forklift at Thule because the extra two chalks required to move the vehicle were not worth the "relatively little time" that it would be used to load and unload the fuel bladders. Better coordination with Thule authorities, ATGHQ hoped, would resolve the conflict.[94] When the forklift conflict persisted the following spring, the CAF promised that a suitable "permanent" forklift would be positioned at Thule.[95]

The promise resolved the forklift difficulty for a few years,[96] but the vehicle was either removed or Thule's remaining forklifts dwindled resulting in further vehicle conflicts. Operation *Boxtop* also required Thule's K-loaders, vehicles used to lift and load multiple pallets to and from aircraft. Typically, Canadian planners preferred to have both of these vehicles at their disposal for drylifts and a single K-loader to load and unload the BFDS system during wetlifts. After *Boxtop* 2/91, however, Col M.A. Wansink's post-operations report once again complained that a 10,000 lb forklift, as well as a K-25 loader "were extremely difficult to obtain" at Thule. The vehicle conflict, it turned out, was due to the arrival of four USAF C-141 Starlifters for a separate operation as well as the unserviceability of one of the K-loaders. The base's 10,000 lb forklift and its only operational K-25 were consequently often only available for Canadian use between 1600 and 0700 hours. The OIC MAMS scrambled to fill the ground support void. "Priorities for such equipment," he complained, "depend on US regular resupply flights, terminal/dock ops with Canadian needs being last." To make up for this equipment scarcity and keep *Boxtop* running on schedule, the OIC MAMS employed two teams around the clock. The Operations Commander again recommended that Canada "not depend on the availability of American resources," and advocated conducting two additional pre-positioning and de-positioning chalks to bring its own "independent resources," including two K-25s on future drylifts. If this was not possible, Wansink suggested rescheduling *Boxtop* 2 to the middle or end of August when he expected Thule's vehicles would be more readily available.[97]

Boxtop planners did not fully follow either suggestion, but the operation did receive additional resources the following year. A 10,000 lb Hyster forklift was permanently positioned at Thule, but an informal arrangement at the base that led the Americans to assume that they also had the right to use the forklift created further confusion during *Boxtop* 1/92.[98] Three months later, the drylift pre-positioned a K-25 loader and a 6,000 lb forklift to supplement the 10,000 lb permanent forklift. This resolved *Boxtop's* K-loader problem, but the supplemental forklift proved to be inadequate. This time, Thule resources were available, and the Danes provided *Boxtop* 2/92 with a "large" USAF forklift.[99] Similarly, Canada brought a single K-loader to *Boxtop* 2/92 but the OIC MAMS expressed concern when it had to be de-positioned before the BFDS could be unloaded. Once again, the "Danes permitted MAMS to use the USAF K loader." When reviewing the operation, the Airlift Control Element Commander acknowledged that "it would be nice to have our own K-25," but he concluded that "it is not always practical. We have to rely on Thule AFB support during our spring and fall wet lifts to load and unload the BFDS" because the K-25's redeployment depended on the availability of additional aircraft.[100] Today, *Boxtop* utilizes a Canadian 10,000 lb forklift that is permanently positioned at Thule, and continues to rely on Danish and American vehicles to satisfy its remaining loading requirements. According to George Stewart, Canada's continued reliance on Thule resources does not jeopardize *Boxtop* operations.[101]

The vehicle conflicts at Thule rarely prevented Operation *Boxtop* from completing its mission on time. This achievement is partly due to good planning. RCAF planners have long recognized that weather, mechanical problems, and resource conflicts regularly impact the operation, and so they consequently build several buffer days into the operation. Sometimes these extra days were not required and the operation ended ahead of schedule. On other occasions, this flexibility was essential to the operation's completion. But planners openly acknowledged that they could not plan for every contingency, and MAMs personnel often had to work extra shifts or develop less than ideal solutions to meet the operation's timeline. Realistic planning, initiative, agility, and quick thinking have, in short, contributed to making Operation *Boxtop* appear to be a "routine" operation.

Boxtop's Future

Canada does not possess a large air force. It consists of about 260 aircraft and 13,500 Regular Force and 2,600 Primary Reserve personnel, aptly described by one of its generals as a "smedium" air force.[102] Canada also has a busy air force. Not only does it have a wide breadth of air power functions and responsibilities,[103] it is also responsible for executing them within Canada's geographical vastness in addition to undertaking and supporting a high tempo of CAF expeditionary missions. It is the RCAF's responsibilities at home, however, that really distinguishes it from the Canadian Army and Royal Canadian Navy. When the Army and Navy return home from expeditionary operations, they are not as active as the RCAF because the latter maintains a high operational tempo undertaking domestic air power responsibilities.[104] The RCAF's air mobility community, in particular, is tasked with the majority of these operations, and one of the most prominent and extensive has been Operation *Boxtop*.

Operation *Boxtop*, as 8 Wing Commander Colonel Colin Keiver, explains, is an opportunity for RCAF personnel to "broaden" their operational experience.[105] According to RCAF doctrine, the Generate function "develops and prepares an aerospace force to meet force employment requirements" and its focus is on the development of capabilities and forces.[106] Since a large amount of the air mobility community's force generation consists of force employment functions,[107] Operation *Boxtop's* steep learning curve allows RCAF air transport personnel to hone essential Arctic skill sets as well as develop teamwork and team spirit.[108] The annual nature of Operation *Boxtop* also serves the Generate function by allowing the RCAF to create and retain important lessons learned about air mobility operations that can inform doctrine and improve safety programs.[109] In the future, however, resupplying Alert may change. New technologies and the possibility of moving the airlift from Thule to a Canadian airport could bring Operation *Boxtop* to a close.

Since its inception, Operation *Boxtop* used Thule AFB as a staging point. Several CAF officers believe that the military no longer needs to rely on the USAF's resources in Greenland to resupply Alert.[110] In his Master's thesis, Lieutenant-Colonel Ziprick posited that Canada could use NORAD's Forward Operating Location (FOL) concept, the air mobility concept of operational support hubs (OSH), and the pre-packaged deployment systems (like those used by example of the Disaster Assistance Response Team), to create support hubs at strategically-located points in the Arctic such as Iqaluit, Resolute, Cambridge Bay, or Eureka.[111] Lieutenant-Colonel John St. Dennis, who served as the Chief of Staff for Operations for Joint Task Force North (JTFN) from 2013 to 2015, is unsure of several of Ziprick's proposed sites, but agrees that Iqaluit could be used as a staging point to resupply Alert. "The nice thing about Iqaluit," he explained during his interview, "is that JTFN has a … four-person detachment there and one of their functions is to look after the FOL, do security checks on it, and work with [CFB] Bagotville to maintain it." The airport has already been identified in the Canadian Joint Operations Command (CJOC) plan for the North as being one of the primary Arctic Hubs, so aligning *Boxtop* with these plans "would tie in very nicely to what the Canadian [Armed] Forces are doing there." Moreover, St. Dennis believes that Iqaluit's fuel farm could handle *Boxtop* wetlifts. "They only fill up their tanks to about 75%," he noted, so "Iqaluit is one of the few places where you're not going to have fuel issues in the North."

Ziprick and St. Dennis agree that Canada and its northerners would benefit from moving *Boxtop's* staging point away from Thule. The shift, they suggest, would enhance the Canadian military's northern presence and foster greater public understanding of the roles that the RCAF plays in Canada's Arctic Region. The move would, for example, foster air mobility and encourage further military and Whole of Government (WoG) operations in Canada's North. Currently, the CAF has to bring in equipment such as K-loaders to Iqaluit when participating in Operation *Nanook* and these machines have often failed in the cold temperatures. If this plan was implemented, the CAF could leave suitable cold-weather vehicles at Iqaluit year-round to be used during Operation *Boxtop*, emergencies, as well as other annual operations including Operation *Nanook*. Critically, the shift would also serve the economic development goals envisioned in *Canada's Northern Strategy* by injecting additional revenues into Canadian Arctic communities and enhancing domestic transportation infrastructure.[112]

Not everyone believes that Canada would benefit from moving Operation *Boxtop* away from Thule. During his interview, George Stewart pointed out that Iqaluit currently lacks the resources to service CC-130Js and CC-177s. He also doubted that the town could accommodate the sheer number of personnel required for *Boxtop* operations. Finally, Thule sells JP-8 jet fuel to Canada at an extremely good price, and Stewart consequently believed that purchasing the equivalent fuel from Iqaluit would be much more expensive.[113]

The location of *Boxtop's* base of operations is not the only potential change in the operation's future. During their interviews, several former Alert COs noted that the technology exists to significantly downsize or entirely eliminate *Boxtop* wetlifts. In 1995, CFS Alert conformed with NATO's shift to a single fuel strategy and dramatically reduced its diesel requirements by converting its generators to JP-8.[114] This shift allowed *Boxtop* and SF 85/86 aircrews to supplement fuel delivery via the BFDS system by deliberately over-fueling their aircraft's tanks and unloading their surplus at Alert. According to Major Scott Marshall, who served as CFS Alert's CO from July 2014 to January 2015, a CC-130J flying a SF 85/86 typically unloaded anywhere from 5,000 to 20,000 litres of JP-8 into Alert's bulk storage tanks before departing. He estimated that a CC-177 could defuel up to 100,0000 litres by unloading at Alert, flying to Thule for the night, and returning to Alert the next day with full tanks to defuel a second time before heading south. By flying this route, the CC-177 sustains Alert's fuel farm and "adds to the total volume in a way that we have never been able to do in the past outside of Boxtop."[115]

It is not clear, however, whether regularly tasking CC-177s with SF 85/86 sorties could entirely eliminate the need for wetlift *Boxtops*. During his interview, Lieutenant-Colonel Hoddinot speculated the wetlift could be entirely eliminated if CC-177 SF 85/86 flights were expanded to include several flights between Thule and Alert for additional defueling.[116] George Stewart, however, doubts the concept's long-term viability. Canada's CC-177s, he points out, are in high demand. While they are sometimes used for service flights to Alert, last-minute urgent international resupply missions frequently limits the aircrafts' availability. Stewart consequently concludes that it is safer to continue with the present system of defueling service flight aircraft during the year and topping Alert's JP-8 tanks with dedicated wetlift flights during *Boxtop*.[117]

Capitalizing on the efficiencies that could arise from replacing Operation *Boxtop* with regular CC-177 resupply flights, however, might negatively impact RCAF force generation. Lieutenant-Colonel Hoddinot suspects that Squadron Commanders would "absolutely revolt against the idea of killing Boxtop" because "it is a great way for rookie aircrew to gain experience."[118] By flying "the same route over and over every day for like ten days," former CC-130 navigator Major Nathalie Frigon explained during her interview, "it doesn't take a lot of time to get used to the procedures."[119] The skills honed flying in *Boxtop*, moreover, are transferable to operations in other theatres. According to Hoddinott:

> one of the great aspects of Boxtop is that, because it is canned [i.e. flight crews fly the same routes over and over again] … it is a great place to get young inexperienced aviators the experience they need to be more useful down south and around the world… It was because of experiences in Boxtop that you develop the skills to react at a moment's notice… because the distance between airports is far in the Arctic and the weather changes so quickly, you get really good at reading the terminal area forecasts and the meteorological reports… it only takes a couple of weeks in Boxtop before you can read any METAR [Meteorological Actual Report] and TAF [Terminal Aerodrome Forecast] anywhere around the world and you don't have to pull out the secret decoder binder to figure out what … the code words mean which comes in handy when you show up for a mission two hours before [take-off] and you don't want to spend 15-20 minutes trying to figure out what the codes for the certain meteorological conditions are. That takes time away from flight planning and fuel planning, and other considerations.[120]

This transferable force generation is not limited to aircrews. According to Ziprick, all personnel benefitted immensely from participating in the large and often difficult resupply of Alert.

> It is something to see the dynamic when you have a group of people deployed and they're working with the same teams and the aircrew, the maintainers and the MAMS are working hand in hand knowing that each one is critical to accomplishing the mission. It is amazing when you start looking at the records of what was accomplished in each of those periods: the serviceability of the aircraft and the extra mile that people go to make sure that the mission is accomplished when they have that ownership of it. You see it in Boxtop, you see it in deployed operations when

> you're in Afghanistan ... Sometimes when you get back to base… there is a little more of a disconnect … It is not as tight a knit a group because you're not teamed with the same maintainers every day or the same MAMS personnel every day.[121]

The discontinuation of Operation *Boxtop* would eliminate this semi-annual opportunity for air and ground crews to broaden their experience and skills on large airlifts. The future of Operation *Boxtop*, it seems, may be a decision between servicing the Generate function and the efficient sustainment of CFS Alert.

Conclusions

The history of Operation *Boxtop* emphasizes continuity and change. Throughout its existence, the operation has flown almost entirely from Thule AB at regular annual intervals. Yet new aircraft, equipment, resource conflicts, and harsh weather conditions pepper its past. These changing and unexpected dynamics forced planners, ground crews, and pilots to regularly adapt their plans and expectations. In short, the history of Operation *Boxtop* was not a "routine" operation.

This realization is also aided by analyzing Operation *Boxtop* as a domestic-expeditionary operation. The semi- or tri-annual aerial resupply of CFS Alert has always been different than southern domestic resupply missions. Located at the extreme edge of Canadian territory, the great distances that separate it from the RCAF's southern resupply and maintenance networks create challenges that are more akin to expeditionary operations. The use of Thule AB as a *Boxtop*'s base of operations further affirms the mission's expeditionary flavour. Danish/Greenlandic and American partners have been consistently strong supporters of *Boxtop*, but they have not always been able to fully accommodate Canadian requirements. These challenges, as well as the proactive planning and "get the job done" attitudes that have been so important to the operation's success, come to the forefront when the operation is understood as a hybrid domestic-expeditionary operation.[122] Further research is necessary to determine whether this framework is useful for analyzing all Arctic airlift activities, or whether it is only useful with large operations.

As Operation *Boxtop* continues into the 21st century, the CAF will continue to take stock of lessons learned and adjust to new circumstances. As one of the RCAF's few major regular airlifts and its only regular Arctic airlift, Operation *Boxtop* has been an important part of Generate activities. The conflicting opinions of several of this chapter's interviewees about *Boxtop's* future should not be misconstrued as confusion within the CAF. Indeed, their varied suggestions stem from diverse backgrounds and perspectives. Determining whether Operation *Boxtop* remains at Thule may be a question of mission cost-effectiveness over Whole of Government benefits. Similarly, the employment of new and more efficient airframes that promise significantly greater efficiency and possibly reduce or eliminate the need for *Boxtop* will need to be balanced against the force generation opportunity created by staging a large airlift exercise on a semi-annual basis

As this chapter demonstrates, the lessons learned from the past remain relevant today. The complexity of Operation *Boxtop*, the specialized knowledge held by individuals like George Stewart, and the professionalism displayed by RCAF personnel who undertake the operation twice yearly reinforces the importance of institutionalizing best practices in print forms to ensure that their knowledge continues to inform future planning and execution.

Notes

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[2] E.H. Heavens, "Report on Transportation Situation Alert Wireless Station, R.C. Signals," 29 October 1958, LAC, RG 24, acc. 83-84-215 vol. 290, file 2001-584-A28, pt. 1.
[3] David R. Gray, *Alert: Beyond the Inuit Lands* (Borealis Press, 1997), 15-16;
[4] Rachel Lea Heide, "Canadian Air Operations in the New World Order," in Allan English, ed., *Air Campaigns in the New World Order: Silver Dart Canadian Aerospace Studies Volume II* (Winnipeg: Centre for Defence and Security Studies, University of Manitoba, 2005), 86.
[5] RCAF, *Canadian Forces Aerospace Doctrine*, B-GA-400-000/FP-000, December 2010 (Trenton: Canadian Forces Aerospace Warfare Centre, 2010), 25.
[6] The *Boxtop* aircraft crashed while on approach to CFS Alert on 30 October 1991.
[7] Darwin Ziprick, "Leveraging Air Mobility to Support Canadian Arctic Sovereignty," Masters of Defence Studies Directed Research Project, Canadian Forces College, Toronto, 2014, 45. This sentiment is echoed by former Joint Task Force North (JTF[N]) Chief of Staff LCol John St. Dennis, who notes that any operations in Canada's North have an essentially expeditionary character. LCol John St. Dennis, interviewed by Daniel Heidt and Richard Goette, Canadian Forces College, Toronto, 29 September 2015.

[8] Defence Terminology Database (DTB) record AAP-6, listed in the Glossary of Allan English and John Westrop, *Canadian Air Force Leadership and Command: The Human Dimension of Expeditionary Air Force Operations* (Trenton: Canadian Forces Aerospace Warfare Centre, 2007), 237. For more information on RCAF expeditionary operations see: Allan D. English, ed., *Canadian Expeditionary Air Forces*. Bison Paper no. 5. (Winnipeg: Centre for Defence and Security Studies, University of Manitoba, 2004). Denoting a Canadian air force domestic operation as expeditionary is also reinforced in RCAF Sustain doctrine: "Referring to an aerospace operation conducted within Canada as expeditionary is a relatively new idea and can create confusion, specifically if the operation is conducted from an MOB [Main Operating Base]." RCAF, *Canadian Forces Aerospace Sustain Doctrine*, B-GA-406-000-FP-001, February 2011 (Trenton: Canadian Forces Aerospace Warfare Centre, 2012), 46. The domestic nature of *Boxtop* means that most actual RCAF flying occurs in Canadian airspace (the exceptions use the USAF Air Base at Thule, Greenland), which precludes the need by Global Affairs Canada to secure national overflight through and landing rights in foreign airspace and territory.
[9] "Welcome to Thule "The Top of the World," 30-32, www.peterson.af.mil/shared/media/document/AFD-140618-023.pdf. The two bases, which have minimal contact during the rest of the year, use the airlift to compete against each other in the "Boxtop Olympics."
[10] Rachel Lea Heide, "Frigid Ambitions: The Venture of the Alert Wireless Station and Lessons Learned for the Canada First Defence Strategy," in *De-Icing Required! The Historical Dimension of the Canadian Air Force's Experience in the Arctic*. P. Whitney Lackenbauer and W.A. March eds, *Sic Itur Ad Astra: Canadian Aerospace*

Power Studies (Trenton: Canadian Aerospace Power Studies Series, Canadian Forces Air Warfare Centre, 2012), 117.
[11] Gray, *Alert: Beyond the Inuit Lands,* 96-98.
[12] P. Whitney Lackenbauer and Daniel Heidt eds., *The Advisory Committee on Northern Development: Context and Meeting Minutes, 1948-66* (Calgary: Centre for Military and Strategic Studies and the Centre for Foreign Policy and Federalism, 2015), 201, 246.
[13] Alwyn T. Lloyd, *Fairchild C-82 Packet and C-119 Flying Boxcar* (Hinckley, England: Aerofax, 2005), 31; T.F.J. Leversedge, *Canadian Combat and Support Aircraft: A Military Compendium* (St. Catharines: Vanwell Publishing Limited, 2007), 156.
[14] Gray, *Alert: Beyond the Inuit Lands*, 92.
[15] Francis K. Mason, *Lockheed Hercules* (Wellingborough: Patrick Stephens, 1988), 12.
[16] Sam McGowan, *The C-130 Hercules: Tactical Airlift Missions, 1956-1975* (Blue Ridge Summit, PA: Aero, 1988), 4-8; Leversedge, *Canadian Combat and Support Aircraft*, 197.
[17] Note: some documents used Roman numerals instead of Arabic numbers to denote each Boxtop, but the latter form is used throughout this chapter. Alert's polar night begins in the middle of October and persists until the end of February.
[18] D.H. Kuhn, "Report on Operation Spring Resupply and Boxtop," 16 May 1966, LAC, RG 24, G-15-4, acc. 83-84165, box 22444, file 55-00-1316, part (pt) 2.
[19] T. Benson, "Report on Spring Resupply and Boxtop Phase 1 – 1966," 14 June 1966, LAC, RG 24, G-15-4, acc. 83-8416, box 22444, file 55-00-1316, pt. 2.
[20] G. Atwood, "Report on Boxtop: Phase I 1969," 25 Apri 1969, and K.S. Johnson, "Report on Boxtop Phase II, 1969," 5 September1969, LAC, RG 24, G-15-4, vol. 23519, file 3030-9, pt. 1.
[21] J.J. Thompson, "Report on Boxtop Phase III 1969," 1 December 1969, LAC, RG 24, G-15-4, vol. 23519, file 3030-9, pt. 1.
[22] M.J. Connor, "Operation Boxtop – Phase III: Servicing Detachment Report," 1 December 1969, LAC, RG 24, G-15-4, vol. 23519, file 3030-9, pt. 1.
[23] Ibid; J.J. Thompson, "Report on Boxtop Phase III 1969," 1 December 1969, LAC, RG 24, G-15-4, vol. 23519, file 3030-9, pt. 1.
[24] J.C. Henry, "Annex A: Part I – Major Constraints," 28 April 1976, LAC, RG 24, G-15-4, vol. 23601, file 3030-9, pt. 1-75. Readers should note that Henry made a nearly identical comment without recording any recommendation in his Boxtop 3/75 report. J.C. Henry, "Annex A: Part I – Major Constraints," 30 October 1975, LAC, RG 24, G-15-4, vol. 23601, file 3030-9, pt. 1-75.
[25] P.R. DeTracey, "Airlift Commander's Report Boxtop 2/84," 20 August 1984, LAC Winn, RG 24, acc. 1996-01281-9, box 1, file 3030-Op Boxtop, pt. 9.
[26] P.R. DeTracey, "Airlift Commander's Report Boxtop 3/84," 22 November, 1984, LAC Winn, RG 24, acc 1996-01281-9, box, 1, file 3030-Op Boxtop, pt. 9.

[27] W.F. Buckham, “Annex A: Part 1,” 24 November 1987, LAC Winn, RG 24, acc. 2003-01789-5, box 3, file 3030-Op Boxtop, pt. 13. This recommendation appears to have been followed. See: M.J. Anglesey, “Appendix B: Part II – Other Observations,” 28 June 1990, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 16.
[28] Brent Hoddinott interviewed by Daniel Heidt, 26 August 2015.
[29] ALCEs use the MPN-25 to monitor air traffic travelling within sixty miles of Alert and verbally guide approaching Hercules to within 200-feet of the runway during low visibility conditions. Gray, *Alert: Beyond Inuit Lands*, 94; Scott Marshall, interviewed by Daniel Heidt, 29 September 2015; Warren Baccardax, interviewed by Daniel Heidt, 21 October 2015.
[30] See for example: “Annex A: Alert Wireless Station Report on Operation Boxtop 7,” 21 August 1962, LAC, RG 24, acc. 83-84-215, vol. 292, file, 2001-584-A28, pt. 9; “Annex A: Alert Wireless Station Report on Operation Boxtop 65,” 3 August 1965, LAC, RG 24, acc. 83-84-167, vol. 4585, file, 2001-584-A28, pt. 14; G. Fosberg, “Operation Boxtop: Phase II – 1966,” 31 August 1966, LAC, RG 24, G-15-4, acc. 83-84165, box 22444, file 55-00-1316, pt. 2; J.J. Thompson, “Report on Boxtop Phase III, 1969,” 1 December 1969, LAC, RG 24, G-15-4, vol. 23519, file, 3030-9, pt. 1; M.M. Zrymiak, “Airlift Commander’s Report – Boxtop I/85,” 11 June 1985, LAC Winn, RG 24, acc. 2003-01789-5, vol. 3, file 3030-OP Boxtop - Exercise Op Boxtop, pt. 10; “Annex B: Post Op Report – Problems / Recommendations,” September 1991, LAC, RG 24, G-15-27, acc. 1992-93296, box 1, file 3350-1 Boxtop. A more unusual complication came in July 1968, when unseasonal rain turned Alert’s airfield into mud, and forced the station’s Commanding Officer (CO) to temporarily close the airstrip for two days. P.J. Major, “Report on Boxtop Phase II 1968,” 30 August 1968, LAC, RG 24, G-15-4, vol. 23519, file 3030-9, pt. 1.
[31] Gray, Alert: Beyond Inuit Lands, 94.
[32] William Snyder, interviewed by Daniel Heidt, 17 August 2015.
[33] D.H. Kuhn, “Report on Operation Spring Resupply and Boxtop,” 16 May 1966, LAC, RG 24, G-15-4, acc. 83-84165, box 22444, file 55-00-1316, pt. 2.
[34] J.C. Henry, “CFB Trenton Operation Order – 9/76: Boxtop II/76,” LAC, RG 24, G-15-4, vol. 23601, file 3030-9, pt. 1-75; Leversedge, *Canadian Combat and Support Aircraft*, 80.
[35] P.R. DeTracey, “Airlift Commander’s Report: Boxtop 3/82,” 4 January 1983, LAC Winn, RG 24, acc. 1996-01281-9, box 1, file 3030-Op Boxtop, pt. 9.
[36] W.F. Buckham, “Annex B: Part II – Other Observations,” 13 May 1987, LAC Winn, RG 24, acc. 2003-01789-5, box 3, file 3030-Op Boxtop, pt. 12.
[37] J.C. Brace, “Airlift Commander’s Report – Boxtop III/87,” “Annex A: Part I,” 28 March 1988, LAC Winn, RG 24, acc. 2003-01789-5, box 3, file 3030-Op Boxtop, pt. 13.

[38] AM Cleveland, "8 WG Warning Order 011/15: OP Boxtop II/15," September 2015, Christian Roy to Richard Goette, email, 5 October 2015; Christopher Daniel, "8 Wing Delivers Fuel to Canada's Most Northerly Post," *Contact,* 27 April 2012, 11.
[39] See for example: M.J. Anglesey, "Airlift Commander's Report: Boxtop 2/89," 22 September, 1989 and M.J. Anglesey, "Airlift Commander's Report: Boxtop 2/90," 30 August 1990, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 16; M.A. Wansink, "Airlift Commander's Report Boxtop 2/91," 6 September 1991, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 17. Boxtop planners required several years to fully accommodate this practice. While the additional fuel was quickly added at Thule, it took several years for planners to assign Water Sanitation Petrol Oil and Lubricant (WSPOL) Technicians to drylift MAMS teams. In the interim, many aircraft had to depart Alert with their surplus fuel still onboard. D.B. Abbott, "Problem Areas: Annex A," 28 October 1992, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 18.
[40] D.B. Abbott, "Annex A – Problem Areas," 28 October 1992, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 18.
[41] George Stewart, interviewed by Daniel Heidt, 22 October 2015.
[42] Rose Gudex, "Airmen Support Remote Arctic Operations," 15 October 2015, *U.S. Air Force*, www.af.mil/News/ArticleDisplay/tabid/223/Article/509946/airmen-support-remote-arctic-operations.aspx.
[43] Jerome Lessard, "FlightWrites New Chapter in Air Force History," 26 August 2010, *Trentonian,* www.trentonian.ca/2010/08/17/flight-writes-new-chapter-in-air-force-history.
[44] Brent Hoddinott, interviewed by Daniel Heidt, 26 August 2015.
[45] Nathalie Frigon, interviewed by Daniel Heidt, 31 August 2015; Ziprick, "Leveraging Air Mobility to Support Canadian Arctic Sovereignty," 51-53.
[46] Brent Hoddinott, interviewed by Daniel Heidt, 26 August 2015.
[47] Michel Charron, interviewed by Daniel Heidt, 21 October 2015.
[48] G. Walsh, "'Q' Administrative Instruction: Alert Wireless Station," 17 July 1958, RG 24, acc. 83-84-215, vol. 290f 2001-584-A28, pt. 1.
[49] D.B. Dimond, "Minutes of a Meeting Held at Air Transport Command Headquarters to Discuss Boxtop VII and Resupply to the JAWS," 22 June 1962, LAC, RG 24, acc. 83-84-215, vol. 292, file 2001-584-A28, pt. 9.
[50] "Alert Wireless Station Report on Operation Boxtop 7: 6-20 Aug 62," 21 August 1962, LAC, RG 24, acc 83-84-215, vol. 292, file 2001-584-A28, pt. 9. See similar stories in: Lloyd, *Fairchild C-82 Packet and C-119 Flying Boxcar*, 135.
[51] "Alert Wireless Station Report on Boxtop VI – March 1962," late March 1962, LAC, RG 24, acc. 83-84-215, vol. 292, file 2001-584-A28, pt. 9.
[52] Arctic personnel reused some of these drums for other purposes. Archie Asbridge, "Archie in the Arctic 1958 to 1963," n.d., private collection.

[53] "Alert Wireless Station Report on Boxtop VI – March 1962," late March 1962, LAC, RG 24, acc. 83-84-215, vol. 292, file 2001-584-A28, pt. 9
[54] P.D. Smith, "Bulk Fuel Storage Tanks," 22 March 1962, LAC, RG 4, acc. 83-84-215, vol. 292, file 2001-584-A28, pt. 9.
[55] "Alert Wireless Station Report on Operation Boxtop 8: 24 July 63 – 1 Aug 63," 5 August 1963, LAC, RG 24, acc. 83-84-215 vol. 292, file 2001-584-A28, pt. 11.
[56] G.R. Laing, "Fifteenth Annual Canada/US Joint Arctic Weather Stations Planning Conference," 16 February 1962, LAC, RG 24, acc. 83-84-215, vol. 291, file 2001-584-A28, pt. 8.
[57] Heide, "Frigid Ambitions: The Venture of the Alert Wireless Station and Lessons Learned for the Canada First Defence Strategy," 117; Charles Arntsen, interviewed by Daniel Heidt, 7 September 2015.
[58] For more information on Alert's bulk fuel storage system, consult: Col Deane-Freeman, "Fuel Storage Tanks, Alert Wireless Station," 12 April 1962, LAC, RG 24, acc. 83-84-215, vol. 292, file 2001-584-A28, pt. 9; Goodbrand, "Briefing – Operation Mould Bay, N.W.T.," 9 October 1963, LAC, RG12, box 32, file 6754-1292, pt. 14.
[59] Heide, "Frigid Ambitions: The Venture of the Alert Wireless Station and Lessons Learned for the Canada First Defence Strategy," 117.
[60] E. Churchill, "Fuel Oil Storage – Alert, NWT," December 1962, LAC, RG 24, acc. 83-84-215, vol. 292 f 2001-584-A28, pt. 11.
[61] Deane-Freeman, "Minutes of a Meeting to Discuss Installation of Bulk Fuel Storage Facilities at Alert," 19 April 1962; see also Klassen, "Bulk Fuel Storage Tanks: Station Alert," 12 March 1962, LAC, RG 24, acc. 83-84-215, vol. 292, file 2001-584-A28, pt. 9; Goodbrand, "Briefing – Operation Mould Bay, N.W.T.," 9 October 1963, LAC, RG12, box 32, file 6754-1292, pt. 14.
[62] NAMAO to CANARLIFT, 29 April 1963, LAC, RG 24, G-15-4, acc. 83-84165, box 22444, file 55-00-1315, pt. 1.
[63] Canairlift to Stn Namao, 3 May 1963, LAC, RG 24, G-15-4, acc. 83-84165, box 22444, file 55-00-1315, pt. 1.
[64] S.H. Kuhn, "Report on Operation Spring Resupply and Boxtop: Phase I – 1966," 16 May 1966, LAC, RG 24-G-15-4, acc. 83-84165, box 22444, file 55-00-1316, pt. 2.
[65] P.R. Tracey, "Airlift Commander's Report: Boxtop 3/83," 29 November 1983, LAC Winn, RG 24, acc. 1996-01281-9, box 1, file 3030-Op Boxtop, pt. 9.
[66] George Stewart, interviewed by Daniel Heidt, 22 October 2015; Charles Arnsten to Daniel Heidt, email, 8 December 2015.
[67] Charles Arntsen, interviewed by Daniel Heidt, 7 September 2015.
[68] Ibid.
[69] "Part 1, Problem Areas," November 1984, LAC Winn, RG 24, acc. 1996-01281-9, box 1, file 3030-Op Boxtop, pt. 9; BOC Edmonton to CFCCHQ Ottawa, "Leaking MEE Fuel Bladders – At Thule," May 1985, LAC Winn, RG 24, acc.

2003-01789-5, vol. 3, file 3030-OP Boxtop - Exercise Op Boxtop pt. 10; M.J. Anglesey, "Airlift Commander's Report Boxtop 3/90: Annex A – Problem Areas," 30 November 1990, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 16; C.G. Diamond, "Post Op Report – Boxtop III/90," 13 March 1991, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 17.
[70] Charles Arntsen, interviewed by Daniel Heidt, 7 September 2015.
[71] M.J. Anglesey, "Appendix B: Part 2 – Other Observations," 30 August 1990, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 16.
[72] George Stewartm interviewed by Daniel Heidt, 22 October 2015.
[73] A.D. Syme, "Bulk Fuel Delivery System Operational Trial- Boxtop 1-90," 13 May 1991, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 17.
[74] Ibid; see also M.J. Anglesey, "Appendix C – Bulk Fuel Delivery System: Airlift Commander's Report Boxtop 1/91," 3 June 1991, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 17.
[75] A.D. Syme, "Bulk Fuel Delivery System Operational Trial- Boxtop 1-90," 13 May 1991, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 17.
[76] "Annex B, Part II: Problem Areas," March 1992, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 18.
[77] M.A. Wansink, "Annex A - Problem Areas: Airlift Commander's Report: Boxtop 3/91," LAC, RG 24, G-15-27 acc. 1992-93296, box 1, file, 3350-1 Boxtop.
[78] "Aircrew Assignment for Boxtop Operations," November 1991, LAC, RG 24, G-15-27, acc. 1992-93296, box 1, file 3350-1 Boxtop.
[79] M.A. Wansink, "Annex B – Other Observations: Airlift Commander's Report: Boxtop 3/91," LAC, RG 24, G-15-27 acc. 1992-93296, box 1, file 3350-1 Boxtop.
[80] M.A. Wansink, "Airlift Commander's Report Boxtop 1/92," 27 May 1992, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 18.
[81] George Stewart, interviewed by Daniel Heidt, 22 October 2015.
[82] B.P. Uglow, "Report on Operation Boxtop VIII," August 1963, LAC, RG 24, C-1-c, vol. 35810, file 2001-584-A28, pt. 12.
[83] D.H. Kuhn, "Report on Operation Spring Resupply and Boxtop: Phase I – 1966," 16 May 1966, LAC, RG 24, G-15-4, acc. 83-84165, box 22444, file 55-00-1316, pt. 2.
[84] Ibid.
[85] G. Fosberg, "Operation Boxtop: Phase II – 1966," 31 August 1966, LAC, RG 24, G-15-4, acc. 83-84165, box 22444, file 55-00-1316, pt. 2.
[86] Nord was another joint Danish-American weather station at the northern edge of Greenland. G. Atwood, "Report on Boxtop: Phase I 1969," 25 April 1969, LAC, RG 24, G-15-4, vol. 23519, file 3030-9, pt. 1.
[87] George Stewart, interviewed by Daniel Heidt, 22 October 2015. The perpetual linkage between Alert and Thule led to the "Boxtop Olympics," an event where

several dozen American, Canadian, and Danish personnel visit each others' bases to compete at floor hockey, basketball and other sports after the completion of each year's airlift activities. LCol Durwin McLellan, interviewed by Daniel Heidt, 10 July 2015.

[88] G. Fosberg, "Operation Boxtop: Phase II – 1966," 31August 1966, LAC, RG 24, G-15-4, acc. 83-84165, box 22444, file 55-00-1316, pt. 2.

[89] For further research on the history of Thule AFB, consult: Nikolaj Petersen, "SAC at Thule Greenland in the U.S. Polar Strategy," *Journal of Cold War Studies* 13:2 (Spring 2011), 90-115; Clive Archer, "The United States Defence Areas in Greenland," *Cooperation and Conflict* 23 (1988), 123-144; Jørgen Taagholt and Jens Claus Hansen, *Greenland: Security Perspectives*, Daniel Lufkin trans. (Fairbanks, Alaska: Arctic Research Consortium of the United States, 2001).

[90] P.J. Major, "Report on Boxtop Phase II 1968," August 1968, LAC, RG 24, G-15-4, vol. 23519, file 3030-9, pt. 1. For the continuation of this practice consult: C. Henry, "CFB Trenton, Operation Order 12/75: Boxtop Phase II/75," 10 June 1975, LAC, RG 24, G-15-4, vol. 23601, file 3030-9, pt. 1-75.

[91] "ATG OP Dir 15/80 Boxtop II 80," Summer 1980, LAC Winn, RG 24, acc. 1996-01281-9-b-1, file 3030-Op Boxtop, pt. 8.

[92] "Memorandum of Understanding between the Canadian Forces (CF) and United States Air Force Space Command (SPACECOM)," 1 August 1983, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 16.

[93] Charles Arntsen, interviewed by Daniel Heidt, 7 September 2015; Charles Arnsten to Daniel Heidt, email, 4 December 2015.

[94] J.C. Brace, "Annex A: Part I – Problem Areas," 19 January 1987, LAC Winn, RG 24, acc. 2003-01789-5-b-3, file 3030-Op Boxtop, pt. 12.

[95] W.F. Buckham, "Annex B: Part II – Other Observations," 13 May 1987, LAC Winn RG 24, acc. 2003-01789-5-b-3, file 3030-Op Boxtop, pt. 12.

[96] "Annex B: Part II – Other Observations," 28 June 1990, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 16.

[97] M.A. Wansink, "Annex A: Problem Areas," 6 September 1991, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 17.

[98] According to the report, American personnel used the forklift after agreeing to replace its engine. This agreement was not communicated to resupply planners before Boxtop 1/92. M.A. Wansink, "Annex A: Problem Areas," 27 May 1992, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 18.

[99] D.B. Abbott, "Annex B: Observations," 28 October 1992, LAC, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 18.

[100] D.B. Abbott, "Annex A – Problem Areas," 28 October 1992, LAC Winn, RG 24, acc. 2003-01789-5-b-15, file 3030-Op Boxtop, pt. 18.

[101] George Stewart, interviewed by Daniel Heidt, 22 October 2015.

[102] This description is attributed to former Commander of 1 Canadian Air Division (1CAD) Major-General Marcel Dumais. Richard Goette, "Concluding Remarks by

the Commander 1 Canadian Air Division and the Chief of the Air Staff," (Compilation), in *Air Campaigns in the New World Order* (Silver Dart Canadian Aerospace Studies vol. 2), Allan D. English, ed. (Winnipeg: Contemporary Printing and Centre for Defence and Security Studies, 2005), 119.

[103] All military air power functions in Canada – unlike other nations such as Britain and the United States – are centralized under the RCAF

[104] Major Bill March and Richard Goette, "Transforming Canada's Post-Cold War Air Force," in *Transformation of Western Airpower*, Gary Schaub, Jr., ed. (Copenhagen: University of Copenhagen Press, forthcoming)

[105] Colin Keiver to Richard Goette, email, 8 October 2015.

[106] B-GA-401-000 Canadian Forces Aerospace Doctrine, 48.

[107] English & Westrop, Canadian Air Force Leadership and Command, 189-190.

[108] John St. Dennis interviewed by Daniel Heidt and Richard Goette, Canadian Forces College, Toronto, 29 September 2015; Brent Hoddinott interviewed by Daniel Heidt, 26 August 2015; Nathalie Frigon, interviewed by Daniel Heidt, 31 August 2015; Charles Arntsen, interviewed by Daniel Heidt, 7 September 2015.

[109] B-GA-401-000 Canadian Forces Aerospace Doctrine, 49-50.

[110] See for example: Ziprick, "Leveraging Air Mobility to Support Canadian Arctic Sovereignty," Chapter 4.

[111] Ibid. The feasibility of LCol Ziprick's ideas still requires further study.

[112] Ziprick, "Leveraging Air Mobility to Support Canadian Arctic Sovereignty," Chapter 4; J. St. Dennis, interviewed by Daniel Heidt and Richard Goette, 29 September 2015; Canada, "Canada's Northern Strategy: Our North, Our Heritage, Our Future" (Ottawa: Government of Canada, 2009), 23; Scott Marshall commented on the reliability of the RCAF K-loaders during Op. Nanook in an email to Richard Goette on 5 January 2016.

[113] George Stewart, interviewed by Daniel Heidt, 22 October 2015.

[114] Alert's vehicles run on ultra-low-sulfur diesel which Boxtop aircraft transport from Resolute. George Stewart, interviewed by Daniel Heidt, 22 October 2015.

[115] Scott Marshall, interviewed by Daniel Heidt and Richard Goette, 29 September 2015.

[116] Brent Hoddinott, interviewed by Daniel Heidt, 26 August 2015.

[117] George Stewart, interviewed by Daniel Heidt, 22 October 2015.

[118] Brent Hoddinott, interviewed by Daniel Heidt, 26 August 2015.

[119] Nathalie Frigon, interviewed by Daniel Heidt, 31 August 2015.

[120] Brent Hoddinott, interviewed by Daniel Heidt, 26 August 2015.

[121] Darwin Ziprick, interviewed by Daniel Heidt, 22 September 2015.

[122] D.H. Kuhn, "Report on Operation Spring Resupply and Boxtop: Phase I – 1966," 16 May 1966, LAC, RG 24-G-15-4, acc. 83-84165, box 22444, file 55-00-1316, pt. 2.

Chapter Twelve

The CAF Returns to the Arctic, 2000-2006

Adam Lajeunesse

In the summer of 2002, HMCS *Goose Bay* and *Summerside* sailed into the Canadian Arctic for the Royal Canadian Navy's (RCN) first northern deployment since 1989. The mission objectives were extremely modest as the Navy was figuratively dipping its toe back in to test the frigid waters. The ships undertook some limited training with the Canadian Rangers and visited various northern communities during the time of year when ice conditions were most favorable. Despite the cautious approach, a host of technical and procedural difficulties quickly became apparent, revealing just how limited the Navy's capabilities north of 60° really were. While unsettling, these limitations came as no surprise, as Canadian warships were not designed for Arctic operations and whatever skills and knowledge that had been acquired in decades past had long since dissipated.

Exercise *Narwhal* was a radical departure for a navy that had not deployed a warship to the region in 20 years.[1] It was undertaken not to achieve any specific military aim, as much as it was a reaction to a shifting perception of the Arctic and the region's future. By the early 2000s, climate change, economic development, and talk of a navigable Northwest Passage forced the Canadian government and military to reevaluate the potential security threats to the Arctic and the Canadian Armed Forces' (CAF) responsibilities in the region. Much as had been the case in the early 1970s, the deployment was fueled not by any specific threat or requirement but by a general, and still undefined, concern that a northern operating capability was becoming increasingly important, and that the military needed to be seen taking its northern responsibilities seriously.

After the collapse of the Soviet Union, Canada had moved decisively away from the use of military power to assert control or demonstrate sovereignty in the Arctic. Instead, Canadian policy in the 1990s emphasized soft power, international cooperation, and environmental and human security issues.[2] This shift was partly political. In 1993, the Liberal Party replaced the Conservatives in government and brought in a new understanding of 'security,' one that prioritized cost-cutting and deemphasised hard security threats and requirements. From a practical standpoint, it was difficult to make a case for maintaining Canada's Arctic presence and capabilities. Northern exercises had long been designed to counter Soviet threats and to prepare for the anticipated rush of northern resource development. By the early 1990s, the resource industries had exited the Canadian Arctic while the disintegration of the Soviet military removed that traditional driver for CAF investment in the Arctic. Land, air, and naval deployments to the North were cut and the Forces' northern skills were allowed to atrophy.

The Renaissance in Arctic Security

After a decade long absence, the "renaissance in Arctic security," as described by political scientist Rob Huebert, began around 2000.[3] The catalyst for this renewed attention was the increasingly widespread recognition of climate change and the impacts it was having on the extent and thickness of the Arctic's ice.[4] Melting ice would open up sea routes and render oil, gas, and mineral exploration desirable for the first time since the 1980s. At the same time, sky-high resource prices and shipping day-rates, sustained by China's phenomenal economic growth, seemed to make such projections realistic and prompted some analysts to demand a new emphasis on surveillance and power projection in the Arctic.[5]

In 2000, the Department of National Defence (DND) conducted a broad survey of its Arctic capabilities and perceived requirements. This *Arctic Capabilities Study* (ACS) concluded that the CAF's capacity to monitor and respond to threats in the North had decreased to the point that it was virtually non-existent. While the region faced no immediate military threats, these deficiencies were still a problem in the face of what the ACS described as the "many significant security/sovereignty challenges" present in the North.[6] These new threats stemmed from the anticipated increase in northern shipping and economic activity that could lead to the establishment of an international sea route through the Northwest Passage, as well as the assumed environmental, criminal, and immigration issues that would invariably accompany such increased activity. It was assumed that this activity, if ignored, had "the potential to lead, in the long term, to an erosion of Canada's sovereignty in the North."[7] This assessment was based on the assumption that ignoring this activity might lead to the regular use of the Northwest Passage outside of Canadian control which, in turn, could lead to the passage gaining the status of an international strait. This is a situation that Canadian governments have anxiously sought to avoid since at least the late 1960s.[8]

One year after the ACS, the Navy published a white paper outlining its strategy for the next two decades. The natural emphasis of *Leadmark: The Navy's Strategy for 2020* was on the Atlantic and Pacific Oceans, the RCN's traditional areas of operation, though the strategy did highlight the need to maintain a presence in the Arctic as well.[9] As was the case with the ACS, *Leadmark* cited growing concerns surrounding Arctic shipping and economic activity and the illegal immigration and criminal activity that might soon follow.[10] The attention paid to the Arctic may have been minimal but it represented a significant departure from the *1994 Defence White Paper*, which discussed the Arctic only as it related to the Canadian Rangers and surveillance cooperation with the United States.[11] Threat perceptions had come full circle and the CAF was once again interested in what was going on (or might soon be going on) in the Arctic.

Operation *Narwhal*

There were various proposals within the RCN for a new northern deployment and staff talks were held between the surface operations planners from Maritime Forces Atlantic and staff at Canadian Forces Northern Area (CFNA). In January 2002, the planning process was given added momentum by the publication of Danish plans for a trip to Hans Island—a rock in Nares Strait claimed by both Canada and Denmark. Originally, CAF plans involved the deployment of a frigate and a company of soldiers, supported by Aurora aircraft. However, deployments in Afghanistan and the Balkans limited what became Exercise *Narwhal* to the

Kingston-class coastal defence vessels (MCDVs) *Goose Bay* and *Summerside*.[12]

The mission objectives were to practice communications and procedural interoperability between Maritime Forces Atlantic and CFNA while practicing interoperability with other forces in the North, such as 442 Squadron and its CC-138 Twin Otter aircraft and 14 Wing's CP-140 maritime patrol aircraft. Assistance was also rendered to the Canadian Rangers in a North Warning System and sovereignty patrol and the surrounding area was surveilled while gaining operating experience in the northern waters off the southern tip of Baffin Island.[13] The two vessels visited the towns of Killinik and Iqaluit and transported sixteen Rangers to Resolution Island at the entrance to Hudson Strait. While on the island, the ships' crews had the opportunity to undertake day hikes and cultural exchange with the Rangers while the landing party practiced communications with the ships. After three days, the MCDVs departed and the Rangers were extracted from the island by chartered aircraft.

In addition to the basic training, *Narwhal* was also intended to reinforce sovereignty—a component of any Canadian deployment to the Arctic. In fact there was little the two ships could do to accomplish anything of substance in this regard. Their area of operation was 1,700km south of Lancaster Sound, the entrance to the Northwest Passage, and outside (or on the very edge) of Canada's northern straight baselines (the contested lines of demarcation surrounding the country's internal waters). "Sovereignty" was not a serious operational objective but, as had long been the case in Canada, simply demonstrating the ability to operate in the Arctic was an important political consideration. Colonel Kevin McLeod, commander of CFNA, told the press that it was important to tell the world, "yes, we're here, yes, we can get to a remote place in Canada."[14]

Narwhal's political significance was more immediately apparent than its operational utility, a factor that even provoked some criticism from the media.[15] Still, to focus on the limited nature of the operation is to miss the forest for the trees. *Narwhal* was an important beginning, starting with limited objectives, not only because there were limited resources available but because the fleet was leaving its comfort zone. This was a sensible precaution, as the lessons learned from the deployment showed just how limited the RCN's Arctic capabilities actually were.

Even in the relatively benign waters of the Labrador Sea, *Goose Bay* and *Summerside* encountered some of the same problems that had vexed commanders since Arctic operations began in earnest in the 1940s. The most obvious issue was communications between the ships and ground and air forces. Interoperability and basic safety demanded that ships, shore parties, and air support maintain reliable communications but procedural and technical problems intervened.[16] Air support was 50% less than planned due to poor weather and mechanical difficulties, logistical issues prevented the smooth movement of goods from the South, and mechanical problems proved difficult to manage so far from naval supply lines.[17] Compounding these issues, the *Kingston*-class vessels were clearly unsuited for Arctic operations. The ships were simply not designed for even mild ice conditions and were ordered to avoid heavy weather areas to mitigate the dangers of Arctic navigation.[18]

Exercise *Narwhal* was always intended to be the first of many northern deployments and the series continued two years later. This time the operation was scaled up considerably to include roughly 500 military personnel, Griffon helicopters, the frigate HMCS *Montreal*, and the icebreaker CCGS *Henry Larson*. The 2004 *Narwhal* operation took place between Frobisher Bay and Cumberland Sound, farther north than in 2002 but still a safe distance from the more dangerous ice-conditions of the Arctic Archipelago. The mission was also more complex and focused on combined operations, cooperation with other government departments (OGD), communication, and planning—all while asserting a visible presence.

The centerpiece of the operation was a response to a fictitious satellite crash from an unfriendly country—a scenario that had played out in 1978 after the crash of a nuclear-powered Soviet satellite in the Northwest Territories.[19] In Pangnirtung Fjord, *Montreal* practiced its northern refueling procedures with the *Henry Larson*. The Coast Guard ship then served as a target for a naval boarding party rehearsing the search of a vessel of interest.[20] Running concurrently with *Narwhal 2004,* HMCS *Goose Bay* patrolled the Labrador coast supporting 5 CRPG with community visits

and inspections of the Northern Warning System. *Goose Bay* then proceeded northward to rendezvous with *Montreal* and they crossed the Arctic Circle on 29 August 2004.[21]

These operations were an evolution of what the Navy had attempted in 2002, though with decidedly more political attention being paid. That attention was owed to an increase in public interest in both the changing Arctic and the growing perception of sovereignty and security threats. In 2004, the Arctic Council's *Arctic Climate Impact Assessment* drew international attention to the region's dramatic ice-loss,[22] an assessment given added importance by the rapidly increasing interest in the Arctic shown by the oil and gas industry. A funding deal had been signed in 2003 between northern Aboriginal groups, energy companies, and pipeline builders to restart the regulatory process for the long delayed Mackenzie Valley pipeline project, raising hopes (and concerns) that the region might soon become a major producer of oil and gas. Political pressure was also building, as the Danish warships *Vædderen* and *Triton* landed men on disputed Hans Island to raise the Danish flag in 2002 and 2003 respectively. In the words of Rob Huebert, a "perfect storm" of military, political, economic, and legal dangers seemed to loom on the horizon.[23]

As was the case during the first *Narwhal 2002,* the 2004 exercise's impact on Canadian sovereignty is hard to quantify—especially since the operation took place well south of the Northwest Passage. It is clear that the government approached the notion of sovereignty as something that had to be guarded, reinforced, and renewed through use. While there was no explicit legal justification to support this mindset (or at least none that this author has discovered), a military presence was widely seen as essential to "guarding" Canadian interests. Part of this was based on a popular misunderstanding of the threats to Canadian sovereignty. During *Narwhal 2004*, Colonel Normand Couturier, Commander of CFNA, told the press that "if we don't assert our sovereignty to the North, some other countries could come in and challenge it. You know, it's one of the laws of nature in the sense is that if you don't show any presence or if you don't show any use for a particular land, eventually it will become public lands and anybody can, you know, take advantage of it."[24] While this statement did not represent DND policy, it was picked up by the media and included in several news stories and an episode of CBC's *The National.*

In reality, there was no danger of other nations challenging Canadian control over either Arctic territory or resources. The Arctic Archipelago was not *terra nullius*, nor was it in danger of becoming such. Canadian control over seabed resources was guaranteed by the Third UN Law of the Sea Convention (UNCLOS) and this control has never been challenged.[25] Still, media reports played up these fears, suggesting that there was foreign interest in usurping Canada's northern resources and even lands.[26]

Reporting on *Narwhal* often focused on the need for the military to "protect" sovereignty from foreign intruders. *The National* even cited Canada's past 'failures' to guard its sovereignty in the face of foreign aggression. The incidents cited by the program were the transits of the USS *Manhattan* (1969) and USCG *Polar Sea* (1985), and the proximity of a Soviet drift station, which floated close to the archipelago in 1977. That none of which were actually challenges to Canadian sovereignty went unmentioned.[27] Exactly *how* Canada could defend its sovereignty with military force was a question few cared to tackle but it was implied that the mere presence of soldiers and sailors would "guard" the region. Wayne Lord, the director of e Department of Foreign Affairs, voiced this perspective when he said: "If you are going to exercise your sovereignty, you have to be able to show you can operate and be there … you need the equipment and people to do something."[28]

While Prime Minister Paul Martin held this operation up to the world as an example of his government's drive to defend sovereignty, more practical lessons were being learned on the ground. As had been the case in 2002, *Narwhal* demonstrated just how much friction the military had to work though when operating in the North. Communications problems continued and, at one point, the region's topography forced HMCS *Montreal* to move its anchorage after the high horizon blocked vital satellite connections.[29] Navigation was also a nervous affair aboard the warship and a sharp eye had to be kept for the "growlers" and "bergy bits" (small and hard chuncks of ice that can hole hulls) that littered the sea.

Montreal's greatest concern, however, was fuel. Thousands of kilometres from the nearest port, the ship's options were limited. It was unable to get alongside at Iqaluit, as planned, and had to fill its bunkers from the CCGS *Henry Larsen*. Fueling by tanker is never an ideal situation and can be very dangerous in the Arctic, where fast moving ice sometimes requires a ship to take evasive action. The Arctic Waters Pollution Protection Act requires fuelling at anchor, rather than in transit, and specialized fuel booms and other monitoring gear must be deployed to guard against spills.[30] While the Canadian Coast Guard can be relied upon for refueling during pre-planned exercises, icebreaker availability at other times of the year can never be guaranteed.

Likewise, the army encountered many of the same problems first identified decades earlier. Soldiers were given maps that were not to scale and hard to navigate by. Troops on patrol lost communication with field headquarters, and helicopters flew in radio silence as signals were lost in the fiords and mountains surrounding Pangnirtung.[31] Unpredictable and dangerous weather patterns, long a hallmark of Arctic operations, caused serious problems as well. On the morning of 18 August, soldiers were scheduled to relocate from Frobisher Bay to Cumberland Sound. Fog reduced visibility to less than 100 yards and the army couldn't fly out. Quick adaptation turned HMCS *Montreal* into an amphibious support ship and 118 personnel from 2RCR were successfully embarked with all their gear.[32] It was an excellent example of joint operations in a harsh environment, but it should be noted that the transfer was assisted by local fishermen—an asset that would not be available across most of the Canadian Arctic.

Weather endangered the mission again late in the evening of 23 August when two air force personnel were dropped off by a Griffon helicopter for a hike. Grounded by snow, the Griffons were unable to retrieve the men, who found themselves stranded overnight without survival gear in the middle of a snowstorm.[33] Thankfully, the men were found unharmed the next morning, but it was an eye-opening lesson in how quickly a shore party can be cut off from support—even during the summer. Reconnaissance flights by Twin Otters were grounded by the same dangerous conditions and, what had originally been planned as an aerial search for a downed satellite, became a ground expedition led by Rangers on ATVs.[34] Complicating matters for the army, the aurora borealis blocked the military's high-frequency radios from 8 pm to 8 am.[35]

Logistics and organization continued to be a problem for the army, operating as far as it was from its supply base. Moving parts from southern warehouses was made difficult, not only by the distances involved, but by northern shipping infrastructure that was never designed to handle more than a limited stream of goods.[36] While all of these problems had been encountered many times before, there were new difficulties as well. In the years since the 1980s the military's heating and cooking gear had been

converted to propane. While appropriate for the South, officers noticed that at or below -32˚C, the devices ceased to function.[37]

While the myriad of environmental, technical, and logistical problems slowed or limited operations, they were the reason the forces were there to begin with. The political optics of *Narwhal* helped to sell the exercises to the public (and therefore the politicians) but the real benefit was the operational lessons that the CAF was taking away. For *Narwhal 2004*, planners had brought their forces to an area that they knew would cause difficulties. Runways around Pangertung were short and able to accommodate only small aircraft, steep fiords and uneven tundra made walking nearly impossible, and an isolated location far from normal supply networks taxed logistical services to the breaking point.[38] As Huebert astutely observed, however, that this was the point of the whole affair. Any difficulty encountered during an exercise could be learned from and solutions developed.[39] Foreign states may not have been coming to steal Canada's resources, but the CAF would still need those capabilities to respond to incidents or disasters caused by increased shipping and resource development later on.

Exercise Hudson Sentinel

In April 2005, DND released a major policy statement titled *Canada's International Policy Statement: A Role of Pride and Influence in the World*. In it the department warned that "the demands of sovereignty and security" were becoming more pressing as activity in the North continued to rise. The threats perceived by DND were not conventional military dangers but "asymmetric threats" such as criminal activity or trespassing, which could have "long term security implications." More surveillance and control was therefore required, lest "adversaries … be tempted to take advantage of new opportunities."[40] Not long after this policy statement was published, the Chief of Maritime Staff, Vice-Admiral Bruce MacLean, released *Securing Canada's Ocean Frontiers, Charting the Course from Leadmark,* highlighting the requirement for a three ocean navy and the improved northern surveillance and presence that would come with such a force.[41]

In response to this increased need for presence and the ever increasing political requirement to be seen defending sovereignty, the CAF expanded its Arctic program. In 2005 there were three northern operations: Exercise *Beaufort Sentinel* was an RCMP deployment of a patrol vessel to the Western Arctic; Exercise *Hudson Sentinel* included the circumnavigation of Hudson Bay by the patrol ships HMCS *Glace Bay* and *Shawinigan*; finally, the frigate HMCS *Fredericton* undertook a fisheries patrol in Davis Strait.

Fredericton's operations in the northeast represented the first time a Canadian frigate had performed this sort of mission since 1994. One Canadian fisherman noted that he had not seen an inspector there in over ten years. In his account of the operation, Lieutenant Commander Ian Anderson wrote that news of the *Fredericton's* presence spread rapidly and the command crew received the distinct impression that it was a welcome addition to the area.[42] The mission was a success in that it performed practical fisheries duties while demonstrating the RCN's ability to reach as far as Lancaster Sound with a major warship.

The most complex and involved of these was Operation *Hudson Sentinel*. This mission was designed to reinforce Canadian sovereignty and build northern operating experience while assisting 1 and 2 Canadian Ranger Patrol Groups.[43] From 2 August to 16 September, the *Glace Bay* and *Shawinigan*, with RCMP and Coast Guard support, toured Hudson Bay, visiting several northern communities which had not seen a warship in almost 30 years. The ships spent five days at Churchill where they conducted a day sail for local, provincial, and federal VIPs, they participated in a CAF Days event, and held a memorial service marking the Year of the Veteran. While off Cape Dorset, on the southwest coast of Baffin Island, the ships participated in a Search and Rescue (SAR) exercise involving the CCGS *Pierre Radisson* and local Canadian Ranger patrol members.[44]

The operation was part of the re-engagement in the North that started with *Narwhal* and, like previous operations, was focused more on projecting the image of Canadian presence and capability than achieving operational goals. In spite of this, it continued the CAF's re-familiarization with the region and, by expanding its northern deployments in size and complexity, the Forces continued to push its comfort zone and re-learn crucial lessons. In many cases these lessons were already understood but needed to be hammered home. In its after-action reporting, the CAF noticed that many of the problems afflicting its northern operations were the same year after year. Principal amongst these were the traditional frustrations surrounding supply, logistics, weather, and communications.

Inclement weather frequently grounded flights and helicopter operations, leading to recommendations that future missions include "significant redundancies."[45] Forces again had difficulty communicating with each other, a liability caused by technical limitations as well as a lack of practice in joint Arctic operations. On numerous occasions during the operation, the Rangers' back-up communication had to be used to keep the command ship in contact with shore parties.[46] The ships were not capable of VHF/AM communication (air frequencies) while aircraft were not capable of VHF/FM (ship frequencies).[47] It was also discovered that the MCDV's communications with their light boats (RHIBs) was unreliable. Limited soundings in the area of operations required the RHIBs to operate far from the MCDVs when searching or attempting to deliver medical assistance in coastal areas. In one instance this particular failure in communications could have been disastrous. When the GPS used by one RHIB stopped operating that boat found itself lost and out of contact with its ship. The crew was forced to locate an MCDV visually and its crew was wise to return immediately.

Equipment failure was both more frequent and harder to work around in the Arctic. Resupplying forces or replacing equipment was one of the most vexing problems of operating in the North as the CAF had discovered anew in 2002 and 2004.[48] In 2005, a detailed set of guidelines was compiled to help logistics officers undertake simple tasks, like shipping basic parts or materials north. Experience had shown that the process was dramatically different than elsewhere in the country—owing primarily to the North's limited infrastructure. Experience supplying the *Glace Bay* and *Shawinigan* in 2005, and the *Montreal* in 2004, showed that a logistics officer should expect air cargo destined for the North to be bumped or delayed, sometimes for a week or more. In the South this might be attributed to inefficiency or incompetence, but in the North officers had to consider the priorities of those loading the aircraft. Northern resupply companies have limited carrying capacity and must often choose between loading fresh food and mail shipments to communities and sending a nameless part to a non-repeat customer.[49]

For this reason a personal touch is needed in the Arctic that is not most anywhere else. Communicating with shipping workers and highlighting the importance of a part is an essential component of a logistics officer's job. If the part is important enough to ship, the report continued, it is important enough to pay for priority/guarantee shipping. This may expedite the matter but officers must still be aware that even these shipments are often bumped—particularly if they are not proactively and personally tracked through the system. Using couriers seemed to provide a solution, however it was soon discovered that most such companies are rarely open more than 35 hours a week and often only around flight times on weekdays. The only semi-reliable route was to ship by guaranteed air cargo with the airline for pick-up at the airport.[50]

Getting material from airports to ships in the Arctic presented an entirely different, and equally challenging, set of problems. Since there is no delivery service and no road network across much of the Arctic, unconventional means have to be relied upon. Here, the military must leverage local support–meaning the Rangers, or OGDs. During *Hudson Sentinel*, the *Glace Bay* required equipment that could not be replaced in Churchill. CFNA therefore arranged for the equipment to be purchased by 440 Squadron in Yellowknife and delivered to the Canadian Ranger patrol through a gravel strip at Whale Cove on the next planned CC-138 rotation in support of the operation. The Ranger patrol delivered the equipment by ATV to the ship's RHIB, which transported it to *Glace Bay* at anchor, where it was installed.[51] Resupply is a complex affair and would have been impossible without the Rangers. The experience was taxing but helped to reinforce how tenuous northern logistics really are. When moving goods, time has to be built in for unexpected delays caused by weather or sea states. Most Arctic harbours are unprotected anchorages that can be closed by heavy waves. Likewise, transport over land is often by ATV and can be slowed by fog and snow.[52] Simply put, northern logistics are not an exact science and officers must expect the unexpected and factor a great deal of friction into the process of moving anything to (and around) the North.

As had been the case in 2002 and 2004, these problems slowed the mission down and forced some improvisation. Identifying these issues was the point of the operation and efforts were made to identify solutions.

Hudson Sentinel also displayed the CAF's ability to learn from some of the problems encountered during the two *Narwhal* exercises. Early on in the *Narwhal* series, the benefits of joint planning were identified and a joint operations order was drafted. In 2004, the northern deployment was therefore preceded by three days of training and table top exercises for all officers involved in the joint headquarters and its forward elements. For *Hudson Sentinel*, that tradition was continued and expanded.[53]

The benefit of forward support teams was also clearly assimilated. In 2004, teams from CFNA and the Navy were forward deployed to Iqaluit. There was also a Joint Task Force Support Element, staffed equally by naval officers from CFNA and Maritime Operations Group 5 (MOG5). During *Hudson Sentinel*, MOG5 provided forward logistical support at Churchill, informally augmented by CFNA. The result was improved logistics and smoother operations. Along these same lines, the benefit of having senior officers from different elements and command networks discussing how to improve the interoperability of their units was assimilated from earlier exercises and applied to *Hudson Sentinel*. The Chief of Staff CFNA, Commanding Officer of 440 (T) Squadron, and an Aircraft Commander from 405 Squadron took part in portions of the operation and enjoyed "quality time" with the commodore of the Naval Reserves, Commander Coastal Defense, the commanding officers of the participating ships, and the Plans Officer MOG5.[54]

In addition to the operational refinements evident during the exercise, *Hudson Sentinel* represented an operational shift in Canadian Arctic operations, in that it was the first significant attempt to work closely with other government departments in a Whole of Government (WoG) context. This cooperative framework meant horizontal coordination across government agencies and the CAF to harmonize plans and leverage a diverse set of assets and skills to conduct operations as effectively and economically as possible. The need for this approach was laid out in the *International Policy Statement* earlier that year (2005).[55] This framework was particularly relevant for Arctic operations for various reasons. First, government assets in the region were minimal and developing new capabilities has always been an expensive proposition. As such, coordinating assets and capabilities was more important than anywhere else in Canada.

Second, the CAF realized that the increased activity just beginning to manifest in the region was not likely to result in a conventional military threat. The primary responsibility for dealing with issues such as sovereignty, environmental protection, organized crime, and people and drug smuggling would rest with OGDs. In this operational framework, the CAF would continue to play an important role in Arctic security, but in a supporting capacity.[56]

WoG cooperation[57] was an important element to the success of *Hudon Sentinel*. CAF operational orders and reports emphasised the importance of "combined" planning and operations and this emphasis was intentionally highlighted during the exercise by DND communications and through conversations with the local communities visited by the Navy.[58] Still, the evolution of CAF doctrine to include WoG operations was a slow process and *Hudson Sentinel* represented a baby step. Collaboration was largely limited to the RCMP and the Coast Guard and the military retained full control.[59]

Operation *Lancaster*

In January 2006 the politics of Arctic sovereignty were accelerated by the election of Prime Minister Stephen Harper's Conservative government. While the Liberals had restarted the CAF's northern exercises, Harper insisted that not enough was being done. During the election campaign he had accused then Prime Minister Paul Martin of talking "eloquently about defending national sovereignty" while he "allowed our sovereign capability to defend our territory to crumble." Accompanying this criticism was a promise that, as prime minister, he would invest heavily in defending the country's northern sovereignty.[60] Harper's victory that year did not fundamentally alter the CAF's purpose or intent in the North, but it naturally led to an increase in the size and tempo of Arctic operations.

The military's 2006 deployment, Operation *Lancaster*, was the largest in nearly 30 years. The MCDVs *Goose Bay* and *Moncton* and the frigate HMCS *Montreal* were deployed alongside a platoon of soldiers from the Royal 22nd Regiment and a detachment of Canadian Rangers. The RCAF provided air support while the Coast Guard contributed the icebreakers CCGS *Henry Larsen* and *Terry Fox*. In addition, representatives from other government departments were included as part of an effort to further integrate OGDs into CAF northern operations.

As has been the case during Operation *Hudson Sentinel*, developing these working relationships and capabilities was highlighted as a core component of the operation.[61] As the mission's operational order put it, Operation *Lancaster* was designed to exercise "the synergistic relationship that must be established to react effectively to a vast majority of the contingency response situations that may arise."[62] That collaboration was therefore expanded to include the RCMP, Coast Guard, Fisheries, Public Safety, Parks Canada, and Transport Canada working together on a broad array of tasks, such as ice reconnaissance, fisheries patrols, refuelling, vessel reporting, and community visits.[63] On paper it was an impressive roster, though in practice Operation *Lancaster* was far from a fully integrated WoG operation. Rather, it was a military exercise with OGDs "represented to a lesser degree during different stages during the operation."[64] How most of the OGD personnel were supposed to integrate themselves into the military's operational structure, and what they were supposed to contribute, remained uncertain. Some representatives from the civilian agencies, uncertain of what they could contribute, simply left early.[65] Still, the mission represented valuable operational practice and was an important step towards establishing the working relationships and procedures needed for the more complex operations to come.

Operation *Lancaster* took the assembled forces further into the Arctic Archipelago than they had been in decades. From 12-22 August, the soldiers and ships exercised in Lancaster Sound where they tested and refined JTFN's command and control procedures, "asserted Canadian sovereignty" though presence and community visits, and practiced moving and survival skills in northern conditions. In a test of the CAF's amphibious capabilities, troops from the Royal 22nd were landed alongside Rangers at the entrance of Navy Board Inlet and on the north side of Lancaster Sound. CCGS *Henry Larsen* extracted these forces and then acted as a vessel of interest, which was 'captured' by a boarding party from *Montreal*.[66]

Like *Hudson Sentinel* before it, Operation *Lancaster*'s increased size and complexity brought to light new problems while exacerbating traditional difficulties. There is little room for error in Arctic operations and early planning had long been recognized as a necessity. Still, the size of *Lancaster* meant that it was something different. To coordinate the participants, a JTFN-manned operating centre was established in Yellowknife, supported by a forward operating post in Pond Inlet, a tactical operations center onboard *Montreal,* and a logistical operations centre in Iqaluit. While the size of Operation *Lancaster* seemed to warrant this kind of diffuse command structure, it was soon discovered that this dispersal led to the different commands working in silos. The result was confusion and a stretching of JTFN's resources.

Further difficulties were caused by the large number of new personnel (termed augmentees) brought in to supplement JTFN staff and provide administrative and logistical support. At one point there were 21 augmentees at the HQ in Yellowknife, all of whom were unfamiliar with the unique requirements of northern operations.[67] These personnel were also poorly served by JTFN's stretched resources. The Command was not set up for major operations and many new personnel had no phones or answering machines and most were served by a single printer.

The additional staff were also brought north in a disorganized fashion. It was often unclear to JTFN who they were, where they were supposed to be working, what their jobs were, and how they could be contacted (since they often lacked phones). In the confusion, Tactical Command was making decisions meant for the main HQ in Yellowknife while the Joint Operations Command found itself stretched to the limit.[68] The after-action report noted that, had another large-scale mission surfaced at this time, the Joint Operations Command would certainly have been overwhelmed.[69]

Logistical difficulties naturally increased with the size of the operation. Unlike a small visit by a single patrol ship, a large operation can quickly overwhelm a northern community. In Pond Inlet, soldiers had to make a hurried departure from their temporary base at a local school because usage was greater than anyone had expected and the school had to be prepared for the beginning of term. JTFN quickly realized that it needed new contingency plans and better sources of support from the South in case its plans fell apart in more dangerous circumstances. What was required was a plan, "properly thought out and with a finger on supplies/resources" ready for "instant activation"—something like a Major Air Disaster Plan (which are discussed in more detail in Chapter Twelve).[70]

Fuel, always a serious concern, became even more important with so many forces deployed at once. The Coast Guard can refuel navy ships, but there was a limit to the Coast Guard's availability and how much it could carry. Buying fuel into the region, even on a small scale, presented its own problems. Even filling ATVs was difficult in certain communities that could not process the CAF's credit cards. At Clyde River it was eventually arranged to have fuel put on the 440 Squadron account. It was decided in the future that forces will have to be more conservative with their fuel use and new means of supply would have to be found.[71]

Communications problems were similarly exacerbated by the increasingly diverse collection of services and departments being deployed together. For secure communications, JTFN used the TITAN network while the Navy used the MCOIN system; these systems were unique and the result was serious compatibility issues.[72] As in years past, *Montreal* was still not equipped to support shore parties. This was an even greater problem for the MCDVs and their less advanced communications suites.[73] Air force planes again had difficulty communicating with ground and naval assets as the three services' systems remained incompatible.[74] This lesson had been learned earlier and the CAF had tried to adapt. It was assumed

that land forces would be able to communicate with the naval vessels using HF secure communications and proper frequencies had been identified during the planning phases. Once troops were on the ground, however, it was discovered that both organizations used different variants of the KG84 crypto device.[75] In the aftermath of the operation, a "sound communications plan" including "an in-depth understanding of each other's capabilities and limitations" was deemed an absolute requirement for the future. Major M. Beauchemin noted in his observations of the operations that the CAF has known for years that interoperability is essential, it simply "hasn't yet been assimilated into our doctrine."[76]

At the tactical level, the Navy and army were reminded how difficult simple operations could be in the North and how ineffective some of their equipment was. In particular, deploying troops from ship to shore was more difficult than expected. Moving troops into small zodiacs with ladders dangled over the side of the ship took hours longer than scheduled. Once deployed, surf swamped the small boats as they struggled to land on the rocky coastline. The soldiers were then forced to bail out into the freezing water in order to push the craft free of the rocks and, after climbing up a 20 metre headwall, set up their post kilometres from where they had hoped to land.[77]

Operation *Lancaster* was the first large-scale joint operation in the Arctic and it clearly showed its growing pains. Many of the problems encountered had to do with trying to organize increasingly complex operations with staff unfamiliar with northern operations and a command structure not designed for it. Like the *Narwhal* series and *Hudson Sentinel* before it, Operation *Lancaster* was designed partly to serve a political purpose. More focus than ever was placed on attracting media attention and demonstrating the country's ability to guard its Arctic sovereignty. Like the operations that preceded it, however, its real value was in the lessons taken away and the experience gained by the men and women deployed and those involved in organizing, supplying, and administering the deployment. This experience is hard to quantify but is an invaluable asset if the CAF is ever to establish the regular presence in the North mandated in its policy documents. As the operational planners appropriately noted in their after-action report, "you can only learn by doing."[78]

Conclusion

The practical difficulties of operating in the Arctic identified in these early exercises were not particularly new. Problems with communications, logistics, and weather had always affected operations. New technologies provided some solutions. GPS improved navigation and satellite phones provided semi-reliable communication. Still, reliance on these technologies presented new problems as well. GPS systems can be off by a number of degrees in the Far North, internet and data transfer is slow, cell services often non-existent, and betteries are quickly depleted by the cold. For many of the problems of northern operations there is no obvious technical solution.

Logistics and supply remain the most daunting problems. From St. John's to Lancaster Sound by sea is 3,700km and there is little to support a ship once it arrives in the Arctic. There is little on-the-ground to support anything larger than a sub-unit surge outside of the few population centres north of 60°. Moving and surviving in the Arctic environment requires a great deal of supply, and supporting operations quickly proved to be the CAF's most pressing requirement—as it remains today.

The true value of these operations was that they reminded the military of the problems inherent to Arctic operations. The comfort level that the CAF built up in the 1970s and 1980s had dissipated and needed to be re-established. From the technical to the procedural, the CAF was forced to relearn how to work—and work together—in an environment that left little room for error. These operations also served as a proving ground for the government's early experiments with large-scale northern WoG operations. Progress on this front was slow but laid the groundwork for much of the combined operations developed in the decade that followed. Politics may have driven the CAF back into the Arctic but the real value of the exercises lay in the lessons learned and relearned, in the military's steadily improving comfort with northern operations, and in the new operational frameworks devised and rehearsed in an unforgiving environment.

Notes

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[1] The last RCN warship to deploy north of 60˚ was HMCS *Saguenay* in 1982. The last RCN vessel in the region was the HMCS *Cormorant* in 1989.
[2] See for example: House of Commons Standing Committee on Foreign Affairs and International Trade, *Canada and the Circumpolar World: Meeting the Challenges of Cooperation into the Twenty-First Century* (1997) and Department of Foreign Affairs and International Trade. *The Northern Dimension of Canada's Foreign Policy* (2000).
[3] Rob Huebert, "Renaissance in Canadian Arctic Security?" *Canadian Military Journal* 6:4 (Winter, 2005-2006): 17-29.
[4] O.M. Johannessen, E.V. Shalina and M.W. Miles, "Satellite Evidence for an Arctic Sea Ice Cover in Transformation," *Science* 286 (1999), 1937-39.
[5] See for instance: Rob Huebert, "Canadian Arctic Security Issues: Transformation in the Post-Cold War Era," *International Journal* 54:2 (Spring 1999).
[6] Canadian Forces Northern Area (CAFNA), *Arctic Capabilities Study,* 2000, 9
[7] Ibid.
[8] For a history of Canadian government efforts prevent the Northwest Passage from gaining the status of an international strait, see: Adam Lajeunesse, *Lock, Stock, and Icebergs: The Evolution of Canada's Arctic Maritime Sovereignty* (Vancouver: UBC Press, 2016).
[9] Department of National Defence, *Leadmark: The Navy's Strategy for 2020* (Ottawa: Directorate of Maritime Strategy, 2001), 66.
[10] Ibid, 84.
[11] Department of National Defence, *1994 White Paper on Defence* (Ottawa: DND, 1994), 8, 17, 21, 34.
[12] Ian Anderson, "Naval Operations the Canadian North," *Canadian Naval Review* 1:4 (Winter 2006), 8 and Bob Weber, "Canadian Navy Makes First Arctic Patrol in 13 years for Sovereignty, Training," *Daily Bulletin* (29 July 2002), 2.
[13] Bruce MacLean, "MARLANT/CFNA Joint Exercise Directive Ex Narwhal 2002," 28 May 2002.
[14] "Navy Asserting Arctic Sovereignty: [Early Edition]," *Edmonton Journal* (29 July 2002), A6.
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[16] EX Narwhal ACC Post Ex Report, 2002.
[17] Joan Taylor, AA Comd CFNA, "Op Hudson Sentinel 2005 Post Operation Report," 24 October 2005.
[18] Bruce MacLean, "MARLANT/CFNA Joint Exercise Directive Ex Narwhal 2002," 28 May 2002.
[19] This operation is examined in detail in Chapter Ten of this volume.
[20] W.A. Woodburn, "HMCS *Montreal* Annual Historical Report," March, 2005.
[21] Anderson, "Northern Deployments."

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[22] Arctic Council, *Arctic Climate Impact Assessment* (Cambridge: Cambridge University Press, 2004).
[23] Rob Huebert, "Canada and the Changing International Arctic: At the Crossroads of Cooperation and Conflict," in *Northern Peoples, Powers and Prospects for Canada's North*, Frances Abele et al. eds. (Ottawa: Institute for Research on Public Policy, 2008), 109-10.
[24] Nathan VanderKlippe, "Glitches Teach Valuable Lessons," *Edmonton Journal* (5 September 2004), A2.
[25] United Nations, Convention on the Law of the Sea (1982), Part VI, Article 77.
[26] See for instance: Clifford Krauss, "This Land is our Land," *The Spectator* (4 September 2004), F1.
[27] The *Manhattan* expedition was wholeheartedly supported by Canada, the *Polar Sea* transit was specifically arranged as being without prejudice to Canadian sovereignty, and the 1977 drift station was never in Canadian waters.
[28] See for instance: Krauss, "This Land is our Land," F1.
[29] VanderKlippe, "Glitches Teach Valuable Lessons," A2.
[30] Paul Forget, "Bridging the Gap: The Limitations of Pre-AOPS Operations in Arctic Waters," *Canadian Naval Review* 7:4 (Winter, 2012), 18
[31] VanderKlippe, "Glitches Teach Valuable Lessons," A2.
[32] W.A. Woodburn, "HMCS *Montreal* Annual Historical Report," March, 2005.
[33] Ibid.
[34] VanderKlippe, "Glitches Teach Valuable Lessons." A2.
[35] Ibid.
[36] Joan Taylor, AA Comd. CFNA, "Op Hudson Sentinel 2005 Post Operation Report," 24 October 2005.
[37] David Pugliese, "Military Equipment Faltering in Cold," *Edmonton Journal* (8 August 2004), A2.
[38] VanderKlippe, "Glitches Teach Valuable Lessons," A2.
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[41] Anderson, "Naval Operations the Canadian North," 10.
[42] Ibid, 12.
[43] Joan Taylor, AA Comd CFNA, "Op Hudson Sentinel 2005 Post Operation Report," 24 October 2005.
[44] J.S.R. Payne, "2005 Historical Report, Maritime Forces Atlantic HQ," June 2006.
[45] Joan Taylor, AA Comd CFNA, "Op Hudson Sentinel 2005 Post Operation Report," 24 October 2005.
[46] Ibid.
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[48] Joan Taylor, AA Comd CFNA, "Op Hudson Sentinel 2005 Post Operation Report," 24 October 2005.
[49] D. Connelly, "Expediting to Remote Northern Communities – Op Hudson Sentinel Post Operation Report," 5 October 2005.
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[51] Ibid.
[52] Ibid.
[53] Joan Taylor, AA Comd CFNA, "Op Hudson Sentinel 2005 Post Operation Report," 24 October 2005.
[54] Ibid.
[55] DND, International Policy Statement – Defence, 26.
[56] Ibid, 17.
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[59] Ibid.
[60] "Harper Stands up for Arctic Sovereignty," Address by the Hon. Stephen Harper, 22 December 2005.
[61] C.T. Whitecross, "Operation Order 004/06 – Operation Lancaster," August, 2006.
[62] P Keddy, "Operation Order 001 – OP Lancaster," 21 July 2006.
[63] CT Whitecross, "Operation Order 004/06 – Operation Lancaster," August, 2006.
[64] CT Whitecross, "Operation Lancaster 2006 Post Activity Report," 15 December 2006.
[65] OGD official, interviewed by Adam Lajeunesse, Yellowknife, 30 May 2014.
[66] Paul Dempsey and Edna Keeble, "Dodging Icebergs and Talking Policy: HMCS *Montréal*'s 2006 Northern Deployment," *Canadian Naval Review* 2:4 (Winter, 2007), 23.
[67] M. Beauchemin, "Operation Lancaster, 2006," October, 2006.
[68] Annex F to JTFN 3350-13 (J3), Post Activity Report OP Lancaster, 15 October 2006.
[69] Ibid.
[70] Ibid.
[71] Ibid.
[72] Cryil McDonald, "Operation Lancaster," October, 2006.
[73] M. Beauchemin, "Operation Lancaster, 2006," October, 2006 and LCdr Cryil McDonald, "Operation Lancaster," October, 2006.

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[74] Annex F to JTFN 3350-13 (J3), Post Activity Report OP Lancaster, 16 October 2006.
[75] Cryil McDonald, "Operation Lancaster," October, 2006.
[76] M. Beauchemin, "Operation Lancaster, 2006," October, 2006.
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Chapter Thirteen

The Arctic Response Company Groups: Presence and Mass

Adam Lajeunesse

In 2005, the Department of National Defence (DND), under the Liberal government of Prime Minister Paul Martin, released its *International Policy Statement on Defence*. The document highlighted the Arctic as a region of increasing importance and called for a larger CAF "presence" in the region. Three years later, Prime Minister Stephen Harper's Conservative government released its own defence white paper, the *Canada First Defence Strategy*. This document retained many of the objectives previously laid out by the Liberals, again calling for a larger military presence in the North.[1] Since 2008, this broad requirement has appeared in numerous other statements, strategy papers, and internal directives from the Departments of Foreign Affairs and International Trade (DFAIT, now Global Affairs Canada), DND, and Aboriginal Affairs and Northern Development Canada (AANDC, now Indigenous and Northern Affairs Canada).[2]

This political need to demonstrate "presence" is nothing fundamentally new. It has underpinned Canada's northern deployments for generations and, regardless of the operational objectives of a given mission, the need for presence has always been there as a core strategic objective. The importance of sending forces into the Arctic (and of being seen doing so) is premised on two assumptions. The first is practical. In order to achieve a government's strategic objectives the CAF needs forces able to operate in the region; it needs boots on the ground working towards practical objectives. The second is political. Canadian governments, from the 1950s onwards, have felt the need to "defend" Canada's Arctic sovereignty, and soldiers projecting power into the Arctic have long seemed the best demonstration of that sovereignty. While the notion that presence equates to sovereignty has been the subject of considerable debate, the political benefits of doing so have simply been too great to ignore.[3]

These political and operational requirements have continued into the 21st century. Prime Minister Stephen Harper latched onto Arctic sovereignty as an election issue in 2005 and vowed to use the CAF to strengthen the country's position in the Far North. This attitude was best characterized in a 2005 speech in which the soon-to-be-prime minister stated: "You don't defend national sovereignty with flags, cheap election rhetoric, and advertising campaigns. You need forces on the ground, ships in the sea, and proper surveillance."[4] In the years that followed, the Harper government did exactly that, expanding norther deployments and pushing the CAF back into the Arctic on a grand scale (by Canadian standards at least).

Much of this presence was politically motivated, as the significant amount of time and energy dedicated to publicity and VIP visits during each of the showcase *Nanook* operations demonstrated. A great deal has also changed since the army's exercises and large-scale airborne deployments of the 1970s and 1980s. With the Soviet Union no longer a threat, the CAF has been able to drop any pretense that it is training to fight a conventional opponent in the Arctic. This mental shift has led to the elimination of the highly visible, large-scale airdrops and its focus on tactical training (the kind discussed by Captain Nathan Fry in Chapter Fourteen). Instead the CAF is rebuilding its Arctic specialty forces with more practical objectives in mind.

Canada's northern defence strategy, as outlined in the *Canada First Defence Strategy* and various operational planning documents, has refocused the CAF on unconventional security threats.[5] From law enforcement challenges to environmental threats, these new challenges require small, flexible forces integrated into a Whole-of-Government (WoG) framework.[6] The The Arctic Response Company Groups (ARCGs) are at the heart of the army's new approach to northern security. They offer the CAF the presence needed to meet its practical requirements and respond to a wide variety of (anticipated) unconventional security threats.[7] While these groups' activities have been highlighted in media reports and occasionally played a role in the government's efforts to demonstrate sovereignty through presence, this was never the ARCGs' raison d'être. They represent a new approach to Arctic security, one focused more on responding to practical, operational requirements than the political optics that have historically dominated the military's Arctic presence.

The ARCGs

The Arctic Company Response Groups were first stood up in 2007 as company-sized units (100 to 200 soldiers) generated by each Land Force Area from the Primary Reserves.[8] A company group differs somewhat from a company in that it is built for a specific task and includes specialized personnel attached from outside the unit. Organization of the ARCGs varies, since each division has taken a slightly different approach, but each group was designed to include three generic platoons, an administrative platoon, and a headquarters of 15 to 20 personnel. The platoons are based on an infantry model of 38 soldiers and a platoon headquarters—three sections of ten soldiers each, and a weapons detachment of four soldiers. The administrative platoon has a small headquarters and support elements including supply, medical, and maintenance of around 30 soldiers. ARCG size on deployment can vary greatly due to the availability of reserve personnel and the mission requirements, but the intent is to achieve a total strength of roughly 160 personnel.[9]

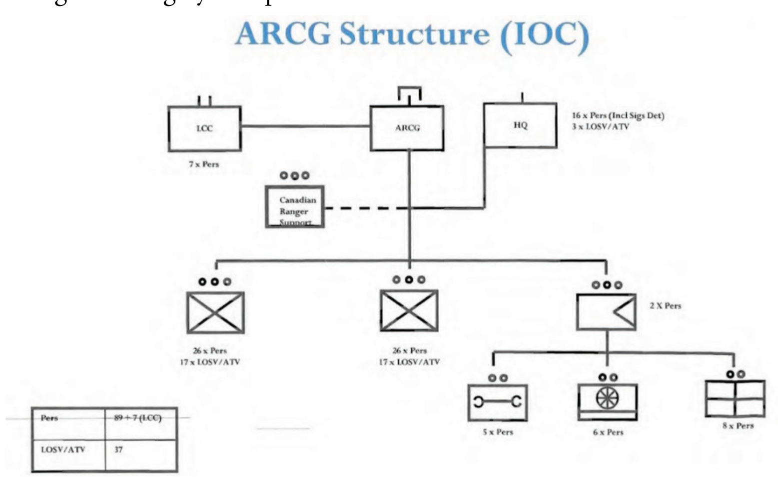

Figure 13.1: Land Force Arctic Master Implementation Plan – IOC ARCGs (June 2010)

The idea behind the ARCGs was to create light and flexible forces suited to an "expeditionary type theatre." These forces would be "uniquely equipped and trained, deployable, scalable, and as self-sufficient as possible" able to provide a presence when and where the CAF needs it most. Specific scenarios listed in the ARCGs' Master Implementation Directive included: sovereignty operations, humanitarian aid, disaster relief, support to ground based search and rescue, major air and maritime disaster response, and generic support for a wide-range of Other Government Department (OGD) missions. The potential for actual combat in an Arctic environment was dismissed, with the focus placed instead on providing support to those OGD with the response mandate in most of the situations in which the ARCGs might participate.[10]

At its most basic level, the ARCGs were designed to provide the CAF with a strategic reserve of soldiers trained and equipped for Arctic operations. As the CAF discovered over the decades, the average untrained soldier is worse than useless in harsh Arctic conditions. Untrained and poorly equipped men deployed north are net consumers of energy, meaning that the time and energy spent keeping them alive is greater than the energy that those troops can contribute to any operation. Deploying inexperienced soldiers to assist a stranded cruise ship or downed aircraft could make a dangerous situation even worse. The ARCGs' training is intended to create units comfortable enough with the Arctic environment that they can take care of themselves and retain enough energy to render assistance to others, essentially to be net contributors in an emergency.[11]

Deployment

The ARCGs were never intended to operate alone but as a supporting force designed to complement the Canadian Rangers and other CAF first responders.[12] This operational concept has been put on display in several exercises and the ARCGs have become involved in more complex scenarios as their capabilities have improved. During Operation *Nanook 2013* one company group practiced providing support to Environment Canada during a poaching scenario on Cornwallis Island.[13] That same year, during Exercise *Guerrier Nordique 2013*, an ARCG was deployed in support of an

Immediate Reaction Unit (IRU) and the Rangers in response to a simulated plan crash and train derailment in a remote area of Quebec.[14]

The ARCGs were also never intended to serve as first responders. Their responsiveness was limited by their basic training and the extra mobilization time required to collect reservists. At Initial Operating Capacity (IOC) they were limited to predetermined and deliberately planned sovereignty operations. Only in extreme circumstances are they intended to react to short notice requirements to augment other Land Forces, and only as one component in the army's overall response strategy.[15] The *Land Force Arctic Strategy* (LFAS) (2010) specifies that the initial reaction to a major disaster or security threat in the North would come from the Canadian Rangers and an IRU and its Vanguard Unit. The Vanguard units are designed around the same model as the ARCGs with the same training and capabilities to achieve the same objectives, but on a much smaller scale with faster reaction times.[16]

The deployment of CAF personnel in response to an emergency would begin with the Canadian Rangers.[17] The Rangers, while experienced first responders, lack specialized equipment and have limited numbers in each community. They would therefore be supported by an IRU activated by Joint Task Force North (JTFN).[18] The IRU would deploy a four-person reconnaissance unit within eight hours, a 'Vanguard company' of twelve people within 12 hours, and the main support body of 32 people within 24 hours.[19] Vanguard units will assess the situation and provide immediate assistance to the Rangers and other government agencies on scene. In the event that more support is required, an ARCG would be mobilized and deployed.

Deployment of an ARCG is based on a presumed 30-day timeline (from D-30 to D-day). At D-30 the army will be tasked with force generating the group for deployment within the JTFN area of operation. Within 24 hours the chain of command would be informed of the deployment and the force generating units would begin the fan-out process to mobilize their soldiers. Typically this process should be 80% complete within three days of initiation and 100% complete by D-22. The ARCG HQ would then receive orders and any other briefings required by D-25. At D-20 the company will deploy a reconnaissance while the HQ begins to

draw and prepare equipment. Reconnaissance would be completed by D-16 and all equipment will be ready by D-13. At D-12 the main body of the ARCG would begin to deploy on mission-specific, preparation training. Typically this exercise will last for six days and be followed by one day of equipment repair and clean-up. The training period can be lengthened or shortened depending on the mission and other factors. On D-5 an Advance Party would deploy to prepare the ARCG HQ and begin liaison with JTFN and Canadian Operational Support Command elements on the ground. If the situation permits, the ARCG could also be given one or two days of pre-deployment leave followed by the deployment itself. This pre-deployment leave period may be especially critical for Army Reservists that need to make final arrangements for their absence from civilian occupations.

This template deployment sequence, envisioned for the ARCGs, was designed to incorporate flexibility. In the event of a serious emergency, it can be shortened considerably. The fan out processes can be reduced, although this may necessitate more Class B reservists and Regular Force personnel to supplement the ARCGs order of battle. Preparation times can be shortened or lengthened depending on the mission.[20] Timeframes will also be more condensed at Full Operating Capacity (FOC). Now that some ARCGs have reached that milestone, deployment times for planned and deliberate operations will be reduced to include full deployment within 15 days, including a reconnaissance party at day five and an advanced party deployed at day ten.[21]

Arctic Operations: Basic Skills

Re-establishing the skills, experience, and comfort level needed to be effective in the Arctic environment is a slow and methodical process. Most of those capabilities were developed in the 1980s and lost after the end of the Cold War as the government cut defence spending and DND downgraded the need for an Arctic presence. Turning the ARCGs into units capable of performing more than the most basic deployments has been a long term project. The initial training program was developed as a two-year cycle, wherein two ARCGs would exercise for summer Arctic deployments while the remaining two were trained for a potential winter deployment. This cycle was then reversed every two years. This format was intended to reduce repetitive training and increase the interest level (and hopefully retention) of the participating troops—an important consideration given that the ARCGs are made up of reservists.[22]

As part of their training, the ARCGs were always intended to work closely with and learn from the Canadian Rangers.[23] The Rangers continued to hold the basic Arctic skills lost by the army during the 1990s and their participation in ARCG deployments has been essential, not simply as mentors but as a means of ensuring the safety of the ARCG troops during northern exercises. After-action reports from these exercises highlight the benefits of this partnership, with an emphasis often placed on the need to continuing leveraging the Rangers' knowledge and capabilities to facilitate operations and further develop the army's northern skills.[24]

How badly the army needed to work on these basic skills was made plain in the early ARCGs exercises. During Exercise *Northern Bison* in December 2008, 28 Brigade Group deployed an ARCG to Churchill for basic winter warfare training with 5 Canadian Ranger Patrol Group. The objectives were simple: plan, deploy, sustain, and redeploy.[25] In an article on the subject, Colonel Robert Poirier admits some surprise at just how many basic winter warfare skills the army had lost amongst its officers and senior NCOs, a conclusion highlighted in the *Northern Bison* after-action report as well.[26] The exercise ran from mid-December to just before

Christmas with temperatures ranging from -45°C to -57°C, coupled with strong coastal winds. The company deployed to a forward operating base (FOB) near Holcroft Lake located about 20km south-west of the town. As temperatures dropped, the soldiers grew miserable, faded cold-weather skills led to sloppy section-level drills and a breakdown in equipment maintenance.[27]

Improving those basic survival skills has been the focus of the ARCG's training and crucial to maximizing their potential. As such (at IOC at least), ARCG training has focused on reaquiring basic survival skills from the Rangers, familiarization with the Arctic environment, and learning to move across Arctic terrain. These activities are often undertaken under labels such as sovereignty, presence, and/or surveillance, however the basic intent is operational, namely to familiarize the personnel with the North and build up a basic level of comfort with northern operations.

Re-Equipping the Forces

In a 2009 after-action report, Colonel Poirier wrote that "mobility is Life and Death."[28] It was an obvious lesson that had been learned and relearned in decades past and quickly became apparent at the resumption of Arctic activities. As such, from the beginning, one of the main tasks of the ARCGs has been practicing tactical mobility and testing everything from toboggans and snowshoes to new ATV models and equipment—to see what works best, what breaks easily, and what can be improved.[29]

In early operations the lack of snow machines and mechanized transport was identified as a critical deficiency. During Exercise *Northern Bison 2009* this deficiency forced many soldiers to travel on toboggans and komatiks, a situation described as "hard on the drivers and brutal on the passengers."[30] In his after action report, Colonel Poirier expressed frustration with the Army's tactical mobility. "Bluntly" he wrote, "we are not equipped, and should not be totally reliant on the Rangers, whose ability to bring transport is not certain. We need transport and (relatively) heavy lift."[31] During the exercise, the force learned that moving a company required 48 Light Over Snow Vehicles (LOSVs), packed to capacity and with soldiers riding outside the vehicles as well. The army's current capacity was nowhere near ready to meet the requirements of effectively moving a formed element. More heavy-lift, with more cargo space, more horse power, longer tracks, and better towing capability were declared absolute requirements.[32]

This was hammered home again during *Northern Bison 2010*, Exercise *Arctic Ram 2012*, and Exercise *Stalwart Goose 2013*.[33] The post-exercise report from *Arctic Ram* noted that the CAF are "critically short of over-snow vehicles."[34] This shortage required renting machines to deploy even a "modest capability" in conducting training exercises, resulting in a $420,000 bill to the Army for *Arctic Ram* alone. This situation was deemed unacceptable in the after action report.[35] In particular, northern exercises demonstrated a need for large and medium enclosed snow vehicles capable of towing large loads and keeping soldiers warm over long trips. Fuel is consumed at about 20 pounds per day per man. If water is carried, rather than melted en route, it adds eight pounds per man per day. Food, parts, and transiting personnel add more weight and all must fit on a komatik, whose absolute carrying capacity is about 1,000 pounds.[36]

The amy's inventory of heavy vehicles consists of 47 heavy, tracked all-terrain BV-206s acquired from Sweden in the 1980s. Despite plans to replace these in 2009, budget cuts led to a renovation, rather than a replacement, of the fleet in 2012.[37] Attempts to address this issue are currently being made through the LOSV project, the purpose of which is to

provide the army with a "robust, light, winter mobility capability." This program is working concurrently with the Arctic All-Terrain Vehicle project to address mobility issues, particularly in the High Arctic, where current LOSVs are not sufficient in numbers, nor suited for operations.[38]

In addition to snowmobiles, army exercises have shown a serious deficiency in other equipment categories. Rations used in more southerly operations have been judged too heavy, inefficient snowshoe designs have been identified, and problems found with CAF toboggans.[39] As was the case in the 1970s, the army's thermoses are ineffective and a new model will have to be procured for Arctic conditions.[40] Sand goggles proved inappropriate for winter conditions while rucksacks failed to stand up to frigid temperatures—their fasteners and quick release buckles snapping easily in the cold. Even smaller items, such as pins, straps, winches, and clips are being tested to find better options for the unique Arctic environment.[41]

Acquiring equipment has been the subject of review. During Exercise *Arctic Ram 2012*, many of the supplies needed for the exercise had to be rented from private suppliers. Contracting in Yellowknife was difficult and it becomes worse the farther north one went. Heaters, light stands, and generators were rented in in Edmonton and brought a thousand kilometres north. Some of this equipment was not compatible with CAF material and huge problems arose when rented machines broke down and army servicemen were contractually forbidden from repairing them. After-action reports concluded that far too much money was spent on these services and that the army might as well purchase a larger stock of items rather than renting them. If was also discovered that a great deal of army equipment had to be winterized. On many occasions technicians had trouble working with fuel pumps in frigid temperatures while drivers found fuel frozen in their gas tanks.[42]

Operational Movement

Travelling across Arctic terrain has not been a straight forward task. During Operation *Nanook 2013*, an ARCG was tasked with assisting in a law enforcement simulation. The group was given hours to travel a few kilometers over flat ground on Cornwallis Island, so much time that

planners worried there would be nothing for the soldiers to do once they reached their destination. In fact, the group's ATVs quickly bogged down in the muskeg, leading to an ignominious rescue by helicopter. Failures like this one reminded army planners how difficult and unpredictable Arctic travel can be. This knowledge is slowly being regained, largely through the assistance of the Rangers. Inuit know, for instance, not to travel directly behind the lead ATV since the vehicle in front can damage the ground and cause the following vehicle to sink. Soldiers accustomed to southern operations are also used to travelling much heavier, carrying pounds of food and gallons of water that could be acquired on the land.[43] The Canadian Rangers traditionally travel far lighter, thus reducing their supply burdens.[44]

Caching fuel is another lesson taken from Inuit and other northern residents. Exercise *Arctic Ram 2012* showed the benefits of caching for future deployments, both in improving mobility and in reducing costs.[45] That exercise also showed the difficulties involved in moving convoys long distances over ice roads. Issues of weather, fatigue, maintenance, and safety had to be dealt with—with one significant crash showing just how dangerous it was to move large, well-equipped groups of soldiers.[46]

Movement by air and sea have been rehearsed in recent years as well. Amphibious operations involving ARCGs were practiced on Bylot Island in 2010 to prove that the groups could be deployed safely from frigates and icebreakers.[47] During these missions, tactical airlift by Twin Otter and helicopter has proven critical to safe operations away from established infrastructure. Exercise *Northern Bison 2010* showed that medical infrastructure in the North is limited and, without air support, a seriously injured soldier could take hours to evacuate on a toboggan.[48]

Safe and effective operations also require a well-prepared plan, plentiful supplies, and a great deal of attention to logistics, calling for a large support echelon, more supplies than one would think necessary, and redundant capacity in all things.[49] Attention to logistics is crucial because northern centres cannot be relied upon by the CAF for unforeseen requirements. Many hamlets in the Arctic Archipelago have their supplies brought in once a year by ship and cannot restock their shelves if they are drained by soldiers operating in the area. An analysis of the situation revealed that few such communities can support anything greater than a sub-unit surge.[50] As such, an operational requirement of the ARCGs is that they be self-sufficient, taking with them whatever they will need to sustain themselves for up to 21 days.[51]

An ARCG has to maintain much of its own equipment while in the Arctic. Because of the limited capacity of many Arctic communities, the companies have to bring with them as many spare parts and as much service equipment as possible. In 2010 it was also noted that technical documentation and service manuals also had to be brought along.[52] To support this effort, Canadian Forces Base Trenton has laid out a requirement for a 60 day stockpile of spare parts for snowmobiles, should they need to be deployed north with an ARCG or an IRU.[53] Purchasing material in the region is also possible in some areas; during exercises, however, soldiers found that CAF credit cards were not accepted in many locations and most transactions had to be conducted in cash. [54]

Communications

Exercises have also reinforced the need for better communications equipment and specialized training. Establishing reliable and effective communication in the North—between units in the field, headquarters, and between services—has been one of the most long-standing and intractable problems associated with northern operations. New technologies, such as satellite phones and mobile internet hotspots, have done a great deal to alleviate the situation but the same unique environmental and atmospheric conditions that proved so frustrating in limiting communications in the 1970s and 1980s continue to hinder operations. Atmospheric conditions in the North offer unique challenges to Very High Frequencey (VHF) and High Frequency (HF) radio communications. These systems work but are limited (to varying degrees) by the time of day, solar flares, the curvature of the earth, and rolling terrain.[55]

During various exercises, units have attempted to remain in contact using their BlackBerrys (smart phones). The problem with this approach is the limited cellular coverage across the Arctic. Even during sub-Arctic operations this became a problem. Exercises *Guerrier Nordique* (which took place in the Schefferville, Quebec area) and *Stalwart Goose 2013* (which took place near the towns of Cochrane and Hearst, Ontario) saw limited capability. BlackBerrys were "adequate" within town limits but, in more remote areas, soldiers had to rely on satellite phones.[56] During larger exercises outside of Yellowknife, 38 Brigade Group was equally unsuccessful in establishing data service over its area of operation. The conclusion was that northern operations required a move away from the connectivity the Forces have grown accustomed to. Basic intelligence, operational orders, and information needed for a mission all had to be available offline.[57]

Satellite phones have proven very useful on Arctic exercises over the past decade, but they are unsecure systems and cannot serve as the backbone of the army's communication system. These phones also depend on batteries which, under Arctic conditions, might only give the user three and a half hours of talk time.[58] During *Northern Bison 2008*, soldiers discovered that battery life was sometimes as little as ten minutes at -30˚C.[59] This same problem has affected soldiers' GPS, which have performed sluggishly in the extreme cold.[60] After Exercise *Stalwart Goose 2013*, army planners noted that, in any future activity in the North, soldiers must follow proper procedures to keep their batteries warm.[61] Despite these shortcomings, the satellite phone and GPS are invaluable tools that will continue to be heavily employed in the future and the army will have to expand and upgrade its stocks. After *Stalwart Goose*, it was suggested that each IRU be issued five devices and that the most advanced models with the strongest lithium batteries be purchased.[62]

As was the case in the 1970s, the most reliable (if imperfect) means of Arctic communication has proven to be High-Frequency (HF) radio. This was confirmed, for example, during exercises *Northern Bison 2008, Arctic Ram 2012,* and *Stalwart Goose 2013.*[63] While HF frequencies are also unsecure, their ability to operate economically over great distances makes the HF radio the best tool for basic communication. Unfortunately, HF is a specialty communication suite and the army has neither the equipment nor the training to use it on a large scale.[64] During Operation *Nanook 2010*, for instance, the army found that its CH-146 helicopter pilots could not communicate with ground elements because of the ARCG's lack of HF radio.[65] By *Arctic Ram 2012*, the situation had improved slightly but 38 Brigade Group could still only find one radio per company.[66] After-action reports note that greater investments in these sets, particularly the man portable 138 HF and the 117HF with antennae capable of transmitting and receiving on the move, will be "crucial to supporting dispersed ops."[67] Equally crucial will be implementing a broad training program for their use amongst ARCG soldiers and others involved in northern operations.[68]

Communications equipment, procedures and frequencies will also need to be coordinated. Arctic exercises have revealed problems with inter-service and inter-departmental communication. Air-ground communications problems came to light during *Nanook* operations and Search and Rescue (SAR) technicians found that their radios were incompatible with the supporting Griffin helicopters during *Stalwart Goose 2013.*[69] In 2012, during operations in the Northwest Territories, the army also ran into problems when it found that the Rangers were not equipped with standard VHF radios. Traditionally, the Rangers have used HF communications and, as such, were forced to talk to headquarters over cell phones or Iridium satellite phones—leading to "sporadic" contact at times. The army also found that the Rangers were accustomed to using different points of reference (navigational aids etc.). One after-action reported noted that it might be useful to have a Ranger liaison officer with headquarters to facilitate a better flow of information and smoother communications with the Rangers in the field.[70]

Towards Full Operating Capacity

Many of the problems encountered by the ARCGs would be familiar to units that operated in the Arctic during previous decades. Communications, mobility, logistics, and basic survival were the most pressing concerns in the 1950s and again in the 1970s and 1980s. Even some of the more obscure requirements pulled from recent northern exercises, such as the need for an Arctic-ready thermos or a better toboggan, were marked out as problems over 40 years ago. The process of reacquiring these skills, and relearning many of these lessons, is a slow and difficult one and the ARCGs have spent years taking baby steps towards operational readiness. While there is still much work left to be done, this process has yielded results. The first ARCGs training exercises focused on building up an acceptable comfort level with the northern environment. Steadily, operations have become more complex, involved more units, and requiring an increasingly specialized skill set. More recent exercises have seen the ARCGs working with the RCAF, RCN, OGD, and municipalities on larger-scale and more realistic response scenarios.

In 2014, one ARCG (from the 5th division, 37 BBG) was declared at full operating capacity (FOC) and operationally ready. This status was upgraded after Exercise *Stalwart Goose 2014* when the unit completed one serial of presence patrols, all LOSV deployed and maintained sustainment, communications, and operability over a total of 540km in four (plus) days. This exceeded the previously stated requirement for FOC—which included a self-sustaining, deployable range of 300km and a demonstrated ability to provide assistance to other government departments and local communities.[71]

At Full Operating Capacity, an ARCG offers the CAF a versatile tool that can be applied to a wide array of northern security scenarios. The 2011 Training Implementation Directive summarized this capacity as: "a robust and resilient Arctic capability … with sufficient depth of personnel qualifications to enable Force Generation for [domestic operations] as needed."[72] This general vision was based on more specific objectives laid out in the ARCG Master Implementation Directive (2010), which assumed that, at FOC, the groups would be able to undertake the following missions:

- Affirm national sovereignty in the North through, northern exercises, and unforeseen operational requirements
- Assist law enforcement agencies
- Provide support to disaster relief, MAJAID and SAR
- Patrolling and presence operations
- Foster relationships with provincial and territorial agencies through Canadian Joint Operations Command (CJOC) and applicable Regional Joint Task Forces
- Community out-reach
- Trial new concepts and tactics, techniques, and procedures for Arctic and remote region operations
- Continue concept of operations development with external stakeholders[73]

Conclusion

The underlying theme of the ARCGs' tasks and requirements is one of support. These units were not designed to reinforce Canadian sovereignty through presence (though that may be an added benefit). They were designed to function in the 21st century Arctic security environment, where support to OGDs and first responders takes precedence over combat training and where unconventional security situations remain the only conceivable threats to the region.

The army may have been forced to relearn many of the lessons from its previous history in the Arctic, but the concept and development of the ARCGs suggest that some of those lessons were retained. The ARCGs encapsulate many of the best elements of army training from earlier decades, while avoiding some of the failures. To begin with, the units have a clear purpose grounded in practical requirements. One of the failings of the army during previous surges into the Arctic was that it was never really sure what it was training its soldiers to do. Economic development and sovereignty concerns seemed to necessitate a greater presence, but what the army could practically accomplish, and what soldiers should be trained to do, was never really worked out. The ARCGs, in contrast, have been built from the ground up to work with and assist other government departments in a wide range of plausible scenarios. Unlike the army's past Arctic combat force (such as the MSF and the airborne division), ARCG training has focused on these realistic scenarios at the expense of large-scale manoeuver warfare training.

Like the New Viking training program undertaken in the 1970s, the ARCGs have focused on the basics: survival, sustainment, and movement. Unlike the New Viking concept, however, the ARCGs aim to concentrate this experience in relatively small, specialized units. This approach is likely the right one. While the idea of training as wide a section of the Canadian Army in basic Arctic skills (which was the idea behind the New Vikings) was theoretically worthwhile, it ran against practical issues like resources and retainment. Spreading expertise so thin resulted in a large number of soldiers with some familiarity with the Arctic, but without enough to be of any real use in an emergency. The relatively small size of the ARCGs facilitates retention and provides a tactical and operational advantage once the units are deployed.

This small unit approach offers other benefits as well. Large groups of soldiers are harder to deploy, supply, and sustain in remote regions where transport infrastructure is limited and where the local communities offer little to no support capacity.[74] Decades of CAF operations have shown that logistics constitutes one of the most vexing problems of northern deployments and, by keeping those deployments small, the ARCG concept relieves some of the pressure from that system. At Full Operating Capacity the ARCGs will be able to operate away from communities and fixed infrastructure, something which would be impossible in larger groups.[75]

Concerns that the ARCGs are too small, are made up of reservists, or lack a serious combat capability misunderstand their purpose and the reality of northern operations.[76] While the ARCGs do practice Arctic combat, this has never been their raison d'être. They are composed of reservists because they are intended to provide mass and support to existing deployments, not immediate response. Regular Force IRU units are tasked with rapid response to Arctic emergencies; the purpose of the ARCGs is to generate sufficient personnel that are comfortable enough with northern operations to provide support. The concept is simple and, in a region so well known for generating friction, simple is good.

Notes

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[1] Department of National Defence, *Canada First Defence Strategy* (2008), 9.

[2] See for instance: Department of Indian Affairs and Northern Development, Canada's Northern Strategy: Our North, Our Heritage, Our Future (July 2009); Canada. Statement on Canada's Arctic Foreign Policy: Exercising Sovereignty and Promoting Canada's Northern Strategy Abroad (2010).

[3] On this debate see for example: P. Whitney Lackenbauer, *From Polar Race to Polar Saga: An Integrated Strategy for Canada and the Circumpolar World* (Toronto: Canadian International Council, 2009), and P. Whitney Lackenbauer and Peter Kikkert eds., *The Canadian Forces and Arctic Sovereignty: Debating Roles, Interests and Requirements, 1968-1974* (Waterloo: Wilfrid Laurier Press, 2010).

[4] Press Release: "Harper Stands Up for Arctic Sovereignty," 22 December 2005; Adam Lajeunesse, *Lock, Stock, and Icebergs: A History of Canada's Arctic Maritime Sovereignty* (Vancouver: UBC Press, 2016).

[5] See for instance: DND, *Canadian First Defence Strategy*; Royal Canadian Navy, *Leadmark: The Navy's Strategy for 2020* (2001); Chief of Force Development, *Arctic Integrating Concept* (Ottawa, 2010), 23-24; Chief of the Defence Staff/Deputy Minister Directive for DND/CF in the North (2011), appendix A: 1-2.

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[6] Chief of Force Development, *Arctic Integrating Concept*, 23-24; Chief of the Defence Staff/Deputy Minister Directive for DND/CF in the North, appendix A: 1-2.

[7] "LF AA Master Implementation Plan – Initial Operating Capability Arctic Response Company Groups," 17 June 2010.

[8] These areas (Quebec, Western, Central, and Atlantic) were re-designated Canadian Army divisions 2, 3, 4, and 5 respectively. Within these divisions the ARCGs are generated by: 1st Division, (Kingston) – Regular Force (manned by organizations from other divisions as tasked); 2nd Division (Quebec) – 35 Canadian Brigade Group; 3rd Division, (Western Provinces) – 38 Canadian Brigade Group; 4th Division (Ontario) – 31 Canadian Brigade Group; 5th Division (Atlantic) – 37 Canadian Brigade Group. John McLearn, "Arctic Response Company Group," Royal United Services Institute of Nova Scotia, 8 June 2015, 2-3.

[9] McLearn, 2-3.

[10] "LF AA Master Implementation Plan – Initial Operating Capability Arctic Response Company Groups, 17 June 2010.

[11] M.Gen Christopher Coates (CJOC), interviewed by Adam Lajeunesse, Ottawa, 23 May 2014.

[12] Ibid.

[13] G.D. Loos, "Operation Nanook 2013 After Action Report," 11 February 2014.

[14] G.P.S. Faucher, "Post Exercise Report for Guerrier Nordique 2013," 8 April 2013.

[15] "LF AA Master Implementation Plan – Initial Operating Capability Arctic Response Company Groups, 17 June 2010.

[16] "Training Implementation Directive – Initial Operating Capability – Arctic Response Company Groups and Arctic Vanguard," 28 March 2011.

[17] See: P. Whitney Lackenbauer, *The Canadian Rangers: A Living History* (Vancouver: UBC Press, 2012), and P. Whitney Lackenbauer, *Vigilans: The 1st Canadian Ranger Patrol Group* (Yellowknife: 1 Canadian Ranger Patrol Group, 2015).

[18] C.C. Thurrott, "Implementation Order Arctic Light Over Snow Vehicles," 7 October 2013.

[19] "Training Needs and Analysis – Land Force Arctic Strategy," April 2010

[20] "LF AA Master Implementation Plan – Initial Operating Capability Arctic Response Company Groups, 17 June 2010.

[21] S.P. Leonard, "Arctic Response Company Group and Land Component Command HQ Full Operating Capability," 24 March 2014.

[22] Army Training Authority, "Training Implementation Directive - Initial Operating Capability (IOC) - Arctic Response Company Groups (ARCG) and Arctic Vanguard," 28 September 2011.

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[23] "LF AA Master Implementation Plan – Initial Operating Capability Arctic Response Company Groups," 17 June 2010.
[24] J.D.G. Henley, "LFAA Lessons Learned Report – Stalwart Goose," 21 March 2013.
[25] "Post Exercise Report, Northern Bison 2008," 13 March 2009.
[26] "Arctic Response and 38 Canadian Brigade Group," *Canadian Army Journal* 13:3 (2010): 145.
[27] Ibid.
[28] R. Poirier, "Post Exercise Report, Northern Bison 2008," 13 March 2009.
[29] S.P. Leonard, "Arctic Response Company Groups and Land Component Command HQ: Full Operating Capability," 24 March 2014.
[30] R. Poirier, "Arctic Response and 38 Canadian Brigade Group," 146
[31] R. Poirier, "Post Exercise Report, Northern Bison 2008," 13 March 2009.
[32] Ibid.
[33] J.R. Casey, "Lessons Learned Report Exercise Arctic Ram 2012," 28 March 2012; J.D.G. Henley, "LFAA Lessons Learned Report – Stalwart Goose," 21 March 2013; and R. Poirier, "Post Exercise Report, Northern Bison 2010," 6 May 2010.
[34] P.F. Wynnyk, "Post Exercise Report – Exercise Arctic Ram 12," 26 June 2012.
[35] Ibid.
[36] R. Poirier, "Arctic Response and 38 Canadian Brigade Group," 146.
[37] Murray Brewster, "Army Scrambles to Buy Snowmobiles for Arctic Units amid Spending Deep Freeze," *Globe and Mail* (18 August 2013).
[38] C.C. Thurrott, "Implementation Order Arctic Light Over Snow Vehicles," 7 October 2013.
[39] O.H. Lavoie, "1 CMBG Post Exercise Report Exercise Arctic Ram 12," 6 May 2012.
[40] J.D.G. Henley, "LFAA Lessons Learned Report – Stalwart Goose," 21 March 2013.
[41] R. Poirier, "Post Exercise Report, Northern Bison 2008," 13 March 2009.
[42] O.H. Lavoie, "1 CMBG Post Exercise Report Exercise Arctic Ram 12," 6 May 2012.
[43] M.Gen. Christopher Coates (CJOC), interviewed by Adam Lajeunesse, Ottawa, 23 May 2014.
[44] See: Lackenbauer, *Canadian Rangers.*
[45] J.R. Casey, "Lessons Learned Report Exercise Arctic Ram 2012," 28 March 2012.
[46] O.H. Lavoie, "1 CMBG Post Exercise Report Exercise Arctic Ram 12," 6 May 2012.
[47] J.J.R.G. Hamel, "Operation Nanook 2010 After Action Report," 8 December 2010.
[48] R. Poirier, "Arctic Response and 38 Canadian Brigade Group," 149-150.
[49] J.D.G. Henley, "LFAA Lessons Learned Report – Stalwart Goose," 21 March 2013.

[50] "Training Implementation Directive – Initial Operating Capability – Arctic Response Company Groups and Arctic Vanguard," 28 March 2011.
[51] "LF AA Master Implementation Plan – Initial Operating Capability Arctic Response Company Groups," 17 June 2010.
[52] Ibid.
[53] C.C. Thurrott, "Implementation Order Arctic Light Over Snow Vehicles," 7 October 2013. Conversations with CAF personnel have, however, indicated that this stockpile may not actually exist.
[54] R. Poirier, "Post Exercise Report, Northern Bison 2008," 13 March 2009.
[55] P.F. Wynnyk, "Post Exercise Report – Exercise Arctic Ram 12," 26 June 2012.
[56] J.D.G. Henley, "LFAA Lessons Learned Report – Stalwart Goose," 21 March 2013.
[57] O.H. Lavoie, "1 CMBG Post Exercise Report Exercise Arctic Ram 12," 6 May 2012.
[58] Huebert Pruitt, "In-Depth Iridium 9555 Satellite Phone Review," *Global Satellite* Communications, www.globalsatellitecommunications.com/
[59] R. Poirier, "Post Exercise Report, Northern Bison 2008," 13 March 2009.
[60] R. Poirier, "Arctic Response and 38 Canadian Brigade Group," 149-150.
[61] J.D.G. Henley, "LFAA Lessons Learned Report – Stalwart Goose," 21 March 2013.
[62] Ibid.
[63] See for instance: PF Wynnyk, "Post Exercise Report – Exercise Arctic Ram 12," 26 June 2012; R. Poirier, "Post Exercise Report, Northern Bison 2008," 13 March 2009; J.D.G. Henley, "LFAA Lessons Learned Report – Stalwart Goose," 21 March 2013.
[64] J.D.G. Henley, "LFAA Lessons Learned Report – Stalwart Goose," 21 March 2013.
[65] J.J.R.G. Hamel, "Operation Nanook 2010 After Action Report," 8 December 2010.
[66] O.H. Lavoie, "1 CMBG Post Exercise Report Exercise Arctic Ram 12," 6 May 2012.
[67] Ibid.
[68] P.F. Wynnyk, "Post Exercise Report – Exercise Arctic Ram 12," 26 June 2012.
[69] J.D.G. Henley, "LFAA Lessons Learned Report – Stalwart Goose," 21 March 2013.
[70] O.H. Lavoie, "1 CMBG Post Exercise Report Exercise Arctic Ram 12," 6 May 2012.
[71] S.P. Leonard, "Arctic Response Company Group and Land Component Command HQ Full Operating Capability," 24 March 2014.
[72] Army Training Authority, "Training Implementation Directive - Initial Operating Capability (IOC) - Arctic Response Company Groups (ARCG) and Arctic Vanguard," 28 September 2011.

[73] "LF AA Master Implementation Plan – Initial Operating Capability Arctic Response Company Groups," 17 June 2010.
[74] "Training Implementation Directive – Initial Operating Capability – Arctic Response Company Groups and Arctic Vanguard," 28 March 2011.
[75] Ibid.
[76] See for instance: Robert Smol, "When will we get Serious about Arctic Defence," *CBC News* (11 May 2009).

Chapter Fourteen

Survivability, Sustainability, and Maneuverability: Implementing DoD Arctic Strategy at the Tactical and Operational Levels[*]

Captain Nathan Fry[1]

In February and March 2014, fourteen soldiers from the 86th Infantry Brigade Combat Team (Vermont Army National Guard, Maine Army National Guard), the Army Mountain Warfare School, the 10th Mountain Division Lightfighter School, and the Asymmetric Warfare Group joined 35 Canadian Brigade Group's Arctic Response Company Group (ARCG) for Exercise *Guerrier Nordique*. The exercise, in its fourth year of US participation, took place near Iqaluit, the furthest north the exercise had ever been held. All US attendees were at least Basic Military Mountaineer qualified, and included individuals with combat deployments to Iraq and Afghanistan, advisor missions to various other countries, and significant civilian mountaineering experience and credentials. So impressed were the members of the US *Guerrier Nordique* team with the challenges of Arctic warfare that they resolved to record their experiences in an effort to call the US Army's attention to its critical and dangerous lack of ability to operate in Arctic and sub-Arctic environments. The following chapter draws from the experiences of the *Guerrier Nordique* attendees, 60 years of military studies on Arctic warfare, current scientific research on climate change, current political theories on Arctic expansion, and comments from longstanding veterans of the Northern Warfare Training Center, US Army-Alaska (USARAK), and the USMC Mountain Warfare Center.

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US Arctic Operational Capability

During the early Cold War, US military planners and strategists began to focus significant effort and resources on the challenge of Arctic and cold weather warfare. Driven by operational and tactical difficulties in Korea's cold and mountainous environments and the USSR's assumed superiority in cold weather operations, the US Army conducted a series of exercises with names such as *Ice Cap, Lode Star, Nanook,* and *Deep Freeze* throughout the 1950s and produced reports well into the late 1970s on Arctic and sub-Arctic operations. By the 1980s, however, competing military and political demands forced Arctic operations strategy and planning into a dormant state, which continued into the first decade of the new millennium. This lull reflected the early 1950s predictions of Arctic strategist Colonel Charles M. McAfee, Jr. that the Arctic would not become truly important until "valuable deposits of critical war minerals should be discovered" and made critical by "world-wide scarcity" in more accessible regions.[2] Now, as a decade of war in Iraq and Afghanistan recedes from NATO members' national defense strategies and strategic planners begin to look towards future conflicts, it is clear that McAfee's conditions for Arctic importance are becoming increasingly viable.

Of the world's current and aspiring Arctic powers, the United States clearly trails the pack.[3] While Canada, Norway, and Russia have realigned entire units to focus on Arctic readiness and operations, the United States has no specialized Arctic warfare capability, despite holding a substantial portion of valuable Arctic territory immediately next to an increasingly aggressive Russia. The US Department of Defense (DoD) published an *Arctic Strategy* in 2013 and the generalized approach to Arctic operations set forth in that paper illustrates the military's lack of a deep understanding regarding the Arctic problem set. As a document it also lacks focus, being rife with general tasks, many of which are currently impossible to implement at the tactical and operational level.[4] In subsequent and supporting publications, the US Navy, Marine Corps, and Coast Guard have shown a more focused and serious approach to preparing for Arctic operations.

Still, the US Army shows little interest in the Arctic at the strategic level. There is no formal requirement for Regular Army or National Guard units to prepare for Arctic warfare and current force generation structure and personnel management continues to undermine the building of Arctic specialty skills in active duty units. Exacerbating these difficulties is that fact that the Army's Arctic equipment is outdated and inadequate for extended Arctic use. In short, despite the US government's recent steps towards articulating an Arctic strategy and increasing the military focus on the challenges of Arctic operations, current defence efforts do not fully recognize the need for a joint ground presence and, therefore, fail to address the logistical, educational, and operational infrastructure required for successful tactical ground operations in the Arctic.

Introducing ground forces into Arctic and sub-Arctic environments requires an extensive knowledge base which the US Army and Joint ground warfighting community do not currently have. The US Army maintains two combat brigades and multiple support units in Alaska that, although stationed in the North, do not have specific requirements to operate in the Arctic.[5] Furthermore, one of these combat brigades relies primarily on the non-Arctic Stryker vehicle as its main mobility platform, thereby limiting its ability to conduct extensive cross-country mounted movement in the region.

This confusion between northern and Arctic warfare has been a recurring phenomenon and nearly always results in a large number of environmental and enemy-induced casualties when a northern-trained force that thinks itself well-suited to Arctic conditions confronts a true Arctic specialty force.[6] As the members of the US element learned during participation in Exercise *Guerrier Nordique*, when temperatures drop to extreme lows, tasks become exponentially more difficult. Whereas a cold weather soldier operating in moderate northern latitudes may remove his gloves temporarily to do a task that requires fine motor skills, the Arctic or sub-Arctic environment will immediately freeze flesh and result in a cold injury. This level of cold, especially when coupled with factors such as wind and physical terrain, requires an entirely different operational mentality and equipment design methodology. Put simply, attaining the strategic goals outlined in the DoD's *Arctic Strategy* will require the US Army and Joint ground warfighting community to focus major attention at the tactical and operational level on *survivability, sustainability,* and *maneuverability* as applied specifically to Arctic and Subarctic environments.

Survivability and Sustainability

Based on the experiences of the 86th IBCT's *Guerrier Nordique* teams over the previous four years, the US Army is currently incapable of successfully conducting these tasks in true Arctic environments. The foundation of all Arctic operations is human and material resources that properly function in the harsh environment and are able to provide a basic level of *survivability*. If a person, vehicle, or flashlight fails as soon as it is exposed to -50°F temperatures, it fails the survivability test and is therefore useless in Arctic operations.[7] In interacting with the Canadian Rangers, it is clear that everything that they use has a specific function for a specific condition. For example, seal, dog, and caribou furs all have slightly different properties and advantages that the Rangers can employ to great effect in the proper circumstances. Understanding the nuances between seemingly identical pieces of equipment or resources very often spells the difference between success and failure. As Arctic strategist Col. McAfee pointed out, taking a piece of equipment that functions well in temperate or moderately cold weather and "[adding] kits, devices, and assemblages which complicate the item and increase the difficulty of maintenance" rarely meets Arctic survivability requirements.[8] Colonel Lauris Eek, Jr., an armour officer who conducted a study on maintenance requirements in Arctic conditions in the late 1960s, came to the same conclusion. He noted that his mechanics could not grasp "normal" tools with their Arctic mitts, that small screws on vehicles were impossible to access with reduced dexterity, and that the effect of fine blowing snow on vehicles often had unexpected and devastating effects on normal electrical systems.[9]

The 86th IBCT's *Guerrier Nordique 2014* team observed similar effects on their clothing, shelters, sleep systems, stoves, and packs. Normal military rucksacks, for example, crushed insulation in the Extreme Cold Weather Clothing System (ECWCS) and cut off blood flow to the arms and hands, resulting in almost immediate numbness in hands and fingers, significantly increasing the danger of cold weather injuries. Additionally, the ECWCS, while functioning reasonably well in the cold weather of Vermont,

exhibited major design flaws in Arctic conditions—the outer loft jacket and pants have no functional pockets for carrying equipment and, because standard Fighting Load Carriers also crush insulation and freeze when worn on the exterior, many soldiers resorted to carrying items in interior pockets where they were extremely hard to access. In contrast, the Canadian insulation system incorporates large exterior pockets that hold ammunition magazines, flashlights, maps, and other mission-critical combat equipment that typically resides in or on the Fighting Load Carriers. This design allows access to mission-critical gear, maintains insulation loft, and prevents equipment from fully freezing.

Despite Canadian advances in certain areas of *survivability*, such as in cold weather clothing, the Canadian Army still struggles to solve critical challenges of Arctic warfare such as the use of ceramic body armor (dangerous because it becomes a heat sink when worn against the body) and shelters (like the US Army, the Canadian Armed Forces still use an outdated "circus tent" style shelter that is extremely inefficient for heat retention). That the Canadian Army continues to work through its Arctic tactics, techniques, and procedures with a wealth of institutional knowledge in Arctic warfare and significant experience in the region is a telling indicator of the challenges of operating in such an extreme environment and further underscores the need for the US Army and Joint community to begin focused preparation immediately.

Also important to emphasize is the aspect of human survivability. The 35th Canadian Brigade Group's lead Arctic trainer, Master Warrant Officer Carl Pelletier,[10] has frequently noted that the ARCGs have significant difficulty retaining young soldiers after their rotation into a winter Arctic environment. While the troops fare well during summer training, the exposure to the misery and demands of the cold drive many soldiers to resign soon after returning from their first winter Arctic exercise.[11] Pelletier's observations echo those of Colonel Harold Hansen, an Infantry officer writing about mountain and cold weather operations in 1957. "Operations in the arctic and high mountains require a particular breed of man," he observed, "and reflect the same need for enthusiastic and committed volunteers that populate the ranks of airborne and special operations units."[12] Hansen also notes that, in addition to the mental demands of the extreme cold, the techniques for operating in the cold often demand acquisition of skills, such as skiing, that only a fraction of normal infantry troops can master.[13] For the US Army and Joint community, this means that developing the proper equipment only partially solves the challenge of aligning the proper resources to the *survivability* principle. As the United States moves towards implementing its strategic Arctic vision, it must devote considerable effort to putting the proper resources into the hands of the proper personnel to establish the foundation for success in the Arctic.

Once the US Army creates a pool of human and material resources which enables *survivability* in the Arctic, it must move on to treat the issue of *sustainability*. Perhaps more than any other operational environment, the Arctic demands a logistics system that provides a continuous stream of support to its ground troops. Although other environments present hazards, such as a lack of water in desert operations, the cold of the Arctic greatly magnifies these hazards. The Arctic is essentially a cold desert. Not only is there a lack of freshwater sources, but any water that a unit carries in reserve is frozen and therefore useless without fuel to heat the water. Furthermore, the human body's need to heat itself metabolically with calories demands a steady stream of food—placing an added requirement on an already strained logistical system. Currently issued military rations, it should be noted, also have a tendency to freeze into solid ice blocks. As First Sergeant Todd Gagnon of the *Guerrier Nordique 2014* team observed, "There is no glide path [in the Arctic.] If you don't have the right supplies, if there is any pause in sustainment, everything shuts down."[14] Colonel Hansen corroborates this, stating that "the margin between success and disaster in the arctic is narrow."[15] Therefore, as LCDR Dixon notes in his research on naval operations in the Arctic, extraordinarily detailed logistics and sustainment planning must accompany the decision to move a military presence into the Arctic.[16]

Supply and Demand

Exercise *Guerrier Nordique* provided an excellent example of the challenges in supplying land operations. In the months prior to the week-long operation, the 35th CBG planners arranged for food, ice blocks, maintenance supplies, medical supplies, and communications equipment to arrive at a central logistics point in Iqaluit. These plans were quickly thrown into chaos, however, as thick ice in Frobisher Bay stopped shipping traffic and air transport became the only feasible option. After the arrival of the training unit (also by air) the logistics team loaded each platoon with approximately two days of normal supplies and one day of emergency rations and, after the unit's deployment approximately 35 kilometers from the base camp, sustainment teams maintained a daily resupply run via snowmobile to the distant camps. Fuel was, as noted, the most critical aspect of supply—each company required 64 gallons of fuel per day to melt water, heat food, and keep tents around -17°C to provide temporary relief from the bitter cold outside.[17] However, as Colonel Eek observed in 1969, these logistics lines were amazingly unstable and, even in a non-combat environment, severe weather and multiple vehicle breakdowns always threatened the logistics team's ability to provide supplies to its deployed units.[18] In a combat environment, given air defense artillery threats to air resupply, and the need for security during ground resupply, the job would be significantly more challenging. As many soldiers observed during the exercise, the easiest way to immediately incapacitate an Arctic force would be to disrupt its supply lines.

The problems of fuel, water, and food, although the major sustainment concerns, are only a fraction of the tasks that fall to a unit's logistics teams. In a combat operation, leaving no trace of one's passing is a paramount aspect of operational security. However, considering that all bowel movements on the frozen ice typically go into sealable "wag bags" for purposes of field sanitation, a sustainment unit must determine how to dispose of large amounts of bagged fecal matter, mitigate its signature to enemy observers, or establish a "slit trench"-style tactic for frozen ground or ice that allows for disposing waste into the environment.

Additionally, as soldiers endure the rigors of the environment or the hazards of combat, medical personnel must invariably begin to treat casualties. Again, the Arctic environment adds major complications to this process. The *Guerrier Nordique* team discovered that, even in the shelter of a tent, maintaining unfrozen fluid in IV bags was impossible without keeping the bag under clothing and next to the skin. Accounts from the Korean War corroborate this experience, recording that blood and plasma frequently froze and necessitated that medical staff maintain tents heated to adequate levels to administer fluids to wounded soldiers.[19] These problems underscore that without fuel, the entire sustainment system can begin to fall apart. Even with adequate fuel, issues such as maintaining the physiological ability to perform one's job over an extended duration in the brutal cold can seriously hamper a unit's ability to perform basic operations in the Arctic.[20] However, a military that can adequately address issues of *sustainability* and maintain the *survivability* of its valuable resources gains a major battlefield advantage which enables it to move on to the critical task of *maneuverability.*

Maneuverability

The line between surviving and operating is subtle in the Arctic. With only a small misstep, a unit or individual can transition from fighting for a tactical goal to fighting for survival. While *survivability* is certainly a main principle of Arctic operations, it is not until a unit can accomplish the basic soldier tasks of "shoot, move, and communicate" that it is truly prepared to operate in the Arctic as a military element capable of projecting force. Mastering the principle of Arctic *maneuverability* marks the transition into true Arctic combat effectiveness. Here, combat actions in the Russo-Finnish War and the Second World War illustrate that light infantry troops with cold weather clothing and skis do not constitute an Arctic force and, when they face true Arctic formations, the large and well-equipped light infantry unit cannot match a light, maneuverable Arctic formation.[21] As Master Warrant Officer Pelletier repeatedly stated during the *Guerrier Nordique* rotations, "arctic warfare is a skill you must acquire over time … that is why the ARCGs undertake operations and the regular [Canadian] forces just survive."[22] In other words, the frequent personnel rotations in the Regular Forces degrade the Arctic knowledge base every few years, while the ARCG's low personnel rotation cycle enables them to build a more experienced force capable of transitioning from mere survival to Arctic operations. The few personnel remaining in the US Army with extensive Arctic warfare skills underscore this point:

> One of the greatest detrimental factors [in] the U.S. Army [with regards to] Cold Weather Mountain operations is [the Army's] … need to constantly rotate personnel. There are very few soldiers who have the requisite skills to move into [an Arctic] unit and be proficient, either as a leader or as a unit member. These skills take years to refine and become a cohesive operational entity. Every unit is only as strong as its weakest link, and in this [area of

> operations] that weak link can make you combat ineffective or possibly kill you.[23]

In short, merely possessing the equipment and logistics required to fight in the Arctic is not sufficient for success—a unit must understand how to overcome the challenges and use its resources to project combat power.

One of the US Army's current major shortfalls in employing its limited Arctic resources is a lack of formal Arctic maneuver and sustainment tactics. While the *Ranger Handbook* codified years of light infantry experience into a single school and doctrinal publication, the US Army fails to recognize that, beyond the basic tenants such as the principles of patrolling, our current maneuver knowledge is based on warfare in temperate climates and does not adequately address the Arctic environment. Arctic tacticians and practitioners repeatedly stress two main tenants of warfare that defy current trends in our brigade-sized, offense-heavy warfare. First, that the upper hand in an Arctic fight goes to the defender and, second, that the most lethal unit is the small, mobile one.[24]

The need for extensive supply lines and the difficulty in maneuvering non-Arctic combat vehicles or large dismounted formations will force opposing armies into mobile defensive lines similar to those of the First World War. While the bulk of the Army remains in a position to receive supplies from a secure rear area, small units will probe gaps and seams in

defensive lines in an effort to force the defending opponent to abandon its own logistics safe zones and advance the defensive line forward, similar to Lieutenant Erwin Rommel's mountain maneuvers in the First World War's 12th Battle of Isonzo.[25] The defender which can sustain its force against both the enemy and the elements, while simultaneously making slow, creeping progress towards its goal, will win the day against an enemy who moves quickly but outruns his supply lines—leaving soldiers at the mercy of the environment.

In developing Arctic maneuver and sustainment tactics, the US Army and Joint ground warfighting community will invariably need to augment its almost complete lack of ski and mountain-trained troops. As Colonel Walter Downing observed in his 1954 study on future Arctic warfare, the Arctic's diverse landscape of "[ice] barrens … muskeg, rugged mountains, and almost impassible scrub forests" requires a force to traverse snow, ice, rock, and swamp to reach its objectives.[26] During *Guerrier Nordique*, for example, a team landing on an island near Frobisher's Farthest arrived at the beginning of the tidal fall. While the first team walked onto the island, subsequent teams faced the emergence of an ice cliff (exposed by the falling tide) requiring the use of basic mountaineering tasks to bypass the obstacle. Adding to these terrain challenges, the effects of degraded communications due to ionospheric blackouts, inaccuracy of traditional compasses, difficulty in utilizing the limited cover and concealment to hide a bullet's ice fog trails, vehicle exhaust plumes, and thermal indicators. One begins to see that the "Arctic" *Ranger Handbook* will encompass an entirely different way of conducting small unit warfare to maintain combat superiority.

Developing an Institutional Arctic Capability

At the root of the lack of progress towards a unified Joint Arctic and mountain operational requirement is the failure to unify efforts of the several key organizations that practice these increasingly critical skills. The Northern Warfare Training Center in Alaska continues to retain an institutional knowledge for Arctic warfare. Likewise, the Mountain Warfare School in Jericho, Vermont and the associated 86th Infantry Brigade Combat Team (Mountain) maintain a small cadre of personnel well-versed in mountain and cold weather operations. Additionally, as a result of its relationship with the 35th Canadian Brigade Group's Arctic Response Company, the 86th IBCT possesses a cohort of approximately 15 to 20 personnel with Arctic and Subarctic experience. Also in Alaska, USARAK and its two brigades of the 25th Infantry Division have recently focused efforts on moving key elements from within the two combat brigades and associated support units towards building an Arctic capability by establishing one ski-mobility company and one Arctic/mountain-mobility platoon per battalion.

Finally, the Marine Corps Mountain Warfare Center is making a serious effort towards reviving cold weather and mountaineering equipment, renewing efforts to work with Arctic NATO partners such as Norway, and establishing a formal force structure that integrates over-snow mobility into its maneuver battalions.[13] This program represent a major effort towards renewing the USMC's Arctic and mountain warfare capability. However, while the personnel within these units represent a great depth of knowledge in critical Arctic and mountain tasks, the distance and lack of a formal requirement to operate together results in an ad hoc and informal "networking" relationship detracts from their ability to make substantial headway in developing a Joint capability. In violation of a key tenant of Joint Publication 1, Doctrine for the Armed Forces of the United States, there is a decided lack of unity of effort within Joint ground warfighting units towards establishing the tactical and operational capacity to fulfill the tenets of the DoD's Arctic Strategy—beginning with the failure to establish "a common philosophy, a common language, a common purpose" in the form of Uniformed Joint Task List that addresses Arctic and mountain operational requirements.[27] Various steps are required for the US Army to gain and retain the necessary skills.

To begin with, a Joint requirement for Arctic and mountain warfare capability is required to unify the efforts of associated service schools and units. This will provide the strategic support for the necessary operational changes in force structure and tactics. With this in place, a select contingent of US Army combat units should be formed for Arctic operations. Given the specific demands of sustainability and maneuverability in the Arctic, this dedicated Arctic task force should include specialized ski troops, sustainment units, engineer units, medical units, and aviation elements that understand the challenges of operating in full-spectrum Arctic operations. USARAK currently plans to equip both of its combat brigades with snow mobility, mountain mobility, and specialized Arctic support units. However, as previously noted, the lack of Joint doctrine, specifically documenting requirements to operate in the Arctic, will limit USARAK's ability to place continued command emphasis on the program for the years it will take to build adequate institutional knowledge on these specialized skills. Additionally, without changes to current force generation models that require frequent personnel rotations, efforts towards generating a competent Arctic force are likely to struggle.

A sustained commitment from the Army is important, so too is the retention of its best Arctic personnel. Like SCUBA specialties in Special Operations communities, mountaineering and Arctic specialties require leaders with years of experience and consistent training to operate effectively in a high-risk environment. Current force generation, assignment, and rotation structure seriously inhibits any attempt at successfully establishing a specialty Arctic or mountain unit.

To achieve this sustained training and skills retention, the Army should designate at least one complete Arctic Response Unit within the National Guard's combat brigades comprised of infantry, artillery, aviation, engineer, and logistics support units. Unlike USARAK's combat units, the National Guard maintains a more stable contingent of soldiers, thereby increasing the overall institutional knowledge required for Arctic warfare. The 86th IBCT is a prime candidate for the infantry unit due to its existing emphasis on mountain and cold weather operations, relationship with the 35th CBG's Arctic Response Company, and physical location in New England (an historical location for high-altitude, cold weather mountaineering training due to terrain challenges and complex weather patterns). Additionally, as Colonel Hansen observes, other ideal locations may include the northern Midwest states (Minnesota or Wisconsin for snow and ice ground mobility), northern Western states (Montana, Wyoming, or Colorado for vertical ice/snow mobility), and, naturally, Alaska.[28] These units must be proficient in the various forms of over-snow mobility (snowshoes and skis), mountaineering (ice and rock climbing), and maneuver warfare that the Arctic environment demands. Some units, such as Alaska's aviation unit, already maintain a proficiency in Arctic conditions without an explicit mandate to do so from Joint doctrine.[29]

Training these units once they are formed is, likewise, essential. The Army must engage designated units in extended pace of establishing an institutional foundation of Arctic warfare. Given the two demands of domestic fiscal constraints and the need to maintain NATO training relationships, the United States and Canada should endeavor to participate in bilateral Arctic training exercises that establish relationships between Arctic units and share funding requirements. If all Arctic units are situated within driving distance to Canada (i.e. 86th IBCT), ground combat maneuvers remain largely accessible and, therefore, cost-effective. Additionally, involving Army units in Marine Corps Arctic exercises with Norway promise to add considerable Arctic experience from a more advanced NATO partner and further grow the Joint Arctic relationship.

To equip these forces the Natick Laboratories and the Cold Regions Test Center should be dedicated to revising the current Arctic equipment set, focusing specifically on improving the existing ECWCS, creating a new Arctic tent/shelter, and replacing or maintaining the BV-206 Small Unit Support Vehicle. In conversations with personnel from NWTC, USARAK, and the US Marine Corps' Mountain Warfare Center, it is clear than many units are making significant progress towards refining Arctic equipment and merely need to unify efforts towards a Joint solution. Involving the USMC Mountain Warfare Center, US Army Northern Warfare Center, US Army Mountain Warfare Center, and USARAK in designing and testing will accelerate fielding and add a variety of experienced personnel in design and implementation. The results of the design must undergo tests in true Arctic environments with experienced Arctic and mountain warfare personnel over extended duration field exercises.

During Arctic maneuvers an element from the Asymmetric Warfare Group should also be attached to observe and guide the process of creating new Arctic tactics at the TRADOC level that address shortfalls in sustainability and maneuverability. This should at least result in an Army Tactics, Techniques, and Procedures publication that augments maneuver, sustainment, and protection; guides the formation and training of the

Arctic specialty units within the US Army; and is ultimately nested with an overarching Joint publication on Arctic and mountain operations.

Finally, the relationship between the 86th IBCT and the 35th Canadian Brigade Group's Arctic Response Company should be strengthened. This includes establishing *Guerrier Nordique* as a NORTHCOM-supported training event with a formal selection process within the 86th IBCT for exercise attendees and a plan to rotate personnel in for Arctic and sub-Arctic rotations. The relationship must also involve inviting soldiers from the 35th CBG to train at the Mountain Warfare School and sharing lessons learned on doctrine and equipment to further enhance *survivability, sustainability*, and *maneuverability*.

Conclusion

Strategic-level leaders and planners must understand that, despite articulating a formal Arctic strategy for the Department of Defense, current capabilities at the Joint tactical and operational level do not equip ground combat units to perform successful Arctic operations. Furthermore, while a small contingent of leadership and instructors in the 86th IBCT, Northern Warfare Training Center, USARAK, Army Mountain Warfare School, and the Marine Corps Mountain Warfare Center maintain a depth of knowledge in Arctic operations and the associated skills, the US Army and Joint community critically lack the institutional knowledge to quickly create and employ units capable of accomplishing Arctic tasks. As the Arctic region becomes more important, and other Arctic states move towards increased operational capability in the region, every delay puts the US military at further risk of being unprepared to defend itself or its NATO allies in an Arctic conflict.

From a fiscal standpoint, in an era when modular formations are no longer required en masse in Iraq or Afghanistan, it is cheaper to prepare several units with specialized skills to operate in an important environment than it is to wait until the need is at hand and, only then, to develop personnel, doctrine, and equipment. As Arctic explorer Vilhjalmur Stefansson wrote in his Arctic treatise *The Northward Course of Empire*, "there is no northern boundary beyond which productive enterprise cannot go until North meets North on opposite shores of the Arctic Ocean."[30] The time is coming when countries will meet in the North and, although we hope for peaceful expansion of business interests and governance into the Arctic, we must prepare to defend national security policy at the top of the world.

Notes

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[1] The contents of this paper reflect the author's own personal views and experiences and are not necessarily endorsed by the 86th IBCT, Army Mountain Warfare School, Northern Warfare Training Center, USMC Mountain Warfare Center, USARAK, Asymmetric Warfare Group, National Guard Bureau, or Department of the Army.

[2] Charles Moses McAfee, "The Strategic Importance of the Arctic," unpublished student paper (US Army War College, 1953), 21 and Gerhard Baumann, "The Arctic-Strategic Center of the World," *Military Review* (December 1962), 85-97.

[3] Siemon T. Wezeman, "Military Capabilities in the Arctic," Background Paper (Stockholm: Stockholm International Peace Research Institute, 2012).

[4] United States, Department of Defense, *Arctic Strategy*, 22 November 2013 and Alan L. Kollien, "Toward an Arctic Strategy," unpublished student paper (US Army War College, 2009).

[5] Rex Finley, interviewed by Nathan Fry, 5 May 2014.

[6] Harold D. Hansen, "The Adequacy of Mountain and Cold Weather Operation Capabilities in the U.S. Army," unpublished student paper (US Army War College, 1957).
[7] Bob E. Edwards, "The Role of the Army in Polar Regions," unpublished student paper (US Army War College, 1960).
[8] Charles Moses McAfee, "The Strategic Importance of the Arctic," unpublished student paper (US Army War College, 1953), 21.
[9] Lauris M. Eek Jr., "Maintainability of Military Motor Vehicles under Arctic Winter Conditions," unpublished student paper (US Army War College, 1969).
[10] Carl Pelletier has since been promoted to Captain.
[11] Carl Pelletier, interviewed by Nathan Fry, 1 March 2014.
[12] Hansen, "The Adequacy of Mountain and Cold Weather Operation Capabilities."
[13] Ibid, 14.
[14] Todd Gagnon, interviewed by Nathan Fry, 10 March 2014.
[15] Hansen, "Adequacy of Mountain and Cold Weather Operation Capabilities."
[16] Jeffrey S. Dixon, "Determination of Sustainment Requirements for Operations by the U.S. Military in an Ice-free Arctic Using the Tenets of Operational Art," unpublished student paper (US Naval War College, 2012).
[17] Carl Pelletier, interviewed by Nathan Fry, 1 March 2014.
[18] Eek, "Maintainability of Military Motor Vehicles under Arctic Winter Conditions."
[19] Edwards, "Role of the Army in Polar Regions."
[20] Eek, "Maintainability of Military Motor Vehicles."
[21] Edwards, "Role of the Army in Polar Regions."
[22] Carl Pelletier, interviewed by Natahn Fry, 1 March 2014.
[23] David A. Hoffman and Greg Netardus, "Re: Arctic Warfare Research Paper," email to Nathan Fry, 1 May 2014.
[24] Vitalie Micov, "Modern Perspectives for Tactical Level Operations in the Arctic Region," unpublished student paper (US Army Command and General Staff College, 2013); Edwards, "Role of the Army in Polar Regions"; Walter A. Downing, "Future War in the Arctic," unpublished student paper (US Army War College, 1954).
[25] David A. Grossman, "Maneuver Warfare in the Light Infantry: The Rommel Model," www.killology.com/maneuver_warfare.pdf.
[26] Downing, "Future War in the Arctic."
[27] United States, Department of Defense, Joint Publication 1, "Joint Doctrine for the Armed Forces of the United States," 25 March 2013.
[28] Hansen, "Adequacy of Mountain and Cold Weather Operation Capabilities."
[29] Rex Finley, interviewed by Nathan Fry, 5 May 2014.
[30] Anthony Harrigan, "Northern Defense Frontier," *Military Review* (December 1969), 3-8.

Chapter Fifteen

Finding Ihuma: Inuit Leadership Norms and Canadian Ranger Operations

Peter Kikkert, in conversation with Doug Stern[1]

On a frigid spring day in 2004, Canadian Ranger Corporal Doug Stern found himself in the middle of a long, deep gully on Hazen Plateau, Ellesmere Island, with the other members of his Enhanced Sovereignty Patrol. The gully was strewn with boulders and the rough terrain made travel by snowmobile extremely difficult, especially while dragging a heavily laden plywood kamotik. The lead guides, all Inuit who have spent their lives on the land, had strongly advised the commanding officer of the patrol to avoid the treacherous gully. Unfortunately, the major rarely listened to his Rangers on the mission and usually dictated the route that they would take. Confident in his ability to operate in the northern environment after only a short time in the North, the officer had ignored his guides and led the patrol into the gully. Once they were inside, the Rangers realized just how dangerous the gully actually was and suggested to the major that he pull the patrol out and find another route. Their opinions fell on deaf ears. In the following hours, snowmobiles were broken, kamotiks smashed, and many riders were catapulted violently through the air after their machines struck hidden rocks. The gully destroyed a substantial amount of Army property and injured several Rangers, including Stern who was evacuated with back spasms.[2] According to Stern, the CO lacked the *ihuma* necessary to survive, let alone lead people, in the Arctic.

Ihuma (or *isuma* in some dialects) is an umbrella term in Inuktitut with many multi-faceted meanings, but is most simply defined as reason, wisdom and knowledge. Stern first discovered the term while flipping through a book on Inuit behaviour written by the famous anthropologist Jean Briggs. Briggs' description of *ihuma* came from the Utkuhikalingmiut

Inuit, a group that inhabited parts of the Kitikmeot region south of Victoria and King William Islands, but the concepts it embodies are important to Inuit across the Canadian Arctic.[3] *Ihuma* encapsulates a wide array of intellectual faculties and is the indispensable element in adult competence. In Inuit society, the presence of *ihuma* signifies adultness and refers to all functions that are considered cerebral, including mind, memory, sense, thought and ideas. A person with *ihuma* has a calm, cheerful and patient demeanor, equanimity in the face of difficulty and frustration, a realistic and pragmatic view of the environment and a high regard for the independence of other people. Historically, the concept was so important that the word *ihumatuaq*, which means thinker, was used to denote a leader in the community.[4] Interestingly, the Utkuhikalingmiut believed that when a person lacks *ihuma*, they are incapable of learning anything.[5] Such people, as with the officer on Stern's patrol, are considered *nutaraqpaluktuq*, which translates into childish. In short, to be considered a fully competent member of Inuit society, a person requires *ihuma*.

Stern's experiences as a hunter and trapper in the Arctic, and his interactions with Inuit on the land, have given him a unique perspective on *ihuma* and what it truly means in the northern environment. For 30 years he developed his own *ihuma*, honed his skills on the land, learned to read the environment and, in many ways, lived as traditionally as most Inuit—quite a feat for someone born and raised in the southern Ontario town of Burlington. Stern, however, has always had a strong love of the outdoors and a thirst for adventure. While completing a Bachelor's degree in physical geography, he worked on the ski patrol in Whistler, B.C. In 1980 he and a small group of friends set out on a canoe trip down the Coppermine River, his first time in the Northwest Territories. During the canoe trip he made a connection with the land and its people and hoped to return as soon as possible. Stern worked for one more year in Whistler, then sold everything he owned and moved up to Cambridge Bay, a small community on Victoria Island.

From the beginning Stern felt extremely comfortable in his new surroundings. At first he moved in with a young Inuit couple and their child, until he decided to buy a small matchbox house for himself. In those first years, Stern did a lot of listening and quickly learned not to ask too many questions, which is a trait Inuit parents accept from their children, but not from fellow adults. Unlike most of the southerners who moved into the Arctic, Stern tried his best to get out on the land and interact with Inuit experienced in travel, hunting and trapping. He lived in a tent for two winters at the rough outpost camp at Bay Chimo, Bathurst Inlet. He shocked the Inuit at the camp when he managed to make the 140-mile trip from Cambridge Bay on snowmobile all by himself. During his years on the land, Stern became an excellent hunter, and he continues to trap today.

In those first years in the region, Stern worked with the local cadet group and tried to teach the children some of the lessons he had learned about life on the land. Though he was interested in joining the local Canadian Ranger detachment, he thought that, as a white man who had only recently settled in the Arctic, it was inappropriate for him to do so. In 1988 he finally became a Ranger in the Cambridge Bay Patrol of 1st Canadian Ranger Patrol Group, and has served ever since.[6] During his 24 years as a Ranger, Stern has been on some of the most impressive patrols and operations the Canadian Armed Forces (CAF) have conducted in Canada's Arctic. If they are lucky, most Rangers are able to go on just one enhanced sovereignty patrol or major military exercise. Stern, however, is a seasonal employee of the federal government at Quttinirpaaq National Park on Ellesmere Island and, given the policy that a park employee must be attached to any military force that enters the area, he has had the special privilege of participating in five major exercises since 2002. These experiences have given him a detailed and unique perspective on leadership in the Canadian Rangers. He has seen many Regular Force officers and sergeants who have displayed elements of *ihuma* and others, unfortunately, who have not.

Operational *Ihuma*

When the Royal Canadian Air Force evacuated Stern from that awful and seemingly endless gully on Hazen Plateau, he experienced a sinking feeling of incompletion. He had thought the mission would be the adventure of a lifetime; a chance to travel over a thousand kilometers of tundra and pack ice on which few had ever set foot. Instead, the Commanding Officer (CO) committed the cardinal error of any soldier posted to lead a patrol group: he refused to listen to his Rangers and, though the operation eventually succeeded, it was a nightmare for the participants, not an adventure. Throughout the trip the major chose dangerous routes that were next to impossible to traverse, relied on his Gobal Positioning System (GPS) rather than the traditional knowledge of his guides, and refused to listen to advice. The officer often forced the patrol to climb steep hills on their snowmobiles so that he could get a better view of the terrain, even though the rocky surfaces ruined the machines. On their own, the Rangers would have simply gone around the hills, but the officer angrily dismissed these suggestions. The CO did not act with the humility so necessary for any newcomer to the Arctic environment. He clearly thought he knew how to operate well on the land, and nothing—not the broken equipment, injured Rangers, or his own near death in a snowmobile accident—could convince him otherwise. A healthy respect for the environmental conditions in the Arctic is one of the most important characteristics of someone with *ihuma*. In winter, the land is always dangerous. It is always a threat to be taken seriously. Showing any kind of arrogance to nature is the first and fastest way to die in the North, a lesson the officer often ignored.

The officer also failed to show *ihuma* in his personal relations with the Rangers. He often displayed a lack of humour and on several occasions berated Rangers for not following his orders as he thought they should have. He rarely listened or partook in the communal, slow and deliberate weighing of options that characterizes Inuit decision-making. Instead of suggesting courses of action at these meetings, he simply barked orders and expected them to be followed. He was inflexible and often lost his calm when faced with challenging situations. At times, the officer completely violated traditional forms of behaviour and failed to display the emotional restraint that is, above all else, a sign of someone with *ihuma*. At one point, some of the Rangers were wrestling to stay warm, a common practice out on the land, and the officer started to roughhouse with one of them. Rather than playfully wrestling, the man seemed to grow angry and roundhouse kicked the Ranger in the chest, sending him careening into a kamotik. Such an act of violence, coupled with his cheerlessness and rough nature, indicated to the Rangers that the officer lacked even the most basic sense of reason. No Inuit would have followed such a man when they lived out on the land and none wanted to follow him on this operation. In Stern's opinion, this particular officer represents the archetype of a bad Ranger instructor and offers the prime example of how not to lead a Ranger patrol—or any operation in the Canadian Arctic.

On the other end of the spectrum is Major Yves Laroche, an officer who demonstrated the appropriate *ihuma* while leading the Kigliqaqvik Ranger patrol during the April 2002 expedition to the North Magnetic Pole. During this exercise the patrol ran into some of the most difficult terrain Stern has ever seen, but through it all Laroche kept his calm and

deferred to those who knew how to overcome these conditions—his Rangers. He allowed his Inuit guides to dictate the speed, direction, and routes of the mission. When the group moved out of Resolute they encountered hard, rough ice. Even the most experienced Inuit elder would have had difficulty picking a route through the chaotic jumble. Rather than pushing his Rangers and forcing them to pick up the operational pace, Laroche deferred to their decision-making and listened to them. Eventually the guides managed to get the patrols safely through, though the work was exhausting and time-consuming. Through it all, the major seemed to really enjoy being out on the land with the Rangers and wanted to learn as much as possible.

During the exercise, Laroche let the Rangers showcase what they could do and he appreciated their talents. His easy going, humble, and curious nature made him a hit with the patrol and forged a bond of trust with the Rangers. Thus, when Laroche told the press that "These are the true citizen soldiers and they are truer Canadians than anyone south of 60," the Rangers believed he meant it and they appreciated the praise.[7] Laroche remains one of the best leaders Stern has encountered in his long tenure as a Ranger.

Stern used these two officers as examples of how a Ranger leader should and should not act. One clearly possessed *ihuma* while the other proved lacking. Thankfully, more often than not the officers and Non Commissioned Officers (NCOs) he has served under have been like Laroche. Given their military training, and the adaptability and flexibility the combat arms demand, many Regular Force soldiers already possess elements of *ihuma* when they come north. Still, even some of the best officers need to make adjustments to their outlooks and command styles if they hope to successfully lead Rangers or other Canadian Armed Forces personnel in the North. Sometimes, what might seem pragmatic and perfectly reasonable in the south is viewed quite differently in the North.

The Problem with Objectives

In several of the enhanced patrols and major exercises in which Stern has participated, tensions have arisen from unreasonable expectations and objectives. Almost all Regular Force personnel, even those whom the Rangers like and respect, try to accomplish their objectives, no matter the adversity and danger. The objective is paramount, which is very much a military mindset. Stern has been on several patrols during which Regular Force personnel have led the Rangers through conditions they would not have travelled in under normal circumstances. On one exercise, an officer, who had pneumonia, drove the patrol through unfamiliar terrain in a blizzard to reach his objective on time. On another, an instructor pushed his boat patrol to travel in fog as thick as pea soup in order to make it to his final destination on schedule. Whether it is forcing a patrol into a gully, boating through the fog of the Dease Strait, or snowmobiling in a blizzard, Regular Force officers and NCOs often take dangerous action to save time or to keep an operation on schedule. In the Arctic, however, few journeys or operations stay on schedule, and an attempt to force traditional military timetables and standards to the region shows a dangerous lack of *ihuma*.

In the past, newcomers to the North have sharply criticized Inuit as childish "because the latter do not plan for the future with the elaborate caution" of southerners.[8] Inuit, however, understand that making concrete plans in the Arctic is a waste of time. They scoff when they hear an officer assert that his patrol will make it to Alert on Monday at 1300 hours. Challenges arise while on the land and nature interferes, so it does little good to make such predictions.[9] The Arctic is an area where Clausewitzian friction is not merely a factor to be taken into consideration, but rather the dominant concern of any operation. Predictions about the future and concrete objectives do not reflect the rational caution and respect for the unknown that is so prominent in traditional Inuit thought. An important characteristic of someone with *ihuma* is a pragmatic adaptability. This generally refers to a flexibility in defining situations, which allows for the efficient use of the environment and adaptation to circumstances.[10] When plans are made in too firm a manner, some of this flexibility is lost, which is dangerous. Regular Force officers and instructors[11] need to accept that, in the Arctic, every operation will fall behind schedule, particularly those held to a rigid timetable, and they must learn to accept those delays. In fact, operations might run more smoothly with no schedule imposed on them at all.

Inuit would probably identify an officer or NCO with a narrow and intense mission focus as having an overabundance of *ihuma* (ihumaquqtuuq), which is a negative characteristic. A person with too much *ihuma* often focuses extensively on one idea, objective or goal, and is more inclined to be narrow-minded and selfish. In its mildest form this tendency is thought of as inconsiderate. In more extreme cases, it can lead a person to become angry for a long time, especially if the object they are focused on is threatened.[12] Stern has seen many Regular Force personnel become angry over a slow pace or lost objective. On one exercise, an officer became visibly annoyed and drove the Rangers harder after he learned that another patrol was days ahead of schedule, while his was days behind. Such a competitive and negative attitude made the Rangers uneasy. The lesson is clear: do not become single minded in chasing an objective. Instead, take the time to listen and learn from the Rangers.[13] Do not drive a patrol through a blizzard to achieve some predetermined goal that was set long before the environmental conditions were known.

Respecting the Environment

One of the central characteristics of someone with *ihuma* is a healthy respect for the northern environment. Whenever a person or patrol is out on the land, it is a life and death situation and Ranger leaders need to view it as such. Some instructors and officers think that because this is not

Afghanistan, they are no longer in a dangerous environment or face an enemy. In the Arctic, winter is the enemy and it will kill a Ranger or a soldier with ease. If a person cannot grasp this reality and act accordingly, he has no business leading anyone in the North.

Unfortunately, on many occasions Stern has witnessed Army instructors act without the humility needed to function and survive in the Arctic. Many of these individuals are too used to day trips, overnights, and short patrols, and have limited experience operating on the land. Others think that, because they have been to many communities in the North, they know more about the land than the Rangers. During one exercise, a sergeant displayed this particular type of hubris and stopped listening to the Rangers. The sergeant led the patrol into the teeth of a three-day blizzard, during which they were confined to their tents. It soon became clear to the Rangers that the sergeant was starting to panic. He was constantly radioing the situation back to headquarters, became snappy with the Rangers, and was unable to calmly and accurately assess the situation. How a person responds to unfavorable changes in environmental conditions is one of the truest tests of his *ihuma*, and this sergeant failed.

On operations, a respect for and understanding of nature should transfer into a recognition that the tempo of northern operations has to be much slower than in southern climates. In northern conditions equipment failures are routine, as are injuries and exhaustion. All of these challenges are made worse when inexperienced and impatient leaders push the operational pace to meet an objective. When a leader overworks Rangers to the point of sweating or forces them to skip the meals and breaks that keep them going, trouble will follow. Planning must highlight these dangerous realities and stress the flexibility and caution necessary to overcome them. One of the Rangers, who was with Stern on Operation *Nunalivut* 2007, put it best when he said, "For the army everything has to be fast. I guess that's the times we live in—faster, faster all the time. But faster is not better, it's just faster."[14]

Adaptation, Flexibility and Decision-Making

Two important attributes in someone who respects the Arctic environment are adaptation and flexibility. How a person responds to changing conditions will define his character while out on the land in the Arctic. People with *ihuma* are highly in tune to changing conditions in the physical environment. They can remain cheerful in conditions that would make most southerners crumble. On the land, a hunter who uses his mind will be careful to look at each new situation he encounters in its totality, figuring out what its requirements will be. Unlike Stern's sergeant who lost composure during a blizzard, when faced with unexpected events he responds with calmness and patience. He does not sulk, scold, get annoyed or angry. Instead, he adapts. When new conditions make it imperative, the hunter will be able to adjust and respond.[15] It is this calm and functional perception of the environment that allows many Inuit to view almost any object as adaptable to diverse uses, which explains the mechanical skills for which they have become so famous.[16] In sharp contrast, someone who does not have *ihuma* will have a skewed perception of the environment and his judgments for the future will be confused and unrealistic.[17] When faced with the dangers and rapid changes that anyone out on the land will experience at some point, these men crumble. Stern has seen this happen.

Adaptation and flexibility are dominant themes in Stern's stories about his experiences with the Rangers. One year, during a patrol to Bathurst Inlet in November, nothing went right. The patrol struggled to find caribou to harvest and even failed to catch much char. The snowmobiles and sleds kept breaking down in the rough terrain. The instructor leading the Rangers grew discouraged and confrontational in the challenging conditions. The patrol seemed a complete failure. The Australian Army, however, had sent an observer on this particular training exercise, and this officer was amazed at the adaptability of the Rangers. He could not believe how well they responded to the breakdowns and managed to jury rig solutions in the middle of nowhere, and without orders. When a snowmobile broke, one Ranger would start to take the machine apart or inspect the motor, another would detach and unload the kamotik, and others would set about making tea and preparing a snack. The Australian found the ease and speed with which they adapted to new challenges remarkable.

Inuit decision-making processes highlight this adaptability. Those who possess *ihuma* will not make ill-considered or hurried responses to any situation. They contemplate various options, collect information and weigh opinions before making a decision. Traditionally, Inuit decision-making involves lengthy discussions to examine issues from multiple perspectives, with few offering any clear-cut solutions. Eventually some kind of consensus-based conclusion emerges. It is this type of contingency based planning that makes Inuit so effective when out on the land.

Stern suggests that Ranger commanders can best display their leadership by allowing this process to unfold without their interference. Stern has noticed, however, that even when instructors allow such discussions to occur, too often they fail to listen, ask too many questions and, in the end, simply make the decision by themselves. The best instructors will focus and engage a patrol, giving them objectives, but not telling the group how things are going to be done. These men should act as participants in these discussions, not leaders. In Inuit society explicitly telling someone how to act is severely frowned upon. A person with *ihuma* would never make this mistake. Personal autonomy is extremely important to Inuit and respect for a person's independence is highly valued. Suggestions can be made, but direct orders should be avoided. Understandably this concept is alien to a military culture built around chains of command, however, the North is different and repeated experimentation has shown that this framework simply does not function well in so harsh and unpredictable an environment.

Listening

A major component of Inuit decision-making is listening. Someone who possesses *ihuma* will take the time to listen to those who know better. At times, Canadian Ranger Patrol Group headquarters staff do not take the time to listen, as was the case with an officer who refused to listen to his Inuit guides and instead took his men into a rock-filled gully where they, including Stern, sustained injuries. Often instructors will ask the Rangers what they think or want, but make the final decision based on what they wanted in the first place, without really listening to their Rangers. On one patrol, the CO asked Stern and his fellow Rangers if they should continue in near-blizzard conditions to the next objective. Though several warned against it, the patrol was ordered to proceed anyways. Clearly the officer's mind was made up before he began the conversation.

Generally, Inuit are slow to voice their opinions or decisions, and are very accommodating. If the instructor is insistent on going out on the land or sea, even when conditions are unsafe, the Rangers will probably follow along against their better judgment. On one training patrol outside Cambridge Bay, a couple of Regular Force instructors decided they wanted

to take a shortcut across Ferguson Lake to reach a new campsite they had chosen. In their indirect, shy manner, some Rangers mentioned that the ice might still be too thin for such an action. Stern recounts that the lake was only half frozen and was still full of holes and slush. Had these instructors solicited more opinions or just listened more effectively, they could have avoided a dangerous situation. In the end, some of the Rangers put themselves at risk of falling through the ice to follow the soldiers. One of Stern's most frequent complaints is that regular force officers and NCOs often order Rangers to drive their skidoos into dangerous terrain. On several patrols, commanding officers have forced the Rangers to drive to the top of rocky, windswept hills in order to get their bearings. These actions displayed a lack of *ihuma* that lost the instructors the respect of the patrols. Listening, really listening, should be one of the greatest tools of all Army personnel tasked with leading or administering the Rangers.

The Right Attitude

For a Ranger instructor or any other soldier who is inexperienced on the land or is working with the Rangers, the right attitude can go a long way. Perhaps most importantly, Inuit adults who possess *ihuma* are cheerful and humorous. They laugh easily and often, for this indicates a happy person who people can feel comfortable around.[18] Stern thinks it is important for Regular Force personnel to joke around with the Rangers. There is no quicker way to form a positive relationship with a Ranger patrol than to laugh with them and make them feel at ease. Instructors, however, must take care not to cross the line and need to realize that humour has limits. During one training patrol, a sergeant made a joke about sharing the wife of one of the elders. While he meant it as a joke, the man was embarrassed and angered by the statement and cursed at the sergeant.

There is little worse in Inuit culture than losing face, given the emphasis that is placed on personal reputation. Inuit do not mock one another, for there is an extreme sensitivity to criticism and subsequent embarrassment. Every effort should be made to avoid embarrassing Rangers. Stern has seen many instructors dress down Inuit Rangers as they would a recruit in the south. He has heard a sergeant poke fun of an elder in front of the entire patrol for having "Ranger gold" (rust) on his rifle. He has heard instructors call certain individuals the "worst hunter," or the "worst Ranger."

He has, however, also seen examples of soldiers handling situations in the proper manner. On Operation *Nunalivut* in 2007, Stern's patrol travelled 2,000 km from the most northerly coastline in the world to raise the flag on Ward Hunt Island, a mere 684 km from the North Pole, before finishing the trek at Alert. At one point on the long journey, the lead Inuit guide made a mistake and hit some rough terrain, which damaged his machine and destroyed Major Chris Bergeron's (the commander of the patrol). The scout had made a mistake, but Bergeron did not rub it in or make a big deal of the situation. He knew enough not to criticize the man and cause him more embarrassment than he already felt. This was an excellent example of a leader showing important cultural sensitivity.

How a person expresses his feelings plays an important role in how he will be perceived and judged by Inuit. If someone wants to lead Rangers, they need to embrace the type of personality that the Rangers will respond to positively. In general, a person with *ihuma* strives to achieve harmony, forbearance and charity in all relationships with all people. One should be sociable and, most importantly, never, under any circumstance, angry or resentful.[19] If this type of man led a patrol, the Rangers would follow him.

Patience and "It Can't be Helped"

Inuit often assert that southerners lack patience. This is the opposite of how most Inuit try to live their lives. At one point or another, every Regular Force officer or NCO involved with Inuit Rangers will probably hear one of them say "it can't be helped (ayuqnaq)." To Inuit, this attitude is a rational feeling, given all of the challenges and obstacles that can be confronted on the land in the Arctic. According to Jean Briggs, for most Inuit, "if circumstances make it difficult to realize a plan, well, it can't be helped."[20] If an Inuk who possesses this key element of *ihuma* runs into challenges, he will be able to shrug his shoulders, remain calm, and adapt. Stern stresses that it does not mean that the goal or plan did not matter, but, since getting angry or despondent will not help, why fret? He has seen Rangers respond this way when machines have failed, kamotiks have broken, when patrols are storm stayed, and when wrong routes have been taken. The older

Rangers, in particular, take pride in reserving their equanimity and calm in the face of such adversity. This outlook should actually impress the military, which tries to teach its soldiers to react positively and calmly to unexpected situations.

At times, however, this attitude will test the patience of instructors, who often perceive it as an excuse for making a mistake or for giving up. To better deal with this attitude, the slow decision-making style of Inuit, and the fact that they will not respond like typical soldiers, Regular Force personnel assigned to lead the Rangers must have patience. Without patience they will not be able to function properly on the land, or to interact well with Inuit on the patrols, and they will struggle to lead. Patience, then, is at the core of leadership in the Rangers.

Conclusions

For centuries those Inuit who possessed the right amount of *ihuma* have led their people on the land in the Arctic. Armed with the skills provided by *ihuma*, they were able to help those who depended on them for guidance survive in the harshest conditions on earth. With this in mind, all officers and NCOs charged with leadership roles in the North should try to emulate some of the basic elements of *ihuma*. They should be adaptable and flexible, easy going and patient, calm and less focused on objectives. In the Arctic, soldiers need to acclimatize and adapt to the ways and needs of diverse communities. If a soldier fosters *ihuma*, he or she will have a firm foundation no matter where he or she is sent. It creates a unique type of leadership, but an effective one. At the very least, incoming Ranger instructors should understand that *ihuma* does influence how many of the Rangers, especially the elders, perceive people and the land. This knowledge will help them to close the culture gap that separates Rangers and instructors and allow them develop stronger working relationships. After all, when out on the land, it is these relationships that truly matter.

Notes

[1] This chapter is based on an interview between Ranger Corporal Doug Stern and Peter Kikkert in September 2011, as well as Whitney Lackenbauer's interviews with Stern in 2009 and 2010.

[2] Adrian Humphreys, "Military Rents Planes for Arctic Mission: Cost of Sovereignty Patrols Doubles," *National Post* (10 June 2004). In fact, the Army would spend $20,000 to repair the machines broken on the patrol, mostly during that ride into the gully.

[3] Jean Briggs, *Utkuhikhalingmiut Eskimo Emotional Expression*, (Ottawa: Northern Science Research Group, 1969); and Jean Briggs, *Never in Anger: Portrait of an Eskimo Family*, (Cambridge: Harvard University Press, 1970), 311-366. See also: Hugh Brody, *Living Arctic: Hunters of the Canadian North* (Toronto: Douglas and McIntyre, 1987), 139-142. For more recent discussions on the concept of ihuma see: Peter Collings, "Aging and Life Course Development in an Inuit Community," *Arctic Anthropology* 37:2 (2000): 111-125; and Peter Collings, *Inummarik: Men's Lives in an Inuit Community* (Montreal & Kingston: McGill-Queen's University Press, 2014), 36-47, 59-60, 318, and 370-372.

[4] Briggs, Utkuhikhalingmiut Eskimo Emotional Expression, 42.

[5] Ibid, 40.

[6] For background on the Canadian Rangers see the extensive work of P. Whitney Lackenbauer, including: P. Whitney Lackenbauer, "The Canadian Rangers: A Postmodern Militia That Works," *Canadian Military Journal* 6:4 (Winter 2006): 49-60; P. Whitney Lackenbauer, *Canada's Rangers: Selected Stories, 1942-2012* (Kingston: Canadian Defence Academy Press, 2013); Whitney Lackenbauer, *The Canadian Rangers: A Living History* (Vancouver: UBC Press, 2013); and P.Whitny Lackenbauer, *Vigilans: The 1st Canadian Ranger Patrol Group* (Yellowknife: 1 Canadian Ranger Patrol Group, 2015).

[7] Kevin Wilson, "Staking a Claim," NNSL.com (22 April 2002), www.nnsl.com/frames/newspapers/2002-04/apr22_02pole.html.

[8] Briggs, *Never in Anger*, 361
[9] Briggs, Utkuhikhalingmiut Eskimo Emotional Expression, 53.
[10] Ibid, 45.
[11] On Ranger instructors, see: P. Whitney Lackenbauer, "Teaching Canada's Indigenous Sovereignty Soldiers … and Vice Versa: 'Lessons Learned' from Ranger Instructors." *Canadian Army Journal* 10:2 (Summer 2007): 66-81.
[12] Briggs, Utkuhikhalingmiut Eskimo Emotional Expression, 42.
[13] Briggs, *Never in Anger*, 363.
[14] Dianne Whelan, This Vanishing Land: A Woman's Journey to the Canadian Arctic, (Vancouver: Caitlin Press, 2009), 96.
[15] Briggs, Utkuhikhalingmiut Eskimo Emotional Expression, 45.
[16] Briggs, *Never in Anger*, 360.
[17] Briggs, Utkuhikhalingmiut Eskimo Emotional Expression, 40.
[18] Briggs, Utkuhikhalingmiut Eskimo Emotional Expression, 50.
[19] Briggs, *Never in Anger*, 181.
[20] Ibid, 50.

Chapter Sixteen

Search and Rescue in the Arctic

Lieutenant Colonel Dany Poitras[1]

The level of interest for the Arctic has reached unprecedented heights in the last decade, leading many Canadians and experts to question the country's abilities to react to various crises and incidents in the North, including Search and Rescue (SAR) events. Recent northern SAR occurrences, the Arctic Council SAR agreement, and the increasing level of activities in the North have all contributed to re-ignite this debate. Many critics have argued that Canada lags behind, even suggesting that Arctic SAR in Canada[2] is more myth than reality.[3] As a solution, they campaign for the establishment of permanent SAR units in the North. But is that really the answer in the current circumstances? Canada has the largest and one of the most challenging areas of responsibility in the world, characterized by extremes in climate, topography, and weather conditions. The successful completion of the vast majority of the northern SAR missions is a testimony of Canada's ability to conduct Arctic SAR. That being said, the current system offers little flexibility or residual capacity and needs improvements to expedite casualty extraction time in the North. Given the low demand, the challenging time and space environment, and the cost associated with SAR operations, any practical solution must involve a holistic approach to enhancing the current program. Lessons learned from the history of Arctic SAR suggests that the way ahead must capitalize on one of the major strengths of the current SAR program: its integrated and multi-agency dimension. In so doing, Canada can bolster its Arctic SAR capabilities and deliver a better service to those in distress.

In 2011, the Standing Senate Committee on National Defence conducted a special study on sovereignty and security in Canada's Arctic. It made two basic observations about SAR in the region: first, the requirement for the capability is on the rise and second, current response times are too slow. Many witnesses, including retired military members, academics, and politicians, testifying before the committee criticised the lack of permanent SAR units in the North.[4] The Canadian Coast Guard (CCG) reached a similar conclusion in its 2007 analysis of SAR requirements: "An evaluation of future trends in each SAR area revealed that generally client activity will increase and that the current SAR system in many areas of Canada may not be able to meet the increased demand."[5] The CCG identified the overall lack of SAR units in northern Canada as its primary concern. Some have also argued that not much progress has been made over the last two decades to improve Canada's ability to respond to northern SAR events.[6] Listening to the ongoing criticisms, it is fair to wonder if SAR in the Canadian Arctic is a myth or a reality.

This chapter analyzes the Canadian National Search and Rescue Program (NSP) in an Arctic context, shedding light on the complexity of establishing a robust Canadian Arctic SAR program. The Arctic is vast, remote, and thinly populated, and its harsh weather conditions require the best equipment available to support missions year-round. On the other hand, the current number of SAR occurrences in the Arctic is still exceptionally low. Canadian Armed Forces (CAF) aircraft and ships are tasked in approximately 1,100 of the 8,000 annual cases triggering a response from the federal aeronautical and maritime SAR system.[7] Less than 1% (typically under 60 per year) of all annual SAR incidents are located north of 60°.[8] While the activity level is unquestionably increasing in the Arctic, the number of events prompting a SAR response has remained consistently low, and have not coalesced into a discernible upwards trend. In these circumstances, the real challenge clearly remains to find an adequate balance between the disparity of demand, the particularly demanding time and space environment, and the cost associated with SAR operations in a resource constrained framework. Unfortunately, when it comes to saving lives, many often use an emotional discourse rather than a more logical and rational approach. Whereas money is never a detrimental factor when responding to a SAR incident, there is a harsher reality that needs to be acknowledged when dealing with the positioning of SAR capabilities and units. Resources are limited and must be positioned to best respond to the majority of SAR occurrences.

Many actors underestimate the real challenges associated with Arctic SAR and also the CAF's achievements in that domain. While there has been criticism of Canada's northern SAR capability from domestic commentators, those same capabilities are actually praised and envied by other countries. In the vast majority of northern SAR cases, the military and other NSP stakeholders have managed to fulfill their mandate. Despite this, Arctic SAR in Canada requires certain improvements to provide a faster response to improve the odds of those in danger even further.

The Canadian SAR System

Canada has the second largest landmass and the longest coastline in the world. Not surprisingly, the country has to handle the world's largest SAR area—approximately 15.5 million square kilometres. It is characterized by sparsely settled regions with limited infrastructure in some areas and great extremes in geography and weather conditions. Arctic temperatures range from 35° to -45°C, making the Canadian area of operation (AOR) one of the most challenging in the world for SAR operations. This environment calls for an equally unique SAR system. The NSP is an integrated service provided by numerous agencies and volunteer associations. Its objective is to 'prevent loss of life and injury through SAR alerting, responding and aiding activities using public and private resources."[9] Each stakeholder has specific roles and responsibilities and the requirement for specialized skills, combined with the scarcity of resources over such a large AOR, has always favoured this kind of whole-of-government approach. This is especially true in the Arctic, where the system needs to provide services across an enormous area with a peculiarly low population density. The cost and scarcity of highly specialized SAR resources, combined with the fact that no single organization possesses all the equipment, training and skills to respond to all types of SAR incidents everywhere in Canada, are driving factors necessitating an inter-agency approach.

This SAR system dates back to the closing days of the Second World War.[10] In 1942, an Air Sea Rescue Organization was created to improve the search efforts of downed aircraft. It was based on a Royal Air Force model employed during the Battle of Britain. At the time, numerous British Commonwealth Air Training Plan schools were created in Canada to support the war effort. One school was involved in search efforts for downed aircraft and recognized quickly the need to expand the SAR capabilities. Two years later, in 1944, the concept included the parachuting of military paramedical personnel and the training evolved to include enhanced survival skills, medical training, and mountaineering. The same year, the Interdepartmental Committee on Search and Rescue (ICSAR) was created and chaired by the Royal Canadian Mounted Police (RCMP), giving birth to the multi-departmental dimension of the NSP.[11]

In 1947, the RCAF took over the leadership of the ICSAR, assuming responsibility for the provision and coordination of air rescue in Canada with the signature of Cabinet Directive Number 18. During the same period, the Convention on International Civil Aviation (also known as the Chicago Convention) came into effect and the International Civil Aviation Organization (ICAO) was born. The ratification of this agreement is one of the cornerstones of the current system and resulted in harmonizing the Canadian SAR system to an international SAR framework. The agreement established responsibilities for aeronautical SAR incidents which prompted Canada to create the Rescue Coordination Centres in 1947 to meet its obligations.[12] The SAR responsibilities of the RCAF were further extended to maritime SAR coordination in 1951 and the Minister of National Defence became the Lead Minister in 1976 so as to establish a single spokesperson for the government on SAR matters.[13]

The government of Canada established the NSP in 1986, led by the Minister of National Defence. The focus on SAR as a distinct, integrated activity at the federal level was maintained through the ICSAR and the National Search and Rescue Secretariat (NSS).[14] The ICSAR is composed of applicable senior federal officials and provides interdepartmental coordination and advice to the ministers on SAR policy, planning, resources, and effectiveness. The NSS, as supporting agency, has the mandate to coordinate, promote and review the program.[15] Figure 16-1 illustrates the relationship between the various stakeholders.

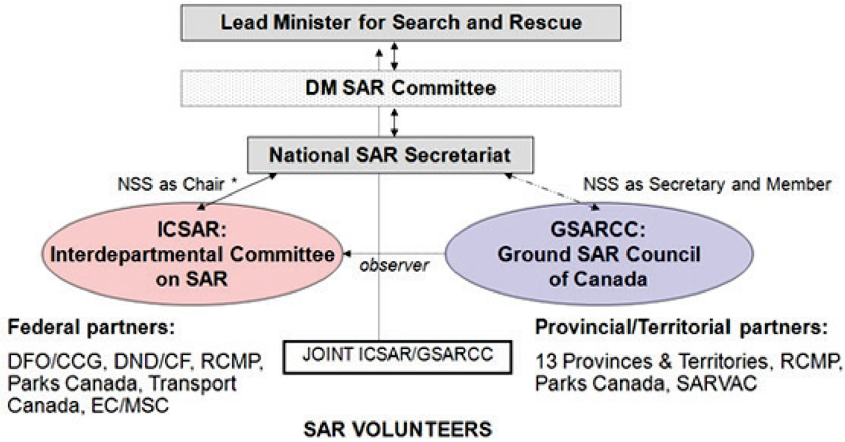


Figure 16-1: National SAR Program - Relationship[16]

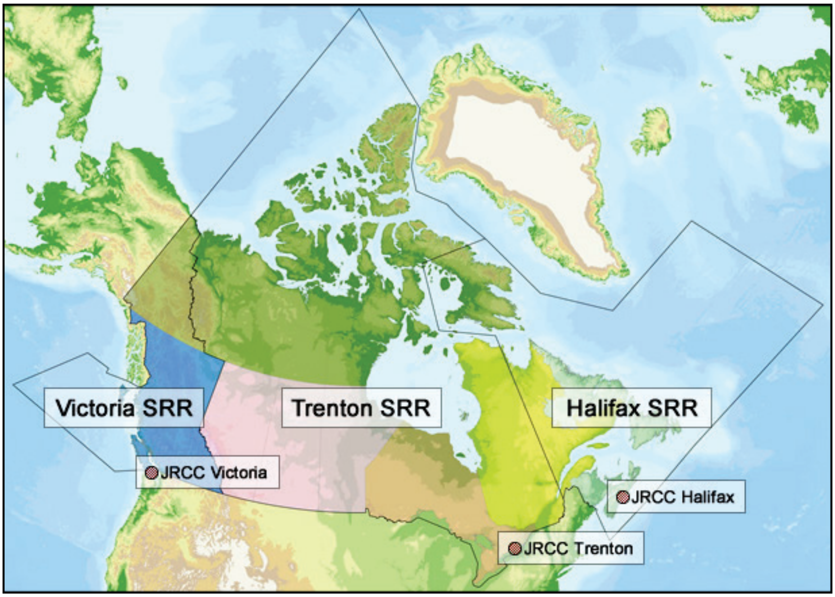
The NSP is an integrated service and a co-operative, Whole of Government (WoG) effort by federal, provincial, and municipal governments along with other SAR organizations.[17] The mandate and responsibilities to provide these services is shared primarily by the CAF, the RCMP, and the Canadian Coast Guard (CCG). Provinces, territories, municipalities, Transport Canada, Parks Canada, and other volunteer organizations also play an indispensable role.[18] The federal government is responsible for responding to all aeronautical and maritime SAR incidents. The aeronautical responsibilities are defined under the ICAO while the maritime responsibilities are based on the International Maritime Organization (IMO) agreement which encompasses 15 million sq km of open sea, the Great Lakes, the St. Lawrence System and waters falling within National Parks.[19] Provincial/territorial authorities are responsible for all ground SAR responses, as well as those that occur within inland waters. The provincial/territorial responsibility is typically delegated to the police force of jurisdiction.

Federal responsibilities are further divided among various departments. DND's core responsibilities are to provide "aeronautical SAR services and effective operation of the coordinated aeromedical and maritime SAR system."[20] Public Safety Canada, through the RCMP, has been delegated the responsibility for land and inland waters SAR in eight of ten provinces and in the territories as the police force of jurisdiction.[21] Fisheries and Oceans Canada, through the CCG, is responsible for the detection, coordination, control and conduct of SAR operations related to maritime incidents within federal responsibility.[22] Both the CCG and DND work closely together and they also provide assistance to provincial, territorial, and municipal emergency services when necessary. Lastly, Transport Canada is involved as a regulatory body for air, land and maritime transportation and Parks Canada is the lead agency for incidents occurring within the boundary of a National Park.[23] In addition, a host of volunteer groups and organizations assist in air search operations with their own aircraft or boats.

SAR Regions and Mission Coordination in Canada

The boundaries of the Canadian SAR AOR are defined under the ICAO and IMO agreements. It is further divided in three distinct search and rescue regions (SRRs) named Victoria, Trenton, and Halifax, based on the location of its respective JRCC. The JRCCs are staffed by CAF and CCG personnel to coordinate aerial and marine SAR operations in their respective SRR.[24] They act as the nervous system in support of operations, providing coordination among stakeholders. The Commander of the Canadian Joint Operations Command (CJOC) retains the overall responsibility of the CAF participation in the NSP. More specifically, he is responsible for the establishment of operational policy for force employment and the provision of advice and liaison with the ICSAR and other departments. He retains operational command for the force employment of all CAF assets and ensures proper functioning of the JRCCs and operational employment of CASARA. This is done through three SRR commanders who are accountable for the coordination, control, and conduct of SAR operations in their regions through their respective JRCCs.

Lastly, the Canadian Mission Control Centre, staffed by DND, is also under the responsibility of the CJOC and plays an important role in the initial phase of a SAR mission. It is located in Trenton and supplies the satellite downlink of emergency beacon signals from the international COSPAS/SARSAT system.[25] Once an emergency locator beacon distress is



confirmed by the Canadian Mission Control Centre, the information is forwarded to the applicable JRCC for mission staffing and resolution.

International Agreements

Canada participates in international organizations such as the ICAO and the IMO. It also agreed to adopt SAR standards and practices in accordance with the Convention on International Safety of Life at Sea, the Convention on International Civil Aviation, the International Convention on Maritime SAR, the Air Standardization Coordinating Committee, and the North Atlantic Treaty Organization (NATO). Bilateral agreements with the United States have also been in place for many years, ensuring and enhancing coordination and mutual support operations adjacent to the common border.[26]

In May 2011, Canada and the seven other Arctic Council member states signed the Agreement on Cooperation in Aeronautical and Maritime SAR in the Arctic.[27] The agreement is a legally-binding instrument defining an area of the Arctic in which the signatory member will have lead responsibility in organizing responses to SAR occurrences.[28] The agreement is a framework for cooperation including combined SAR training in the Arctic, and the first table-top exercise under this accord was held in

Whitehorse in October 2011. The first live SAR exercise among the eight Arctic states took place in September 2012 in Greenland.[29] While the agreement is an important step towards increasing cooperation, it does not impose a minimum standard with respect to response time or assets. It is left to the individual countries to define their own level of service, capabilities and distribution of assets.

CAF SAR Capabilities – Assets and Location

When one of the JRCC responds to a distress call, various assets are available to carry out the mission. The CAF and the Canadian Coast Guard have primary and secondary SAR Units (EO/IRs) on standby to respond to the emergency. Assets are also available through CASARA, the Canadian Coast Guard Auxiliary and other SAR organizations. Private industry may also be hired in support to SAR mission when they are essential in the completion of the mission.[30] As this study focuses on the CAF capabilities, only these assets are covered in detail. Table 16-2 shows the distribution of the CAF air SRUs within each SRR.

It is important to note that all CAF aircraft have SAR as a secondary role and may be tasked to support such operation at any time.[31] In particular, *Sea King* helicopters and *Aurora* aircraft (not shown in Figure 16-2 as they are not designated primary SAR assets) are essential in providing more depth to CAF capabilities. The *Auroras* also brings a unique Electro-Optic/Infra-Red (EO/IR) sensing capability that is lacking on the primary SAR fleet, which can be extremely useful in SAR operations.[32] The Canadian government has also announced the planned acquisition of 16 new C295W aircraft as replacements for the current fleet of CC-115 and CC-130s.[33]

There are significant differences in response times and capabilities between primary and secondary units. Primary SRUs maintain a standby posture with mandatory response times (discussed below). Secondary SRUs are not specifically dedicated to the NSP and therefore they do not maintain the same readiness posture. Combat Support units shown in Figure 16-2 are SAR capable but primarily assigned to base rescue duties. Whereas secondary SRUs do not maintain a SAR standby posture to support the national mandate, they may be tasked on SAR incident if avail-

Figure 16-2: CAF Primary and Secondary Air SRUs within SRRs[34]

Type of Unit	SRR Victoria	SRR Trenton	SRR Greenwood
Primary SRU	442 T&R Sqn (Comox, BC) FW: Buffalos RW: Cormorants	435 T&R Sqn (Winnipeg, MN) FW: Hercules 424 T&R Sqn (Trenton, ON) FW: Hercules RW: Griffons	103 Rescue Sqn (Gander, NL) RW: Cormorants 413 T&R Sqn (Greenwood, NS) FW: Hercules RW: Cormorants
Secondary SRU	Nil	417 CS Sqn (Cold Lake, AL) RW: Griffons 440 T&R (Yellowknife, NWT) FW: Twin Otters	439 CS Sqn (Bagotville, QC) RW: Griffons 444 CS Sqn (Gosse Bay, NL) RW: Griffons
T&R Sqn: Transport and Rescue Squadron / CS Sqn : Combat Support Squadron FW : Fixed Wing / RW: Rotary Wing BC: British Columbia / MN: Manitoba / NL: Newfoundland / ON: Ontario / NS: Nova Scotia / AL: Alberta / QC: Québec			

able.[35] This flexibility is instrumental in strengthening the CAF/DND structure as it provides the ability to redirect other units from their primary employment to support SAR operations when required.[36] The 2008 rescue of an explorer in the high Arctic by a Griffon helicopter deployed on a utility mission illustrates the flexibility and benefits of using secondary assets when possible.[37] The explorer was located 130nm northwest of Alert. In that case, using a secondary asset in proximity of the incident avoided more than 21 hours of transit to a primary SRU helicopter.[38]

While undeniably advantageous, it is also equally important to note that secondary units do not always provide the same level of SAR capability as the primary SRUs. As examples, CS units operating the Griffon helicopter are not authorized to conduct a night boat hoisting extraction and generally fly with only one SAR technician (SARTEC). In addition, the

Griffon helicopter, the largest RW fleet in the CAF, cannot fly in icing conditions which limits its potential usage in the Arctic for a significant portion of the year.[39] Lastly, given that secondary SRUs or other CAF units are not mandated to support the NSP, it is extremely hard to predict their availability and, consequently, they cannot be relied upon on a daily basis to support SAR incidents.

SAR Response Posture

The SAR response posture is not standardized within the NSP. For example, the CCG maintains a 30 minute posture 24 hours a day, seven days a week. Other federal entities, such as the RCMP and other provincial/territorial emergency services, have different response postures. For the CAF, current policy dictates "that each SRR have one of each type of aircraft per SAR squadron airborne within 30 minutes during weekdays from 8:00 am to 4:00 pm local time, and within two hours at other times."[40] This represents the maximum time allocated to the crew to be airborne.

The impact of primary air SAR response time posture on incident outcomes has been the subject of many critics over the last few years. In April 2012, the Official Opposition attempted to put forward a motion in the House of Commons suggesting that Canada SAR standards are lagging behind international norms.[41] Media have also reported on the subject and presented a fairly negative picture of the CAF standby posture, describing it as a two-tier system lagging behind other countries.[42] It is accurate to say that there are differences among countries with respect to standby posture. However, it is erroneous to suggest that Canada lags behind and does not meet established international standards as no such standards actually exist. It is left to each country to determine its own SAR readiness levels based on its territorial specificities, resources and other factors.

In response to critics, a few studies were conducted. One CAF analysis concluded that of 2,700 lives at risk in 1,054 CAF SAR cases over a four year study period (2000-2004), "six people might have had an increased chance of survival if a 30 minute posture had been in effect."[43] Another study often used and cited is the 2005 Bourdon and Rempel historical analysis covering incidents over a three year period. One observation highlighted is that the highest SAR demand does not coincide with the 0800-1600 timeframe. In fact, according to the study, only 17% of events happen during the 30 minute standby posture. Clearly, a shift in the 30 minute response time would be beneficial. The same study also noted that maintaining a 100%, 30 minute standby response is very expensive.[44]

While these facts deserve consideration, they are not further analyzed herein as their impact is much more limited in an Arctic SAR context. Other factors such as transit time, re-fuelling stop-overs, and severity of the Arctic weather environment have a much greater impact on the time required to proceed to the scene than the actual standby posture. More importantly, in an Arctic scenario, it is generally more advantageous to task a crew holding a two hour standby posture than a crew on a 30 minute standby as it maximizes the authorized crew day.[45] CAF aircrew crew day is limited to 15 hours (extendable to eighteen hours) with a maximum flying time of 12 hours (extendable to 14 hours).[46] Unless a mission requiring extended transit starts within the first 90 minutes of the day, the two hour window is the only way to provide a fully rested crew.

The information above constitutes standard operating procedures for conducting day-to-day SAR operations. They can be modified and tailored pending on the demand or specific events such as the opening of the fishery season where the risk is deemed higher than normal. There is also a contingency plan in place, described below, for major disasters or events that would overwhelm the system in place.

Major Air Disaster (MAJAID)

DND is responsible for preparing the response to a Major Aeronautical Disaster (MAJAID) within Canada's AOR.[47] The plan focuses on major air disasters in remote areas such as the Arctic but could also be activated for a variety of other disasters such, as a major marine SAR incident in the North, flooding, or evacuations. The latest revision of the MAJAID Contingency Plan (CONPLAN) was promulgated in August 2010 and "provides resources and measures to respond to a MAJAID incident involving up to 320 survivors."[48] Essentially the plan would involve the response of the normal SAR primary assets enhanced with other primary assets from adjacent SRRs. In theory, the MAJAID CONPLAN

would be activated on request and the initial response would include the air drop of a MAJAID kit pre-positioned in Trenton.[49] A twelve-person Airborne Support Group (ASG) would also deploy with the first MAJAID load to support the primary SAR responders that would be already on the ground. The concept calls for having the first MAJAID load and personnel launching within 24 hours and air dropping on scene within 20 hours.[50] It is also planned to use a forward base and CAF Health Services Support "to conduct patient triage, treatment, and preparation for aeromedical evacuation."[51]

Availability of helicopters to carry out the evacuation is a critical element of the operation, and their early deployment is imperative given their much longer transit time to a remote location. According the CONPLAN, "SAR helicopters can be expected to transit approximately 1,500nm per crew day, approximately a 15 hour response for all of Canada's SAR AOR south of 65ºN latitude."[52] It is also expected that the transport of helicopters (Griffons or potentially Chinooks) via Fixed Wing (FW) aircraft will be considered to expedite the deployment over great distance. The RCAF's CC-177 Globemaster III strategic lift aircraft is a great enabler of this capability, as two Griffon helicopters could be deployed and flown to a forward location within hours of notification.[53] Even though it could happen very quickly and result in a very fast deployment of Rotary Wing (RW) assets, some perspective is necessary. It is very unlikely that airlifted RW aircraft would be part of the initial response as all assets and crews involved in this concept do not maintain a formal SAR readiness posture. Odds are that primary RW SAR assets will have already reached the scene and the RW assets deployed with CC-177 would be used for follow-up actions after the rescue efforts were completed.[54]

The CONPLAN includes many more details and describes the participation of other elements with their associated deployment timelines. It also describes the Chain of Command to facilitate its execution, but needs revision to reflect the CJOC creation. Nevertheless, it still provides a sound framework for the CAF response to a MAJAID in remote areas. The CCG has a similar responsibility with respect to Major Marine Disasters (MAJMAR). As such, they are responsible for the development and implementation of plans to respond to the marine version of a major air disaster.[55]

Cold Weather Survival

One of the defining characters of the Arctic, from a SAR perspective, is its extreme weather conditions. The severity of the region's whiteout conditions can limit and even deny mobility on the ground, the temperature can reach -50°C, and wind can produce deadly flying conditions.[56] The environment has also little to offer in term of vegetation, natural shelters, and flammable material, making survival much more arduous than in the South.

RCAF doctrine appropriately states that "since the probability of survival of incident victims decreases rapidly with the passing time, particularly if injuries or severe climatic conditions exist, the most essential characteristic of SAR forces is the ability to provide a rapid response."[57] A recent study goes as far as to claim that the chance of survival statistically decreases by about 3% for every hour that passes after an incident occurs.[58] The undeniable fact is that the extreme climatic conditions found in the Arctic amplify the requirement for a rapid extraction.

Figure 16-3 represents hypothermia survivability probability as a function of outside temperature and survival days. The graph has some major limitations, as many factors influence the chance of survivability, but

Figure 16-3 (right): Hypothermia Survivability Graph[59]

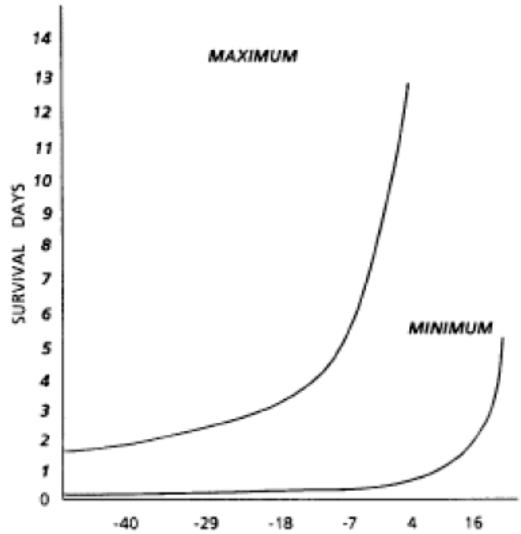
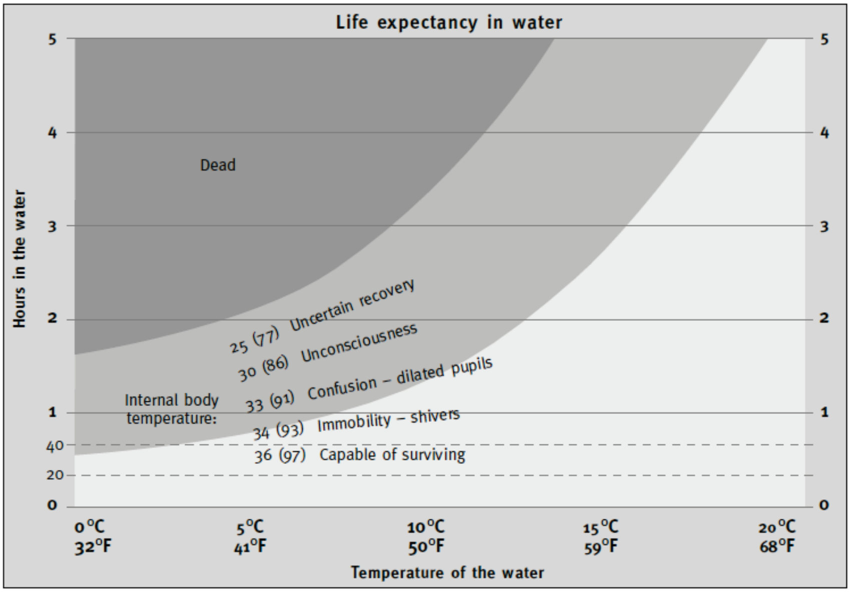


Figure 16-4 (below): Chart of Survival Time as a Function of Water Temperature (assuming no cold protection)



it is still illustrates the urgency of extracting a casualty quickly in a cold weather scenario. Similarly, Figure 16-4 gives an estimated life expectancy based on immersion time in cold water. It clearly illustrates the fact that the survival time in a cold water immersion scenario is matter of few hours, if not minutes.

The Population Density and SAR Incidents Distribution

Canada's population is clearly not distributed evenly. The Canadian Arctic represents approximately 40% of the country's land mass yet has only 0.3% of the population,[60] barely 0.1 person per km^2. In comparison, Alaska has approximately 725,000 residents with an area 2.5 times smaller than the Canadian Arctic giving a population density of 3.1 persons per km^2.[61] It is no surprise that most SAR events happen in the southern portion of the country where the level of activity is the highest. Since SAR resources are positioned to better respond to the majority of the incidents, their location also correspond to the population distribution.

The CAF manages and positions primary SAR assets throughout Canada with the aim of maximizing "their effectiveness in responding to the majority of calls for assistance."[62] In a 2005 study related to SAR response time, it was determined that there was a strong correlation between the locations of the primary SAR assets Main Operating Bases and where the highest numbers of SAR incidents occurs. It concluded that SAR helicopters were currently "very well positioned" and SAR FW aircraft were "suitably positioned" to respond to SAR incidents in Canada.[63] It is hard to argue to the contrary when considering Canada's population concentration along its southern border, but when the SAR system is analyzed within an Arctic context, it produces the paradox hinted at earlier. Since most primary SAR assets are located in the South, the slowest response time is in the Arctic, where a fast response is needed most. This paradox is one of the biggest challenges for the Canadian SAR system. There are no easy solutions and it comes down to striking an adequate balance between the ability to respond quickly, the distribution of limited resources, and the cost associated to SAR operations.

CAF SAR Response in the Arctic

In a classic northern scenario involving a CAF response, the first responder on scene will almost certainly be a FW aircraft given their speed and range. Consequently, the initial response is normally limited to the air-drop and dispatch of survival equipment and/or the parachuting of SARTECs to provide medical care and survival assistance. Parachuting operations are extremely useful, even critical, in many SAR missions but they are also limited by wind velocity and ceiling height and therefore are not always possible.[64] Furthermore, air drops rely on the ability to extract the personnel from the accident site and minimize exposure from the elements. The casualty extraction time from the Arctic environment, however, has always been, and remains, problematic. The lack of infrastructure in the North limits the means that can be employed for extraction, favouring the usage of helicopters and boats to recover the victims back to safety. As the options to effect the extraction are significantly limited, it becomes the weakness of the system if the demand does not substantiate the establishment of a unit in the area.

When looking at Figures 16-3 and 16-4, it is quite apparent that the level of service has serious limitations for SAR incidents in the Arctic. A person immersed in cold water (no immersion suit) in the Arctic has very little chance to be rescued alive by a CAF aircraft given the distance and transit time required. In fairness, to assume that SAR assets could be available and located in such way that a victim immersed in cold water could be recovered within the survival time everywhere in the Canadian SAR AOR is simply unrealistic. However, the discussion still raises a fundamental question regarding the SAR level of service and its overall effectiveness in accomplishing the mission.

Assessing the current performance of the NSP is difficult, as the program fails to define a minimum level of service to be provided. In 2002, the Chief of Air Staff provided criteria to the NSS regarding CAF SAR services, roles, and responsibilities.[65] The same criteria were used in the development of the Statement of Requirement for the Fixed-Wing SAR (FWSAR) aircraft replacement project.[66] More specifically, the criteria provided by the Chief of Air Staff states that:

> … a primary CAF SAR aircraft will be capable of arriving in the search pattern (Commence Search Point) for any aeronautical or maritime SAR incident occurring in a Canadian SRR within 4 hours of being tasked for 90% of SAR incidents and within 11 hours of being tasked for 100% of SAR incidents. The above response times may be susceptible to delays due to extreme weather conditions, mechanical failures, or to adhere to flying regulations…[67]

These criteria were promulgated in 2002 in response to a request by the NSS for operational departments to produce a SAR service-level document. They are the only criteria referring to the CAF SAR level of service but it is important to realize that, even if they are occasionally used in various forums and documentations, they have never been adopted as a national standard.[68] The Chief of Air Staff directive never originated from a formal government policy and has never been formal military doctrine. Therefore, the numbers are still open for debate from a policy standpoint and one could question if they actually meet the Canadian public's expectations as they are not currently supported by Canadian policy.[69]

In comparison, the US Coast Guard SAR mission response time minimum standard is set as no greater than a two hour total response time to arrive anywhere within an assigned sector or unit's AOR.[70] Note that this standard could be misleading in a Canadian context as it does not apply to over land SAR incidents. Whereas such standard would be unrealistic in Canada given the size of the AOR, the low number of SAR incidents and the limited assets available, the discussion underscores the need to better manage expectations. In a Canadian environment, four hours for 90% of the incidents and 11 hours for 100% of the incidents might be, after all, a reasonable level of service to be expected in the Arctic.

Another difficulty in assessing the CAF effectiveness regarding Arctic SAR operations is the lack of "strategic-level performance measures for its SAR capability."[71] The only real measures available are readiness and response time, with no focus on performance.[72] In contrast, the CCG produced an analysis in 2007 that included benchmarks for such an assessment. The CCG operates under the same NSP umbrella as the CAF and, given the integrated aspect of the program, it captures the CAF participation but it is limited to maritime cases where CAF assets were involved. Nevertheless, in their *2007 SAR Needs Analysis*, the CCG asserted that the federal SAR system is extremely effective, achieving a success rate of 96.2% of lives saved from maritime distress cases of all classifications between 2000 and 2004.[73] They were able to declare that their pre-established national benchmark of 90% was met during that period of time for *conventional incidents* in all regions excluding western Lake Erie area and the Arctic.[74] According to their benchmarks, the Arctic cannot be compared to other regions of Canada given the harsh and difficult conditions found in that particular environment. Arctic cases are characterized as *difficult incidents* for which a 50+% level of service is typically acceptable.[75] The CCG draws two conclusions from the analysis. First, despite the unique challenges presented by the Arctic, the SAR system revealed higher-than-expected levels of service and was considered acceptable. Second, it also highlighted the lack of primary SAR response units in northern Canada, despite meeting overall benchmarks. [76]

The approach taken by the CCG is somewhat similar to the US Coast Guard, which measures the whole SAR system performance in term of lives saved after notification:

> The current performance benchmark for our maritime safety mission strives to measure the effectiveness of our collective prevention and response efforts. Simply stated it measures the number of "lives saved" versus the number of "lives in distress."… Our performance benchmark goal is based on calculations of historical performance and estimations of attainable levels of success. As future improvements are made in the SAR System we expect these improvements to be reflected in our performance.[77]

This provides them with a tool to measure performance, not only on an incident response effectiveness basis but also in term of efficiency in the fields of prevention, technology, regulation, etc. It is not the intent to validate the performance measurements used by either the CCG or the US Coast Guard herein. Still, the point must be made that a similar system does not exist for the CAF or the overall NSP in Canada, making it almost impossible to measure the overall effectiveness of the program over time. This approach would also take into account the integrated aspect of the Canadian NSP as the combined effect of the various stakeholders would be better understood. It would be helpful not only to capture the effectiveness in term of lives saved but also to assess the program as a whole by reflecting the impact of new technology and preventive and regulatory initiatives which often could have a greater impact than just re-locating assets. This shortfall was identified in 1999 by the NSS and more recently by DND Chief Review Service in January 2008.[78]

Given the lack of established measures of performance in the NSP, there is a need for using other means to determine if the current SAR capabilities are able to cope with the actual challenge and demand. Therefore, looking at individual Arctic SAR missions to evaluate the current performance of the CAF in that specific area might be one of the best approaches available to assess the current capabilities. In the following sections, a few high profile northern SAR missions are examined to evaluate the CAF's success in supporting those missions. It is understood that the methodology chosen is rather subjective as the cases were selected by the author; nonetheless, this approach is still suitable to achieve the desired intent. The cases chosen will illustrate the level of difficulty associated with northern operations and show that even if the CAF currently fulfills its mandate successfully in the vast majority of occurrences, improvements should be actively sought to strengthen Arctic SAR capabilities.

BoxTop 22 – October 1991

On 30 October 1991, a CAF CC-130 *Hercules* aircraft, call sign BoxTop 22, crashed while on final approach to CFS Alert with 18 people onboard. The aircraft crash site was located approximately 10nm south of the station and the subsequent rescue operation became the most difficult Arctic SAR mission in Canadian history. The mission was undertaken in total darkness in temperatures from -22°C to -66°C. Hundreds of personnel from the CAF, American agencies, and civilian organizations were involved. In total, 26 aircraft participated in the rescue, with 516 hours of flying time.[79]

The BoxTop Flight 22 crash represents the worst case scenario for the Canadian SAR system. The downed CC-130 was one of three Hercules aircraft tasked to re-supply CFS Alert with fuel.[80] The aircraft involved in the crash hit a rocky cliff while on final approach to the station, the most northern permanently inhabited settlement in the world. Miraculously, only four of the 18 people on board died on impact. Given the closeness of CFS Alert, the survivors believed that help would arrive within a few hours, however the weather conditions delayed this response.

Even with the impressive number of assets assigned throughout the mission, the first SARTECs to make it to the crash site were parachuted in extremely hazardous conditions (darkness, blizzard conditions with winds and low ceiling reported as 40 knots and 800 feet) almost 32 hours after the crash.[81] The SARTECs demonstrated an unprecedented level of courage and determination and, amazingly, there were no injuries during the parachuting operation. They were subsequently joined by a ground rescue party from CFS Alert using Go-Tracks all-terrain vehicles. The ground party succeeded in reaching the crash site after three attempts as the harshness of the terrain, the extreme weather conditions, and difficulty in navigating forced them to return twice to the station.[82] Even if an incident occurs relatively close to infrastructure in the Arctic, it is not always possible, or it might be very difficult, to reach the scene with ground equipment.

The crash site was cleared of all survivors and deceased after 47 hours. One crew member of BoxTop 22 died and two other survivors sustained permanent disabilities due to exposure to the elements.[83] Survivors were extracted from the crash site using a Twin Huey helicopter and the SARTECs and the deceased were extracted by two US Pave Hawk helicopters. All three helicopters used for the extraction were transported to Alert on FW aircraft. For RW aircraft to fly to such remote areas took 37 hours—from Trenton to Ellesmere Island. The aircraft was stood down at Eureka, one leg short of CFS Alert.[84]

The story of the BoxTop 22 is a magnificent display of courage and determination and was the most decorated peacetime event in Canadian military history.[85] It also highlights the incredible challenges of performing SAR operations in the Arctic. When looking at the present capabilities versus what was available at the time, some improvements have clearly been made. Still, it would still take a considerable amount of time to respond to a similar emergency. The CC-177 Globemaster III would make deployments easier but it is a strategic asset and does not maintain a SAR standby posture. The Cormorant helicopter has a much greater range and de-icing equipment, making it much more capable than all other RW aircraft used at the time of the crash. Still, in a best case scenario, it would take approximately 22 hours to fly on scene assuming no weather or mechanical delays.[86] A more recent northern air disaster, First Air Flight 6560, could have tested the CAF newly acquired capabilities but circumstantial factors prevented a truly representative assessment.

First Air Flight 6560 – August 2011

On 20 August 2011, First Air Flight 6560 crashed during the approach to Resolute Bay.[87] The aircraft, a Boeing 737, with fifteen people onboard, impacted a hill about 1nm east of the airport, a few seconds after initiating a go-around manoeuvre. Reduced visibility and low ceilings were present at the time and the crash has been categorized as a controlled flight into terrain.[88] Miraculously, three persons survived the tragic accident.

The First Air crash was only the second time, after BoxTop 22, that the modern SAR system was confronted with a major air disaster in the Arctic. The crash site was located almost 1900nm from Trenton and represented a real test for the CAF's ability to respond quickly. The most astonishing aspect of this accident was the coincidental presence of the CAF in Resolute Bay at the time. The CAF was already on site conducting a two-fold exercise called Operation *Nanook*. The first part of the annual exercise focused on sovereignty operations. The second portion, in a stupefying coincidence, exercised the MAJAID CONPLAN involving a simulated 737 crash in Resolute Bay.[89]

The MAJAID exercise reflected the WoG approach of the NSP. It involved numerous federal and provincial departments and the aim was to practice and evaluate their abilities to provide a timely and coordinated response to a major aircraft crash in remote areas. The simulated scenario was planned to start within 48 hours of the actual crash and was obviously cancelled as the focus shifted to the real accident.[90] This astounding coincidence resulted in having an important CAF presence already deployed on site as "the two-part operation involved more than 1,100 CAF participants and approximately 100 personnel from the US and Denmark."[91] It also included two Griffon helicopters and one shipborne Sea King helicopter to support the operation, resulting in the fastest response one could imagine. CAF members, including 15 medical personnel, were flown to the scene using the three CAF helicopters. When the local ambulance crews arrived on-site, the three survivors had already been evacuated within minutes of impact.[92] Survivors were then flown to Iqaluit.

Whereas the coincidental presence of the CAF resulted in the best case scenario for the survivors, it also overshadowed and blurred the actual capability of the CAF to respond to a major crash in the Arctic. Assuming that ground personnel would not have been able to reach the crash site, which was not the case but highly probable in the Arctic environment given the lack of infrastructure and the roughness of the terrain, the actual response time would have been measured in hours not minutes and could have led to a very different outcome. If the only aircraft to respond had come from CAF primary SRUs, the best case scenario would have been SARTECs parachuting within five to six hours, ceiling permitting. [93] The first CAF helicopter would probably have arrived on scene sixteen hours after notification.[94] While these estimates are speculative, they do highlight that luck was a big factor in the success of this operation.

Lastly, this mission had another similarity to the BoxTop 22 crash. In both cases, the incident happened near logistics support or an airport. Though some may argue correctly that a significant majority of aircraft crashes happen either on take-off or landing and, consequently, are located near airports, this element has a different significance and implication in the Arctic.[95] In the South, the fact that the majority of air accidents occur relatively close to airport favours a quicker response as local or airport emergency services will, in most cases, be able to reach the site without too much difficulty. This is not so likely in the Arctic given the lack of infrastructure, the roughness of the terrain, and the extreme weather conditions—especially during the winter season. BoxTop 22 was a prime example of this Arctic reality, where the combination of these factors made the ground rescue almost impossible. It is also fair to question how much more time it would have taken to reach the First Air Flt 6560 crash site under winter conditions and the consequences for the survivors as a ground rescue would have been limited to the use of snowmobiles and track vehicles. A robust local airport incident response therefore does not necessarily provide a solution as there is a greater potential that the environment will jeopardize this capability.

SAR Igloolik, NU – 27 October 2011

On 27 October 2011, JRCC Trenton tasked a Hercules aircraft from Winnipeg to rescue a father and son stranded in their small aluminum boat in the icy water of Igloolik. The incident site was located approximately 1,250nm from Winnipeg and 1,525nm from Trenton. The two men had activated their personal emergency beacon late the previous day.[96] The first *Hercules*, from Winnipeg, arrived on scene early in the morning and was unsuccessful in establishing communication with the two men (a radio was air dropped but not recovered). The aircraft proceeded to Iqaluit for fuel and returned on scene around noon. Two six-man life rafts and one radio were air dropped and the radio and one life raft were successfully recovered by the men. The aircraft left the area as the aircrew were approaching the maximum permissible crew day for SAR operations. Early that morning, a second Hercules aircraft from Trenton, a Cormorant helicopter from Gander, and two small rescue boats from the local community were also tasked to support the mission. The second Hercules arrived on scene at 1505 hours local time and established visual contact with the two men, who were now nauseated, distressed, and too cold to access the supplies that had been dropped previously. They had moved to the life raft as the weather conditions were deteriorating.[97] By 1600 radio contact with the men was lost and they appeared to be unresponsive and potentially suffering from dehydration and hypothermia. JRCC staff and the Hercules crew agreed to parachute the SARTECs in the icy water to rescue the victims. At 1733, after several delays,[98] the three SARTECs jumped in the water approximately 8nm south of Igloolik only 30 minutes before full darkness.[99]

The first SARTEC was able to swim to the life raft and he provided assistance to the men in distress. The second SARTEC swam until he realized he would not reach the victims and was forced to deploy his personal life raft and wait until recovery. The third SARTEC, the Team Leader (STL), landed further away and managed to make a partial radio transmission before losing contact. After completing the SARTEC drop, the Hercules aircraft provided night illumination (flares) for a few minutes and air dropped two additional survival kits near the victims before proceeding to Iqaluit for re-fuelling. The Cormorant helicopter arrived on scene four hours later, nearly thirteen hours after departure, which included three re-fuelling stopovers. The Cormorant is arguably one the most capable SAR RW aircraft in the world and surely the most appropriate platform to undertake such a task in the CAF inventory. Still, it took a very experienced and highly capable crew half a day to reach the victims. By the time the crew reached the site, the sea conditions had worsened and the helicopter was facing winds gusting to 47 knots and sea conditions estimated at 20 to 30 feet.[100] The victims and the SARTECs were recovered successfully but the STL was found unresponsive after spending nearly five hours in the water. The victims and SARTECs were flown to the nearest health centre and attempts to revive the STL were unsuccessful.[101]

Once again, this heroic and tragic Arctic mission highlights the courage and determination of the CAF members involved. The three SARTECs who jumped in the water received (sadly, one posthumously) the IMO Award for Exceptional Bravery at Sea which is the highest honour awarded by this international organization.[102] Numerous other awards were given to crewmembers involved in this rescue. This mission is another testimony of the astonishing challenges and risks associated with Arctic SAR.

Humanitarian Cases

The cases presented so far all fell into the federal SAR mandate. There are times, however, when the provincial, territorial, and community SAR capabilities are hindered or overwhelmed by the operating environment, or simply require additional resources for humanitarian cases falling under their respective jurisdiction. When this happens, a request for assistance from the CAF is made. Humanitarian cases are not the core responsibility of the CAF, nevertheless they represent about 75% of the missions north of 60° involving CAF aircraft.[103] There have been a few Arctic cases lately involving the CAF that are worth noting for the discussion.

On 22 January 2010, a Cormorant helicopter was dispatched from Greenwood, NS, to rescue a man stranded on an ice floe near Resolute Bay. The temperature at the time was -31°C with a wind chill of -51°C.[104] A Hercules aircraft dropped survival equipment and supplies while the man awaited a helicopter to be rescued. The mission involved an extensive transit (1,950nm) during the winter, exposing the crews and aircraft to the most challenging environmental conditions one can imagine. Due to weather delays, re-fuelling stopovers, and mechanical breakdowns, the man was successfully hoisted off the ice and taken to safety more than 60 hours after the *Cormorant*'s departure.[105]

On April 2011, a hiker waited more than 20 hours after falling into a 25 metre crevasse in Auyuittuq National Park, NU, before being rescued.[106] Unable to support the mission, Parks Canada requested support from JRCC and a CAF Hercules and a Cormorant aircraft were dispatched. The weather was clear and the outside temperature was -30 to -40°C, but the harsh terrain prevented safe parachuting operations; mission success therefore relied heavily on having a helicopter on scene. After 17 hours, the injured man was rescued by the SARTECs using a rope rescue system from the top of the crevasse. In the end, it took nearly 21 hours to complete the rescue.[107]

All the case studies presented in this chapter had several points in common. First, in most cases, mission success was largely due to an incredible amount of courage and determination by the crews involved. Second, these missions underscored the harsh conditions and the severity of the environment. SAR in the Arctic is never benign; it is a high risk operation that requires the best training and equipment available. Lastly, these missions underline the fragility and weaknesses of the current NSP in the Arctic. In most cases, the time required to perform the extraction was the weak link of the system as CAF RW assets had to fly extended hours in treacherous weather to reach the incident scene. Of course, this is a very small sample of missions that was hand-picked to make the argument. Still, even if other missions were completed faster, there are also many others that experienced similar extraction time.

Given an Arctic SAR scenario, one can clearly see that the CAF RW SAR assets already work at their maximum capability and offer very little flexibility or depth to account for unforeseen circumstances. It could be argued that the current capabilities still meet the demand as most of the missions undertaken in the Arctic were completed successfully. But the long transit time and the fragility of the system highlights the requirement for the CAF to pursue aggressively any operationally and financially sound opportunities to improve the current capabilities.

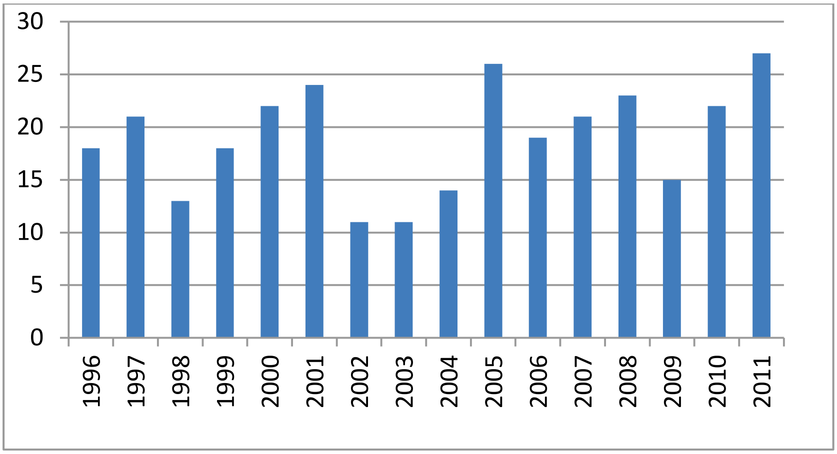
SAR in the Arctic – Trend Analysis – 2007-2011

Although maritime and aviation traffic in the Arctic have increased, this has not translated into more SAR incidents. Furthermore, incidents requiring a response are not limited to the aviation and maritime domains. Therefore, it is important to perform a broader trend analysis and look at all actual northern distress cases dealt by the JRCCs. As mentioned earlier, CAF aircraft or ships are tasked in about 1,100 cases of the 8,000 annual SAR incidents involving a response of the federal SAR system.[108] Using 2010 as a typical year, only 1,658 of all the cases for that year were categorized as distress incidents (category one and two incidents)[109] and 39 of them were located north of 60°, representing less than 3% of all the annual distress calls.[110] Of those 39 cases the CAF is typically involved in 20 to 25 cases.

A sober appraisal of the available data reveals no discernible trends indicating an augmentation of Northern SAR incidents even if the level of activities in the north has been steadily increasing. One could argue that the increase in northern activity will inevitably lead to an increase of SAR incidents. While logical, this it is overly simplistic and erroneous to think that they are interrelated. Many factors offset and mitigate the risk of incident over time. The collective impact and actions, in terms of new regulations, enhanced technology, new operating procedures, and prevention programs of the various NSP stakeholders were responsible for preventing the direct correlation between the increasing level of activities and the actual number of SAR incidents. While it would be unwise to blindly assume that these factors will always be sufficient to offset the upward trend in activities, especially when considering the harshness of the Arctic environment, it is equally important to acknowledge that, regardless of the SAR system in place, it will never achieve a 100% success rate everywhere in Canada. Consequently, it comes down to the difficult task of finding the proper balance between the SAR response capabilities, the actual demand, and the implementation of mitigating programs and regulations aimed at avoiding the SAR incidents in the first place—recognizing that the latter has limitations.

Figure 16-5 presents a 15 year trend (1996-2011) of the number of SAR incidents north of 60° prompting a response by CAF FW SAR aircraft.[111] From a CAF point of view, there is an argument to be made that there is no need to increase the level of SAR support in the North. Based on a purely statistical approach, the argument is quite solid as no significant increase in the number of SAR cases has been noted in 15 years. It is also important to note that the number of SAR incidents north of 60° represents less than 5% of all incidents prompting a CAF aircraft response. It is a very small fraction of all the cases for which CAF aircraft are involved.

Figure 16-5: Incidents North of 60° Prompting a Response by CAF FWSAR Aircraft.[112]



Another factor to consider regarding the trend analysis is the historical seasonal patterns of SAR incidents. Figure 16-6 illustrates the seasonal trend of all the SAR incidents involving a response by the JRCCs. Figure 16-7 shows the seasonal trend for SAR incidents north of 60° prompting a response by FW SAR aircraft. While the number presented in Figure 16-7 include only the CAF FWSAR participation, it still supports the argument that most northern incidents occur during the summer months which is consistent with the national trend. It also draws the attention on the fact that there are only five to ten cases annually that occur outside the summer navigational season. This information is critical as it sets the stage to propose more tailored solutions to improve the overall effectiveness of the NSP in the Arctic.

Figure 16-6: National Seasonal Trend of all SAR Incidents[113]

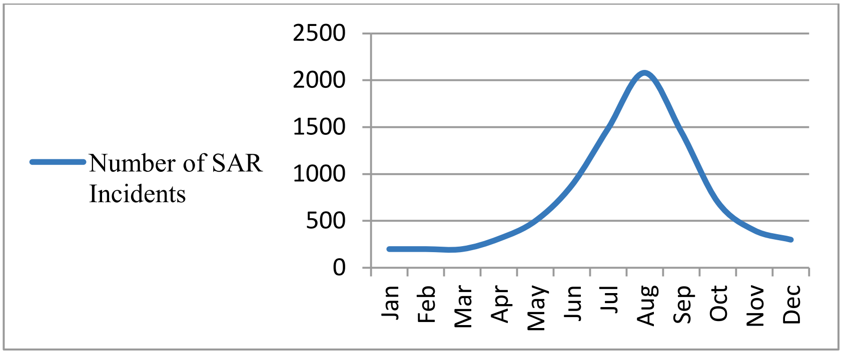
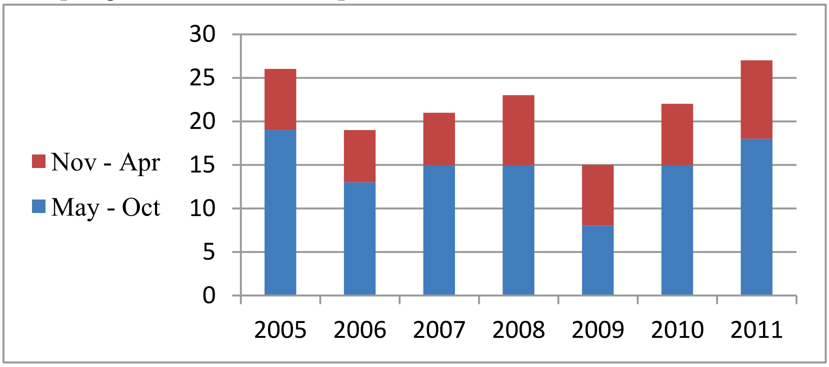


Figure 16-7: Seasonal SAR Incidents Distribution North of 60°N Prompting a CAF FWSAR Response[114]



In an environment where resources are limited, the numbers presented lead to the conclusion that the current CAF capabilities are appropriate to the current demand, assuming that the existing level of service is deemed acceptable. Some authors argue that the emerging activities in the North are re-shaping the future in term of SAR demand in the Arctic. Accordingly, as Colonel (retired) Pierre Leblanc notes, "it may not be wise or prudent to drive based solely on the rear view mirror. The [SAR capabilities] review should take into account the changes in activity which has occurred in the last few years and developing trends."[115] Similarly, Dr. Ron Wallace, who has worked extensively in the circumpolar region, presented a policy update paper in 2009 suggesting that Canada will be "compelled to respond to uninvited, perhaps significant, challenges that may literally come to us out of the Arctic." Three years later, he referred to the series of northern fatal air accidents that happened in 2011 and other factors to demonstrate an emerging Arctic SAR demand.[116] The reality is much more blurry as all the trend analysis presented here, in terms of incidents, accidents, and SAR demand, are not indicating an upward tendency justifying a radical increase in northern SAR capabilities. The trend analysis rather suggests a measured and incremental approach to expand and improve northern SAR capabilities.

Conclusion

The importance of the Arctic for Canada has never been greater and experts are increasingly questioning Canada's ability to react to various crises in the Arctic, including SAR events. On the whole, this system is effective, though designed for operations in the South rather than the North. As such, critics have long questioned the system's ability to deliver an acceptable performance in the Far North. This has been often done with an emotional twist, ignoring the real issues and the complexity of Arctic SAR. Unfortunately, it leaves the impression that Canada lags behind or, worse, makes one believe that Arctic SAR is a myth rather than a reality. When looking at the NSP, one must avoid taking a single event in isolation to judge the overall program and consider the whole task at hand to better appreciate Canada's achievements in that domain. Canada's Arctic SAR capabilities are substantial, tangible, and successful in the vast majority of

occurrences. Arctic SAR missions include the highest degree of risk and have been a testimony of the incredible courage and determination of the crews involved. Given the level of difficulty under which most Arctic missions are undertaken, the positive outcome of almost all missions should be praised.

This being said, the status quo is not an acceptable course of action as the need for improving the current Arctic SAR capabilities has been made abundantly clear. Resource scarcity and constraints hinder depth and flexibility making the whole system rather fragile and, arguably, already working at its maximum capacity in a northern context. The lack of residual capacity in the current setting makes it even harder to respond to this added pressure. However, Canadian geography and population distribution makes it unrealistic to establish a SAR system that would provide the same level of responsiveness everywhere in the country, predominantly in the High Arctic. Comparing Arctic SAR to the southern capability reflects a poor understanding of the problem. It does not account for the disparity of demand or the cost associated to SAR operations in a resource constrained framework. Even with the undeniably increasing level of activities in the Arctic, the Arctic SAR demand has remained constant and very low over the last two decades and consequently, solutions must be tailored to this reality.

In the end, there is no perfect solution in the short-term. No single initiative will make a dramatic change, rather, a holistic approach to augment and improve northern SAR capabilities is needed. The acquisition of new RW platforms is a critical step. This will provide more options and augment the response flexibility on the long northern SAR routes, while still preserving a residual capacity in the South. The intensification and deliberate staggering of CAF northern exercise involving RW assets, the Canadian Coast Guard RW replacement project, and civilian partnerships also offer opportunities to increase the RW SAR footprint in the North.

Reducing the search time through EO/IR and space sensors is important, as is expanding CASARA presence in the North, bolstering the RCN's northern resources, equipping the Canadian Rangers with FRCs, and strengthening and developing new regulations. These measures will all contribute to a stronger northern SAR capability and a safer Arctic. In moving forward it is essential to capitalize on the integrated and multi-agency aspect of the NSP and the CAF's new focus on whole-of-government operations in the Arctic as the best means of sharing resources and providing assets and manpower where they are needed most.

Notes

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[1] This chapter is drawn from: Dany Poitras, "Search and Rescue in the Arctic: A Myth or a Reality?" unpublished Master's in Defence Studies paper (Canadian Forces College, April 2013). Used with permission of Canadian Forces College.

[2] Although there are numerous definitions of the Arctic available, this study will use DND's definition, which is the region north of 60°. The High Arctic is the region above 66.5° North Latitude (the Arctic Circle). As it is the case in many publications and reports, the word "North" and "Arctic" are often interchanged throughout the text but they essentially refer to the same area.

[3] On criticism of Canadian Arctic SAR, see for example: Pierre Leblanc, "Arctic Search and Rescue Lacking," *Hill Times* (18 June 2012) and Michael Byers, "Canada's not Ready to have the World in the Arctic," Rideau Institute (15 April 2012).

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[4] Senate, Standing Senate Committee on National Security and Defence, *Sovereignty & Security in Canada's Arctic, Interim Report,* (Ottawa: Senate Committees Directorate, 2011), 11-12.
[5] Department of Fisheries and Oceans, Canadian Coast Guard, *Search and Rescue Needs Analysis 2007* (Ottawa: Canadian Coast Guard, 2007).
[6] Tony Balasevicius, "Toward a Canadian Forces Arctic Operating Concept," *Canadian Military Journal* 11:2 (Spring 2011), 26.
[7] Department of National Defence, "Backgrounder: Canada's Air Force: A Proud Partner in the National Search and Rescue Program, CAS BG-11.0001, 17 February 2011," www.rcaf-arc.forces.gc.ca/v2/nr-sp/index-eng.asp?id=11505.
[8] Department of National Defence, "Royal Canadian Air Force in the North," www.rcaf-arc.forces.gc.ca/v2/page-eng.asp?id=1512.
[9] Department of National Defence/Canadian Coast Guard (DND/CCG), B–GA–209–001/FP–001 – DFO 5449, *National Search and Rescue Manual* (Ottawa: DND/CCG Canada, Revised May 2000), chapter 1, 3.
[10] Department of National Defence, *Canadian Forces Search and Rescue: 50 Years of Service to Canadians* (Ottawa: Art Direction CAFSU(O) Creative Services, 1997), 9.
[11] Sandy Babcock, "Operation Canon: A case Study of Early RCAF Arctic Search and Rescue Capabilities," in Sic Itur Ad Astra: Canadian Aerospace Power Studies Volume 4: De-Icing Required! The Historical Dimension of the Canadian Air Force's Experience in the Arctic, P. Whitney Lackenbauer and W.A. March eds. (Ottawa: Her Majesty the Queen as represented by the Minister of National Defence, 2012), 31.
[12] International Civil Aviation Organization (), "ICAP in Brief," www.icao.int/Pages/icao-in-brief.aspx and DND, *Canadian Forces Search and Rescue,* 9-10.
[13] Before 1976, there was no lead minister for SAR matters.
[14] DND/CCG, National Search and Rescue Manual, chapter 1, 3-4.
[15] The ICSAR is chaired by the NSS. Members include representation from the six participating federal departments (Park Canada, Environment Canada, Transport Canada, DND, Public Safety Canada (RCMP) and the Department of Fisheries and Oceans) and delegates from other departments. For more see: National Search and Rescue Secretariat, "Who we Are, Interdepartmental Committee on Search and Rescue (ICSAR)," www.nss.gc.ca/site/whoWeAre/icsar_e.asp.
[16] National Search and Rescue Secretariat, "Reports: Annual Report 2008-2010," www.nss.gc.ca/site/reports/nsp/AnnualReports-Rapportsannuel/2008-2010/NSP-2008-10AnnualReport_2-0_e.asp.
[17] DND/CCG, National Search and Rescue Manual, chapter 1, 3.
[18] National Search and Rescue Secretariat, "Who We Are," www.nss.gc.ca/site/whoWeAre/index_e.asp.

[19] National Search and Rescue Secretariat, "Reports," www.nss.gc.ca/site/reports/nsp/AnnualReports-Rapportsannuel/2008-2010/NSP-2008-10AnnualReport_3-0_e.asp.
[20] DND/CCG, National Search and Rescue Manual, chapter 1, 5.
[21] The provinces of Quebec and Ontario are excluded as they have their own police forces providing SAR services. For more details see: Royal Canadian Mounted Police, "RCMP Search and Rescue," www.rcmp-grc.gc.ca/ccaps-spcca/rs-eng.htm.
[22] CCG, "Search and Rescue," www.ccg-gcc.gc.ca/eng/CCG/SAR_About_Sar.
[23] Senate, Sovereignty & Security in Canada's Arctic, Interim Report, 9-10.
[24] Department of National Defence, "Canadian Joint Operations Command: SAR in Canada," www.cjoc-coic.forces.gc.ca/cont/search-recherche/index-eng.asp.
[25] Cospas-Sarsat became operational in 1982. Participants implement, maintain, co-ordinate and operate a satellite system capable of detecting distress alert transmissions from radio beacons that comply with Cospas-Sarsat specifications and performance standards, and of determining their position anywhere on the globe. The distress alert and location data is provided by Cospas-Sarsat participants to the responsible SAR services. For more details, see: www.cospas-sarsat.org/en/about-cospas-sarsat/about-the-programme-g/international-cospas-sarsat-programme.
[26] DND/CGC, *National Search and Rescue Manual*, chapters 2, 3-5, and 7.
[27] Arctic Council Member States include: Canada, Denmark, Finland, Iceland, Norway, The Russian Federation, Sweden and the United States. For more details, see: www.arctic-council.org/index.php/en/about-us/members/89-resources/about.
[28]Arctic Council, "Task Force on Search and Rescue," www.arctic-council.org/index.php/en/about-us/task-forces/282-task-force-on-search-and-rescue.
[29] The Arctic Council, "First Arctic Council SAR exercise in Whitehorse, Canada," www.arctic-council.org/index.php/en/oceans/search-and-rescue.
[30] DND/CGC, National Search and Rescue Manual, chapter 4, 8.
[31] DND, Canadian Forces Search and Rescue: 50 Years, 16.
[32] For more on the sensing capabilities of the Aurora, see: Arsenault, Daniel, and Josh Christianson, "Punching Above its Weight: The CP140 Aurora Experience within Task Force Libeccio and Operation Mobile," *The Royal Canadian Air Force Journal* 1:3 (Summer 2012): 26-37.
[33] Public Services and Procurement Canada, "Fixed Wind Search and Rescue Aircraft Replacement Program," www.tpsgc-pwgsc.gc.ca/app-acq/amd-dp/air/arsvf-fwsar/index-eng.html
[34] Department of National Defence, "Backgrounder: Canada's Air Force: A Proud Partner in the National Search and Rescue Program, CAS BG-11.0001, 17 February 2011," www.rcaf-arc.forces.gc.ca/v2/nr-sp/index-eng.asp?id=11505.
[35] DND/CGC, National Search and Rescue Manual, chapter 4, 5.
[36] DND, Evaluation of the CAF/DND Component of the National SAR Program, 3.

[37] Department of National Defence, "Air Force News – 444 Squadron Rescues British Adventurer in Arctic, 28 March 2008," www.rcaf-arc.forces.gc.ca/v2/nr-sp/index-eng.asp?id=5779.
[38] Estimation provided by the author based on a Cormorant helicopter departing from Gander, NL, with an approximate transit of 2,600 nm and an average ground speed of 125 knots. Routing: CYQX-CYKL-CYFB-CYUX-CYRB-CYEU-CYLT with five 30 minute fuel stops included. Routing may differ pending on crew but it is still a generous best case scenario.
[39] "Griffon Helicopters in Search and Rescue Deemed at 'Risk': Air Force Report," *iPolitics*, www.ipolitics.ca/2011/02/22/griffon-helicopters-in-search-and-rescue-deemed-a-risk-air-force-report/.
[40] DND, "Backgrounder: Canada's Air Force: A Proud Partner," www.rcaf-arc.forces.gc.ca/v2/nr-sp/index-eng.asp?id=11505.
[41] House of Commons, *Debates - Official Report*, 146, no. 138, 11 June 2012, 11:05.
[42] CBC – The Fifth Estate, "Mayday" (30 September 2011).
[43] National Research Council Canada, CR-FRL-2010-0025, Review of the Statement of Operational Requirement for the Fixed Wing Search and Rescue Aircraft – Final Report (Ottawa: NRCC, 2010), 15.
[44] Ibid, 15-18.
[45] The crew day for a crew holding a two hour standby posture starts when the first crewmember reports for duty. Therefore, it provides the maximum allowable crew day for the execution of the mission which becomes quite advantageous when long transit is involved such as in Arctic SAR. It is also important to note that crews on two hour standby are, in average, airborne just over 50 minutes after the call comes in. For more about the response time debate in Canada, see: House of Commons, *Debates, Official Report*, 146, no. 113 (30April 2012), 11:30, www.parl.gc.ca/HousePublications/Publication.aspx?DocId=5532242&Mode=1#TOC-TS-1130.
[46] Department of National Defence. *1 Canadian Air Division (1 CAD) Orders: Volume 2, Flying Orders* (Winnipeg: 30 November 1999), 2-003, Annex F.
[47] DND/CGC, National Search and Rescue Manual, chapter 4, 13.
[48] Canada, Department of National Defence, *Canada Command CONPLAN 10250/10 MAIJAID – CAF Response to a Major Air Disaster* (Ottawa: Commander Canada Command, 2010), 1.
[49] The kit contains survival store to support personnel including a 24 hours of consumable for 320 individuals.
[50] It is assumed that the incident would be located within eight hours of Trenton using a CC-130. A second MAJAID load would also be sent as soon as possible to build some redundancy in the operation.
[51] DND, Canada Command CONPLAN 10250/10 MAIJAID, 3.
[52] Ibid, 6.

[53] Boeing, Defence, Space and Security. "Backgrounder: C-17 Globemaster III," www.boeing.com/defense-space/military/c17/docs/c17_overview.pdf.
[54] Canadian American Strategic Review, "Canadian Sovereignty - A Reality Check: Can Canada Really use a C-17 Transport to Airlift SAR Helicopters to the Arctic to Perform Aerial Search & Rescue Missions? May 2011, www.casr.ca/id-arctic-sar-transport.htm.
[55] National Search and Rescue Secretariat, "Reports: National Search and Rescue Program Annual report 2003," www.nss.gc.ca/site/reports/nsp/2003%20Annual%20Report/programplan_e.asp.
[56] Canada's coldest wind chill was recorded in 1975 at Kugaaruk, Nunavut, when the air temperature plunged to -51° C with sustained winds of 56 km/h, producing a bone-chilling wind chill of -78 °C. The Weather Network, "Glossary: Wind Chill Across Canada," www.theweathernetwork.com/glossary/windchill_across_canada.
[57] Department of National Defence, B-GA-404-000/FP-001, *Canadian Forces Aerospace Move Doctrine* (Winnipeg: Canadian Forces Aerospace Warfare Centre, 2011), 49.
[58] NRC, Review of the Statement of Operational Requirement for the Fixed Wing SAR, 15.
[59] The graph describes the range of days for fatal exposure or hypothermia survivability, in days, for a given temperature. The information calculated is a guide only and is based upon a healthy 25 year old male wearing the equivalent of normal clothing, including a jacket. Australian National Search and Rescue Council, *National Land Search Operations Manual version 6* (Australian Federal Police, 2010), 151.
[60] Statistics Canada, "Population and Dwelling Counts, for Canada, Provinces and Territories, 2011 and 2006 Censuses."
[61] United States, Department of Commerce, Census Bureau, "State and Country QuickFacts," quickfacts.census.gov/qfd/states/02000.html.
[62] DND, "Backgrounder: Canada's Air Force: A Proud Partner," www.rcaf-arc.forces.gc.ca/v2/nr-sp/index-eng.asp?id=11505.
[63] Department of National Defence, DRDC-ORD Technical Report TR 2005/15, Support to Air Transformation (Search and Rescue) (Ottawa: DND, 2005), 27.
[64] Operational jumps shall not be carried out at altitudes of less than 1,200 feet Above Ground Level/Above Water Level (AGL/AWL). The maximum surface wind speed for operational jumps shall be at the discretion of the team leader. Department of National Defence. SMM 60-130-2605, *Standard Manoeuvre Manual CC130(E/H) Search and Rescue Operations* (Winnipeg: 1 Canadian Air Division, 2010), chapter 1, 1.
[65] Department of National Defence, L.C. Campbell, Canadian Forces Search and Rescue Level of Service and Roles and Responsibilities, letter from Chief of Air Staff to the National Search and Rescue secretariat (Ottawa: DND Chief of Air Staff, 2002).

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[66] NRC, Review of the Statement of Operational Requirement for the Fixed Wing SAR, 7.
[67] Department of National Defence, L.C. Campbell, Canadian Forces Search and Rescue Level of Service.
[68] DND, Evaluation of the CAF/DND Component of the National SAR Program, 10.
[69] NRC, Review of the Statement of Operational Requirement for the Fixed Wing SAR, 7.
[70] This includes the standby posture period and equates to a total of 90 minutes from notification to on-scene (US Coast Guard maintains a 30 minutes standby posture 24 hour a day). United States, Department of Homeland Security, Coast Guard, "SAR Program Information," www.uscg.mil/hq/cg5/cg534/SAR_Program_Info.asp.
[71] DND, Evaluation of the CAF/DND Component of the National SAR Program, 9.
[72] It is important to clarify the terminology as the CAF readiness level refers to the minimum proficiency standards that aircrew must maintain and the CAF response level refers to the actual time required to respond to an incident (i.e. ability to be airborne within the prescribed 30 minute or two-hour window). DND, *Evaluation of the CAF/DND Component of the National SAR Program*, 11.
[73] DFO, Canadian Coast Guard, *Search and Rescue Needs Analysis 2007,* introduction.
[74] In the western Lake Erie region, SAR effectiveness was brought below the benchmark (82.98%) due to an airplane crash, in which 10 lives were lost.
[75] DFO, Canadian Coast Guard, *Search and Rescue Needs Analysis 2007*, future trends.
[76] The SAR system effectiveness evaluation in the Arctic revealed higher-than-expected levels of service (based on 50%): 69.23% for the waters of the NWT Area; 86.67% for the James Bay Area; 81.48% for the eastern Arctic Area; and, 93.10% for the Nunavut Area. For more details, see: DFO, Canadian Coast Guard, *Search and Rescue Needs Analysis 2007*, future trends.
[77] United States, Department of Homeland Security, Coast Guard, "SAR Program Information," emphasis added in italic, www.uscg.mil/hq/cg5/cg534/SAR_Program_Info.asp.
[78] DND, Evaluation of the CAF/DND Component of the National SAR Program, 9.
[79] Robert Mason Lee, Death and Deliverance: The Haunting True Story of the Hercules Crash at the North Pole (Toronto: MaCAFarlane Walter and Ross, 1992), 201, 271.
[80] As Heidt and Goette explain in Chapter Eleven, BoxTop is a bi-annual RCAF resupply mission to sustain CFS Alert. See also: Department of National Defence, "Royal Canadian Air Force, Articles: RCAF Delivers Fuel to Canada's most

Northerly Post (2 May 2012)," www.rcaf-arc.forces.gc.ca/8w-8e/nr-sp/index-eng.asp?id=12810.
[81] Rachel Lea Heide, "Frigid Ambitions: The Venture of the Alert Wireless Station and Lesson Learned for the Canada First Defence Strategy," in *Sic Itur Ad Astra: Canadian Aerospace Power Studies Volume 4: De-Icing Required! The Historical Dimension of the Canadian Air Force's Experience in the Arctic*, P. Whitney Lackenbauer and W.A. March eds. (Ottawa: Her Majesty the Queen as represented by the Minister of National Defence, 2012), 121.
[82] Hughes, The Rescue of BoxTop 22, 50-51.
[83] Matthew Lacroix, "BOXTOP 22 Survivor Remembers Fatal Crash," *The Maple Leaf* 11:26 (Summer 2008), 6.
[84] Lee, *Death and Deliverance: The Haunting True Story of the Hercules Crash,* 252. The helicopters used for the extraction were air-lifted by CAF CC-130 Hercules and U.S. C-5 Galaxy transports. CAF Bell Twin Hueys (CH-135) were replaced by the Griffon Helicopters in 1995-1997.
[85] The mission resulted in one Meritorious Service Cross, 18 Meritorious Service Medals and 14 Chief of the Defence Staff Commendations. Babcock, *Operation Canon*, 32.
[86] The calculation was made by the author. This estimate is based on a Cormorant helicopter departing from Gander with an estimated transit of 2,580 NM and an average ground speed of 125 knots. The routing chosen was: CYQX-CYKL-CYFB-CYUX-CYRB-CYEU-CYLT and five 30 minute fuel stops were included. This represents a very optimistic scenario that includes a crew swap along the way, thus additional FW support would be essential for the successful completion of the mission within this timeline.
[87] CTV News, "Experts say Boeing Crash Shows Need for Arctic Capability" (21 August 2011).
[88] Transportation Safety Board of Canada, "Investigation Progress Update: First Air Flight 6560, Boeing 737 Accident, 20 August 2011, Resolute Bay (A11H0002)," bst-tsb.gc.ca/eng/medias-media/progres-update/aviation/2012/a11h0002/a11h0002-20120105.asp.
[89] "Armed Forces Suspends Mock Disaster Response after Crash in Resolute Bay," *Nunatsiaq Online*.
[90] Ibid.
[91] Ron Wallace, "Emerging Canadian Priorities and Capabilities for Arctic Search and Rescue: A Policy Update Paper," (Calgary: Canadian Defence and Foreign Affairs Institute, 2012), 1.
[92] CASR, *Arctic Sovereignty - Arctic SAR: First Air Crash*, www.casr.ca/id-arctic-sar-first-air.htm.
[93] Estimated by the author. Based on a 1490 NM transit with 300 knots ground speed for a Hercules departing from Winnipeg. Note that the actual ceiling was

reported at 300 feet AGL shortly after the accident and therefore additional delays could have occurred.
[94] Estimated by the author. Based on a Cormorant helicopter out of Gander. The transit was estimated at 1980 NM with average ground speed of 125 knots. Routing selected for the estimation: CYQX-CYKL-CYFB-CYUX-CYRB with three 30 minute fuel stops included.
[95] Approximately 30% of commercial jet fatal accidents occur on take-off or landing. This number increases to 60% if the initial and final approach portions are included. For more, see: Boeing Defence, Space and Security, "Statistical Summary of Commercial Jet Airplane Accident, Worldwide Operations, 1959-2011," www.boeing.com/news/techissues/pdf/statsum.pdf.
[96] "Insight: How Did Search-and-Rescue Mission to Igloolik Go Wrong?" *Toronto Star* (20 April 2012).
[97] Weather and sea state conditions estimated at 10-15 feet swells with ice, winds 25-35 knots and air temperature of -8ºC.
[98] The Hercules was requested to investigate the status of the two community boats sent earlier to support of the rescue operations. Once Hercules crew confirmed that both boats were safe but unable to carry on with the mission, the crew proceeded back on scene and resumed the SARTEC drop sequence.
[99] Department of National Defence (DND), "From the Investigator," *Flight Comment* 1 (2012): 36.
[100] Ibid.
[101] "Insight: How Did Search-and-Rescue Mission to Igloolik Go Wrong?"
[102] Department of National Defence, "SAR Techs Receive International Award for Bravery at Sea," *The Maple Leaf* 15:11 (December 2012), 7.
[103] DND, *Royal Canadian Air Force in the North,* www.rcaf-arc.forces.gc.ca/v2/page-eng.asp?id=1512.
[104] Department of National Defence, Royal Canadian Air Force, "New Releases: Man Stranded on Ice Floe Rescued by 413 Squadron in the Arctic, 28 January 2010," www.rcaf-arc.forces.gc.ca/14w-14e/nr-sp/index-eng.asp?id=10010; "Rescue Underway for Hunter Trapped on Northern Ice Floe," *Kelowna.com,* www.kelowna.com/forums/topic/rescue-underway-for-hunter-trapped-on-Northern-ice-floe.
[105] DND, Royal Canadian Air Force, New Releases: *Man Stranded*,
[106] "French Hiker Rescued after Falling in Crevasse," *Northern News Services Online*, www.nnsl.com/frames/newspapers/2011-05/may2_11fh.html.
[107] "French Skier Rescued from Baffin Crevasse," *CBC News*.
[108] DND, "Backgrounder: Canada's Air Force: A Proud Partner".
[109] SAR incidents are grouped as Aeronautical, Maritime, Humanitarian or Unknown incidents. Category 1 and 2 incidents, for each group, refer to distress and potential distress cases only. They exclude incidents resolved in the uncertainty

phase, incident requiring assistance but where no distress exist, false alarms or hoaxes. For more detail, see National SAR manual, Annex 4C, 21-24.

[110] Canadian Forces Canada Command, Presentation by Jay Nelles, *Canadian Forces Search and Rescue.* Northern SAR Roundtable*,* 21 June 2011, www.nss.gc.ca/site/North-Nord/2011/CAF%20SAR%20(DAR).pdf.

[111] The data presented were extracted from a study relating to FWSAR aircraft only. Even though the numbers do not include RW aircraft, they remain extremely representative as FW aircraft are almost always tasked to support Northern incident to provide the fastest response possible.

[112] The author was authorized, for the purpose of this study, to extract raw data from: Department of National Defence, *DRDC-CORA File 3554-1, Preliminary Spatial Analysis of Historical Search and Rescue Incidents* (Ottawa: DND Canada, 12 April 2012), 10-11.

[113] Ibid.

[114] Ibid.

[115] Leblanc, "Canada Ducked an Arctic Bullet," 23.

[116] Ron Wallace, "Why Canada Needs a Robust Arctic Air Rescue Capability: A Policy Update Paper" (Calgary: Canadian Defence and Foreign Affairs Institute, 2009), 1-2, and Wallace, "Emerging Canadian Priorities and Capabilities for Arctic Search and Rescue" (Calgary: Canadian Defence and Foreign Affairs Institute, 2012).

Chapter Seventeen

Planning Operation *Nanook* 2014: Lessons Learned from a Joint Task Force (North) Perspective

Lieutenant Colonel Deanna Manson[1]

Demonstrating Arctic sovereignty is a priority area in *Canada's Northern Strategy: Our North, Our Heritage, Our Future* (2009) and such operations allow the CAF to showcase its ability to operate effectively in that extremely challenging environment.[2] All of the major joint and combined operations in the Canadian Arctic are commanded by the Canadian Joint Operations Command (CJOC) via Joint Task Force (North), the Regional Joint Task Force based in Yellowknife that is responsible for the Area of Responsibility (AOR) North of 60° and all of Hudson Bay. Operation *Nanook* is the centerpiece of several sovereignty operations conducted annually by the Canadian Armed Forces (CAF) in Canada's North, and the primary Whole-of-Government (WoG) operation for the Arctic region. Operation *Nanook 2014* was conducted in Iqaluit and York Sound from 18-30 August 2014 and included two separate scenarios, one based on Search and Rescue (SAR), and the other a Consequence Management scenario, both in close cooperation with strategic and operational mission partners.

Each year the planning phase for Operation *Nanook* begins roughly twelve to eighteen months prior to the main event that is held annually in the mid to late-August/early-September timeframe. Strategic guidance on the type of scenario to be conducted is sought from the CAF chain of command, from policy advisors, and from key WoG partners such as Public Safety Canada and the respective Territorial officials. Efforts have also been made in recent years to rotate the potential location of Operation Nanook across the three territories in a forecasted, consecutive schedule, so that each territory can better prepare and develop venues for the exercise suited to the respective Territorial Emergency Management Organizations. The intent of these scenarios is often based on topical issues, such as the definition of jurisdictional responsibilities for emergency response and management, as well as operational activities such as SAR.

In the case of Operation *Nanook 2014*, all of the initial strategic and operational-level inputs came together to form two separate scenarios: a maritime and airborne SAR response and a consequence management scenario that involved a cruise ship commencing a transit through the Northwest Passage. The latter scenario involved the vessel becoming partially disabled in Hudson Strait and, in an attempt to reach the safety of the port at Iqaluit, it inadvertently ran aground at the entrance to Frobisher Bay in proximity to York Sound, approximately 90nm short of its intended safe haven. In the early days of the planning, the intent was to link both scenarios, having the SAR activity evolve into the consequence management event; however, the two had to be separated in the end, due to the intricacies of SAR Command and Control, and the intent to involve some international partners in the SAR exercise, in accordance with the Arctic Council Agreement on Aeronautical and Maritime Search and Rescue.[3]

This cooperative framework lay at the heart of Operation *Nanook 2014*, and of each *Nanook* preceding it. These exercises are conceived of, and executed as, combined WoG activities, meaning that they involve all of the environmental services (the Royal Canadian Navy, the Canadian Army, and the Royal Canadian Air Force), all levels of the Canadian government, and sometimes international partners from the Arctic Council and/or the North Atlantic Treaty Organization (NATO). For Operation *Nanook*, the invited foreign nations included Denmark, Finland, Iceland, Sweden, Norway, the United Kingdom, and the US. Denmark and the US were full participants, the rest observers.

The SAR scenario brought the CAF, the Canadian Coast Guard (CCG), the US, and Denmark together in international waters beyond Canada's territorial boundaries in the Davis Strait. There, a notional missing fishing vessel had released two life rafts and the RCN Maritime Coastal Defence Vessel (MCDV) HMCS *Shawinigan* led the search. The overarching scenario was directed by the JRCC in Halifax, who also had training audience participants among its normal staff, including both RCN and RCAF operations personnel, CCG, and Transport Canada representatives. RCAF aircraft and a US Navy P-8 Poseidon, soon found the drifting life rafts and vectored the Danish naval vessel HMDS *Triton* onto their locations. RCAF SAR technicians were dropped in their vicinity, and the Danish vessel recovered the life rafts and the SAR technicians from the Davis Strait. An RCAF Cormorant helicopter hoisted personnel (in this case the SAR technicians) from the flight deck of the *Triton* in a confirmation of interoperability with the Danish Navy. As Rear-Admiral Newton, Commander of Maritime Forces Atlantic quipped during his visit to Operation *Nanook*. "The SAR event was an impressive display of Whole-of-Government and international cooperation."

By contrast, the consequence management scenario at York Sound had a Canadian and interdepartmental focus that was led at the territorial level by the Government of Nunavut Emergency Management Office (GNU EMO). This scenario involved responses from all three services of the CAF, a small Special Forces component, and a wide spectrum of federal departments and agencies coordinated by Public Safety Canada, including organizations such as Aboriginal Affairs and Northern Development Canada, the Royal Canadian Mounted Police (RCMP), Canadian Border Services Agency (CBSA), Canadian Immigration and Citizenship (CIC), Environment Canada, and the CCG.

In the early stages of the planning process, the location at York Sound was chosen specifically because of its terrain: a large, flat area that had a usable landing strip for smaller aircraft such as the Twin Otter, a fresh water source, and access to Frobisher Bay. At the mouth of a glacial river, the grade from the plateau down to Frobisher Bay was abrupt but adequate for foot and ATV transit. It is an area used by local hunters and fishers due to ample fish and game. The troops on the ground thus required protection from the dangers of the polar bear that frequented the area but also had to be careful to not disrupt the hunting and fishing patterns of the local peoples.

From an Operational Support perspective, the use of York Sound had other implications: it was inaccessible by land from Iqaluit given the very rough, almost mountainous terrain throughout the Meta Incognita Peninsula. The severity of the terrain made it impossible to position fuel caches by land between Iqaluit and York Sound, which limited the amount of freight and equipment that the smaller RCAF tactical aircraft, such as the CH146 Griffon helicopters and CC138 Twin Otter aircraft, could carry. More importantly, it required the placement of caches of Jet-A1 fuel in barrels at York Sound, so that the aircraft could re-fuel at that location for their return trip. Considerations were given to the possibility of transporting some equipment by sea, but many of the communities in the North were being resupplied by barge at that time of year so none were available for contract. The operational support planners thus faced the unenviable task of calculating Jet-A1 requirements and transporting all of the required supplies (approximately 260,000 pounds in quantity) by air to the York Sound site.

As the operational planners proceeded with the development of the scenarios, they were faced with the challenge of ensuring that the consequence management scenario was realistic and addressed the real-world roles and responsibilities of each department and agency that might be responding to this type of emergency. Discussions ensued on the nature of the simulated distress that the cruise ship would experience, such as the distinction between hitting an iceberg that completely disabled the vessel versus hitting a "growler" (defined as a smaller submerged "bergy" bit that would cause less damage to the vessel). This distinction was extremely important because a vessel that became completely disabled or was sinking would result in an immediate SAR response, but could not be developed into the required consequence management actions for the training audience. Planners also had to be careful that the scenario did not involve any form of a maritime environmental spill because such an event was completely outside the roles and responsibilities of the participating federal departments and territorial authorities.

As the finer details of the planning progressed, the two scenarios were completely de-linked in order to properly exercise the participants and ensure the realism of each. The fictional cruise ship in the consequence management scenario would hit the aforementioned "growler" on its planned route that would not do catastrophic damage to the hull or the vessels' integral systems, but it would cause the vessel to declare an emergency of an urgent enough nature to have it head towards Iqaluit to ensure the ongoing safety of its passengers. With a heavy weather system further affecting the vessel, officials attempted to guide it into a safe haven within Frobisher Bay, but the vessel inadvertently ran aground and listed heavily, causing some minor injuries to passengers and crew.

In reality, the vessel's declaration of an emergency would have alerted the JRCC in Halifax, as well as GNU EMO, conveniently already located in Iqaluit. Given that the vessel was still functioning under its own power, no actual SAR response would be required in these early stages but the GNU EMO would have most certainly continued to monitor the ship, and perhaps alert, some emergency response agencies at both territorial and municipal levels. The CCG would have been advised by JRCC on the location of the vessel and initial assessments of the location of assets, such as CCG vessels in the vicinity, would have been completed. Particularly with the incoming bad weather, all eyes at both federal and territorial levels would be on the progress and status of the vessel.

This is where some of the artificiality of exercises of this nature becomes apparent. In order to achieve the required response of all participants in the scenario, and to ensure their safety out on the land, significant resources had to be pre-positioned at the York Sound location in preparation for the playing out of the scenario. For the passengers (played by approximately 50 military role players) to disembark the notional cruise ship after it had run aground, and to ensure that all of the responders to the incident could be supported in-location, the area at York Sound had to be prepared and secured. The landscape at that location was expansive, and much of it was used for the various response activities, so a large number of Canadian Rangers were required to be in-location to provide what is known as "predator control" duties—essentially to deter the local polar bears from coming inside the camp perimeter. The Rangers, along with a small fleet of ATV's, trailers, and their accompanying supplies were also required at York Sound in advance of the main activities.

Other activities at the notional incident site were not necessarily related to the scenario, but engaged in other sorts of training activities within their own areas of expertise. The RCN Fleet Diving Unit (Atlantic) deployed to York Sound to both support the scenario and for more general training. The divers charted a small channel through the tidal flat at York

Sound to allow smaller watercraft to perform the ship-to-shore activities, unfettered by the otherwise very shallow waters along the bulk of the shoreline. They also provided additional safety measures during the activities, and accomplished important training in an unfamiliar Arctic terrain. The team of divers, their equipment and other supplies were among the many chalks of Real-Life Support requirements that were transferred from Iqaluit in the days before the official start of the operation.

By the time that the Main Planning Conference occurred in January 2014, the operational support planners estimated that it would take approximately two weeks to pre-position all of the equipment and supplies required to support the troops at the Area of Operation in York Sound. These early projections did not include contingencies for weather or other external factors that might delay the pre-positioning activities, such as aircraft unserviceability. This meant that RCAF and contracted aircraft would have to be in-place in Iqaluit along with all of the freight destined for York Sound in advance of this timeline, along with the bulk of the Joint Task Force Support Component, responsible for all of the contracting, supply chain, engineering, communications and movements support functions.

Iqaluit, the capital of Nunavut and home to approximately 9,000 residents, has modest resources in terms of infrastructure and the availability of goods and services. One of the basic tenets for planning operations in the North is to ensure that the local economies are not negatively impacted by the large-scale presence of CAF troops, so the Task Force must be self-sufficient to the greatest extent possible. Contracts are typically established in the communities for specific goods and services that cannot be established using CAF resources, but these must be managed carefully to ensure that the entire fleet of rental vehicles, for example, is not taken up by the CAF personnel.

Iqaluit is resupplied on an annual basis by a sealift of medium-sized container ships that come to the Frobisher Bay anchorage and deliver goods to shore by barge. Bulk fuel carriers likewise deliver gas, diesel, and aviation fuel to the community via a long pipeline that extends from the anchorage to bulk fuel tanks at the edge of the city. These carriers begin to arrive in Frobisher Bay once the ice clears around mid-July and their deliveries continue into late-September (depending on ice conditions within the bay) when winter ice brings an end to the barge and heavy forklift transits across the tidal flat and the barge landing ramps.

Iqaluit residents and businesses are resupplied in this manner, with everything from household goods, furniture, cars, and non-perishable foods arriving in large quantities. Large items marked for disposal are sometimes retrograded back to the South on the empty back-haul voyages, although scrap metal and other garbage has been piling up inside and outside the Iqaluit dump in recent years. This manner of resupply is common in northern communities, particularly in Nunavut where many communities are located on the coasts. Perishables and fresh food are delivered by aircraft, where possible. These deliveries happen several times per week in Iqaluit given the active airline traffic between large urban centres in the South into the Iqaluit Airport. In this regard, two things were of importance to Operation *Nanook* 14. First, with the operation coinciding with the sealift, there was very little Materiel Handling Equipment available for rent in the community. The second issue was that contracting for fresh rations had to be coordinated with the local suppliers well in advance. Consideration was given to either contracting directly with the local suppliers or bringing in fresh rations from 8 Wing Trenton by using an existing Standing Offer Agreement that is in-place to supply Canadian Forces Station (CFS) Alert with fresh food. Ultimately, the decision was made to contract locally, and the local supplier was able to order additional deliveries in advance of the operation without impacting local supplies.

Furthermore, there was little in terms of larger-scale warehousing or aircraft hangar spaces that was not already fully occupied by commercial and governmental entities. DND (under the auspices of NORAD) had previously maintained a "nosedock" hangar at the Iqaluit Airport which was used for the CC-130 Hercules air-to-air refuelling aircraft to "nose-in" if maintenance was required. The hangar was declared surplus in 2013, given its debilitated condition, but was still awaiting disposal in 2015. It might have been available for use for Operation *Nanook* except that it was inaccessible due to ongoing construction activities at the Iqaluit Airport. A smaller NORAD facility was, fortunately, available to the operation at the south end of the airfield, and some warehousing and logistics activities could occur at that location. Cold storage facilities were leased at the Canadian North hangar and the RCMP graciously offered space at their hangar, which was used to temporarily house cargo until it could be moved forward to its final destination within Iqaluit.

Bed spaces for troops were also limited in the community. With the beginning of the school year, the dormitories at Nunavut Arctic College were unavailable and, although some commercial accommodations were used during the set-up and tear-down phases of the operation, the main bed down area was at the NORAD facility (approximately 140 beds). A small tented camp was therefore constructed in the area around the accommodations building to house the remainder of the troops, and additional tentage was established for the Initial Reaction Unit (IRU) while it transited between Iqaluit and York Sound.

With all of these logistics, engineering, and communications considerations in-play, pre-positioning of materiel, equipment, and vehicles into Iqaluit began in early August, with communications technicians among the first personnel to deploy into the theatre to begin coordination of fibre and satellite communications requirement—some of these contracted with NorthWestTel. Other Joint Task Force Support Component key personnel, such as the Contracts Officer, also arrived early to ensure that contracts with local goods and services providers were activated and coordinated. The

remainder of the Joint Task Force Support Component personnel followed in short order to finalize the reception of materiel and equipment and to begin preparing it to move forward to York Sound. Two hundred barrels of Jet-A1 aircraft fuel were received in Iqaluit and stored in temporary berms at the NORAD facility.

Given the volume of goods to be moved to York Sound, Twin Otter charters commenced the transfer of the Jet-A1 barrels on 14 August. The RCAF tactical aircraft, the six CH-146 Griffon helicopters and the two CC-138 Twin Otter aircraft, arrived at Iqaluit on 17 August and commenced their flying program almost immediately. The Griffon crews required some familiarization training to become acquainted with the local geography prior to the commencement of their employment. On 19 August, two chartered helicopters, one a larger Bell 214ST (classified as a medium-lift helicopter and capable of lifting in excess of 5,000 pounds external or slung load) joined the tactical aircraft fleet while the CCG 212 and 124 helicopters were also available to transfer passengers, when available.

The tactical airlift flying program faced a few important challenges right from the start, the first being the perpetual threat of bad weather in Frobisher Bay in the week leading up to 25 August. The second was the ongoing fire that had been smoldering at the Iqaluit city dump since May 2014. In the weeks and months leading up to the operation, health authorities from all levels of government completed an extensive study of the fumes emanating from the fire, and this information was readily shared with DND/CAF health services authorities. Local medical advisories recommended that pregnant women should minimize exposure to the smoke by staying indoors on days when it was omnipresent in the city. DND/CAF leadership thus took the decision to not deploy soldiers who were pregnant (or thought they might be pregnant), as well as members who suffered from asthma, on a case-by-case basis. An air quality monitoring station was also established at the NORAD accommodations barracks, given its proximity to the dump. The military personnel were assured that there was no imminent threat to their health, but nonetheless, a strong odour was in the air on days when the wind patterns pushed the smoke towards town. Moreover, the flight path from the Iqaluit Airport to York Sound took the aircraft close to the dump with very little room to avoid the smoke, given flight restrictions over the adjacent Sylvia Grinnell Territorial Park. The flight crews expressed concerns about their exposure to the acrid fumes from the dump fire and efforts were made to modify flight schedules as well as their egress from the Iqaluit Airport to minimize contact with the smoke.

On 18 August the SAR scenario commenced, as planned, with the weather remaining clear in the Davis Strait for all aeronautical and maritime activities. This scenario was managed from the JRCC in Halifax, from both an exercise control and SAR response coordination perspectives. The training life rafts were dropped by HMCS *Shawinigan*, and exercise play commenced soon after. The JRCC Marine Controller tasked the Danish vessel *Triton*, given its proximity to the site, as well as the CCG with responding. On 20 August, SAR aircraft were placed on stand-by and subsequently launched: a CC-130H Hercules out of 14 Wing Greenwood, a CH-149 Cormorant helicopter, the US P-8 Poseidon aircraft out of 5 Wing Goose Bay, as well as a CP-140 *Aurora* aircraft that was positioned in Iqaluit for other missions prior to *Nanook*. Ironically (and not uncommonly), the aircraft and SAR technicians were redirected to a possible real-world SAR requirement for a time but, once resolved, quickly returned to the exercise scenario.

In effect, the SAR scenario proceeded without a hitch. The deployed aircraft spotted the two life rafts and vectored the HMDS *Triton* to their location. SAR Techs were dropped from the CC-130H Hercules into the water to assist with the recovery of survivors and an additional inject was done to allow the CH-149 Cormorant to perform a hoist of a survivor from the *Triton*, further refining multinational communications and procedures between Canada and Denmark. The US P-8 facilitated "top cover" and on-scene control of the aeronautical assets. HMCS *Shawinigan* stayed in proximity to monitor maritime conditions, advising at one point that a large ice berg was in the vicinity of one of the life rafts, ensuring that it was given a wide berth by all.

With the completion of the SAR scenario, the maritime vessels began their recovery to Iqaluit to prepare for the subsequent Consequence Management activities. Weather had socked in Iqaluit, however, and was preventing the transfer of supplies to York Sound by air. By the time that the SAR scenario was concluding on 22 August, the Task Force and Air Task Force leadership was starting to get nervous that all would not be in-place for the initiation of the follow-on scenario. Planning sessions were conducted within the Task Force Joint Operations Centre, including representatives from the CCG, to brainstorm possible alternatives for the delivery of goods to the Area of Operation. In the end, the CCG came to the rescue by proposing the transfer of the remainder of the equipment and vehicles via a ship-to-shore operation using the *Henry Larsen*, which would proceed to York Sound. The icebreaker was loaded by the RCAF aircraft when weather allowed, and by their barge and sea truck when flight operations were restricted. The Canadian Rangers, the Fleet Diving Unit, Air Task Force operations personnel, and a meteorologist were also moved into position using the Ranger, RCN small watercraft, and the CCG sea truck, which can access the shallow shoreline of the Sound. While the weather remained tenuous in Iqaluit, it was often quite clear at York Sound, so if the helicopters could take-off from Iqaluit Airport, they were normally available at York Sound to transfer the equipment via slung loads from the *Henry Larsen*.

Task Force leadership and logistics staff later commented that the CCG "saved our bacon" and the activities proved the capability of the CCG vessels for logistics activities, as well as their interoperability with RCAF aircraft. Both the CCG and RCN vessels performed vital logistics functions for the operational support staff in the Task Force, later with the HMCS *Shawinigan* generating potable water for the York Sound troops when supplies ran low.

In the meantime, municipal, territorial and federal authorities were preparing to respond to the developing consequence management situation. The Canadian Army Simulation Centre, commissioned to develop the scenarios, their accompanying storybook, and the various exercise injects, had commenced advisories that a commercial vessel carrying approximately 300 passengers had suffered damage to her hull in Hudson Strait. With the vessel limping towards Iqaluit, there was not only the possibility of the influx of this number of foreign nationals into the city, but also the potential for additional emergency situations, medical or otherwise. Keeping in-mind that the hospital in Iqaluit has only six beds, emergency response plans at both the municipal and territorial levels were activated. At the federal level, the RCMP, Transport, Transportation Safety Board, CBSA, and CIC began monitoring the situation, as coordinated by Public Safety via the Regional Manager for the Arctic and the Government Operations Centre (in Ottawa).

The CCG Maritime Communications and Traffic Services office located in Iqaluit is active during the shipping season, providing distress and safety call monitoring for vessels in Canadian waters. As the notional stricken vessel entered Frobisher Bay, the Canadian Army Simulation Centre gave the Maritime Communications and Traffic Services an inject advising of an oncoming weather system that might interfere with the vessel if it was left to attempt the transit down the bay in its current state. As such, the vessel was advised to proceed into a nearby York Sound for shelter from the weather. As it did, it inadvertently ran aground, this time declaring an emergency and requiring assistance. On 25 August, all emergency response organizations began their protocols to mobilize to Iqaluit and York Sound to manage the situation and provide assistance to the vessel and its passengers.

Jurisdictions for emergency response organizations at all levels of government are well-defined and must be respected. This is where the

artificiality of the *Nanook* series can cause confusion, because DND/CAF assets are placed in advance of the scenarios in order to assist with their conduct and with the required Real-Life Support for such a large volume of activity. But the CAF assets would not normally be in-place so quickly in a similar real-world event. Nor would all of the various agencies be forewarned of the event and ready to respond. What the scenarios do provide an important platform for learning and for coordination among the players.

The GNU EMO, by definition, held the lead for the initial response. They quickly deployed to York Sound via their own airlift charters, respecting the reality that the RCAF aircraft would not be available until three or four days after notification of an event like this one. They set up their camp at York Sound within the established safety perimeter provided by the pre-positioned Canadian Rangers, and were remarkably self-sufficient with their kit while testing new communications systems and the Incident Command System, a series of formal protocols that assists in the coordination of emergency response activities among all partners at all levels of government.

As the scenario unfolded, it became apparent that evacuation of the passengers from the vessel to York Sound would be necessary, including some with injuries from the turmoil aboard the ship. The RCMP, CBSA, and CIC facilitated the transfer of the passengers to a processing centre in Iqaluit. Additional concurrent vignettes were injected into the scenario to allow some Public Health Agency of Canada and Health Canada participation along with one fatality aboard the vessel that required the response of the territorial coroner. In the background, a Request for Assistance for federal response was initiated by the territory, including a request for CAF capabilities such as deployment of the Major Air Disaster (MAJAID) kit, airlift support, and an IRU, which was activated in preparation of deployment from Edmonton into Iqaluit.

A portion of the MAJAID kit, enough to support approximately 150 people was deployed from 8 Wing Trenton within eight hours of notification. This equipment, which includes survival gear, food, fuel, and medical supplies, was dropped from a CC-130 Hercules aircraft and landed with amazing precision by parachute. It was accompanied by SAR Technicians and other airborne personnel to provide assistance on the ground. By the third day of the scenario, the IRU was transferred to the site via the RCAF tactical aircraft to provide additional security and support to other federal and territorial activities that were ongoing as the notional passengers were moved out of York Sound and into Iqaluit. Finally, the last portions of the storyboard were activated on York Sound proper with a simulated fuel spill that allowed EC and Aboriginal Affairs and Northern

Development Canada to respond and validate their protocols.

With such an extensive federal and territorial response, two important coordination committees were organized in accordance with the respective emergency response plans and protocols. At the federal level, an Emergency Coordination Group was convened at Iqaluit and chaired by the Public Safety Regional Manager. At the territorial level, the Territorial Emergency Response Committee brought together the territorial organizations. These meetings were held daily, with representatives from each attending the other to ensure liaison and ongoing coordination between the two, and greatly enhanced situational awareness and cooperation among all parties. CAF TF representatives attended both forums and, most notably, a representative from the Crystal Cruise Company participated in the Emergency Coordination Group to contribute an industry perspective. This participation was an important addition, given that the *Crystal Serenity*, a vessel with a passenger capacity in excess of 1,000, was scheduled to transit the Northwest Passage in 2016.

Despite the apprehension among the operational support staff and Joint Task Force Support Component personnel during the deployment phase of Operation *Nanook 14*, the ongoing support to the deployed forces and partners during the main training events proceeded without further hiccups. The landscape at York Sound was buzzing with activity throughout the days that the scenario was conducted and all participants were extremely positive about the training achieved during the operation. The IRU, in this case represented by the Lord Strathcona's Horse Reconnaissance Company, conducted additional training while deployed on the land, working closely with the Canadian Rangers on various patrols and other training activities. The tactical aircraft travelled back and forth between Iqaluit and York Sound on a continuous schedule, carrying observers and visitors into the Area of Operation, while pulling garbage and waste back to Iqaluit for disposal. Moreover, the weather cleared for the remainder of the operation, which allowed the redeployment from York Sound to be accomplished in a very efficient manner.

As has been mentioned throughout this chapter, there is a certain artificiality that is associated with the *Nanook* series, primarily owing to their protracted and deliberate planning phase and prepositioning of equipment and supplies. The size of the deployed Task Force was also much larger than it would be in a real-world SAR or consequence management situation, because of the additional training that is conducted for both CAF organizations and our northern partners. As a result, the required support is much more extensive than it would normally be, and is focussed on Real-Life Support rather than the scenarios and exercise play. That being said, the importance of this venue for learning and coordination across departments and all levels of governments should not be discounted.

Because we "walk-the-walk" in slow time during the long planning phase, culminating in the main event(s) that allow all stakeholders to freely participate in the scenarios (as they have been built by their own subject matter experts), every participating organization walks away from an Operation *Nanook* with an enhanced understanding of their own roles and responsibilities, as well as how to talk-the-talk with their/our partners. The WoG operation better prepares all potential participants to respond to a real-world situation in the unfortunate event that a crisis occurs. Furthermore, any such "real world" event in the Arctic would be on a much smaller scale than a typical *Nanook* operation.

Long gone are the days when the Canadian military operates in a theatre in seclusion, without any interaction with Other Governmental Departments (OGDs), civilian contractors, and even Non-Governmental Organizations (NGOs). This is especially true for operations in the Arctic, where the Area of Operation will be as austere (and potentially as dangerous) as any theatre outside of Canada. This austerity, the provisions in Comprehensive Land Claims Agreements, and the limited economies of northern communities combine to dictate a careful and respectful approach to planning and conducting operations, even in emergency situations. Consultation with local and indigenous groups is essential, as are the achievement of land-use, environmental and the associated permits for water consumption, for example. More importantly for CAF Commanders and key staff is the open and respectful interaction with our civilian partners. The CAF is but one player in a large cast of diverse stakeholders that changes drastically from territory to territory, and from community to community.

On this particular Operation *Nanook*, one of the most important lessons learned was that an emergency can occur anywhere in the Canadian Arctic. Despite the challenges experienced working in such inaccessible terrain the reality is that a similar emergency could occur in an area even more inaccessible, and farther from the nearest urban centre and/or larger airport facilities. The CAF capabilities that may be called upon to respond to such a situation will take time to activate and will be streamlined to the requirement, as requested by the respective territory, rather than the wholesale deployment of a variety of capabilities that we see on a typical Operation *Nanook*. The support construct that accompanies such a Task Force must be similarly stream-lined, and deployed in accordance with existing doctrine, so as to minimize the footprint of the deployed forces in the Area of Operation. Nonetheless, and despite the mayhem that ensues for any iteration of Operation *Nanook*, the importance of the training venue and the learning objectives that are achieved year-after-year should not be dismissed.

Notes

[1] Lt.Col Deanna Manson is Deputy Chief of Staff Support, Joint Task Force (North) Headquarters, Task Force Commander, Operation Nanook 2014.

[2] Department of Indian Affairs and Northern Development, *Canada's Northern Strategy: Our North, Our Heritage, Our Future* (2009).

[3] The Government of Canada, the Government of the Kingdom of Denmark, the Government of the Republic of Finland, the Government of Iceland, the Government of the Kingdom of Norway, the Government of the Russian Federation, the Government of the Kingdom of Sweden, and the Government of the United States of America *Agreement on Cooperation on Agronomical and Marine Search and Rescue in the Arctic*, signed in Nuuk, 2011.

Conclusion

There is No Glide Path in the Arctic: Operational Lessons Learned

Adam Lajeunesse and P. Whitney Lackenbauer

> *The North is a unique environment and operating conditions vary significantly from those in the South to which the CF is more accustomed. The variety of potential tasks, the remoteness of the region, the vast distances between operating bases, the lack of infrastructure, and difficulties in communications mean the North can be regarded as an expeditionary type theatre requiring forces to be uniquely equipped and trained, deployable, scalable, and as self-sufficient as possible.*
>
> -- Canadian Forces Northern Employment and Support Plan (November 2012)

Since the early 1940s, the Canadian military has been preparing for and executing Arctic operations. The mission has varied over the years, as has the equipment, training, and technology used to deploy, sustain, and move naval, air, and land forces into and within the region. As the Canadian Armed Forces (CAF) have taken positive steps to re-build its northern capabilities in the twenty-first century, military personnel have encountered many of the same problems and sources of operational friction that plagued their predecessors. Moving, sustaining, supplying, and communicating with forces in the region remain significant challenges, even with modern technology and equipment at their disposal. As American First Sergeant Todd Gagnon observed after the 2014 Exercise *Guerrier Nordique* in northern Quebec, "there is no glide path [in the Arctic]."[1]

The contributors to this volume have mapped out sources of friction that the CAF has encountered over its lengthy history of Arctic operations, in hopes that these insights will encourage institutional learning and retention into the future. We do not wish to replicate their efforts. Instead, this conclusion seeks to consolidate some overarching lessons learned.

Distance

> *The most significant military characteristic of the Canadian North is not the climate: it is isolation!*
>
> -- Ken Eyre, "Forty Years of Military Activity in the Canadian North" (1987)[2]

Canada's Northern territories are a vast and sparsely populated, spanning nearly four million square kilometres and inhabited by 113,604 people (2016 census). If the lands of Yukon, the Northwest Territories, and Nunavut were combined and ranked in a global context, they would constitute the seventh largest country—but with a smaller total population than the Ottawa suburb of Kanata. Military supply lines to this enormous region are stretched and expensive to maintain. The distances involved in Arctic operations, coupled with the widely dispersed population and limited infrastructure "North of 60," make deployments comparatively slow, constrain tactical movement, and are costly to sustain. Likening northern deployments to expeditionary operations rather than to typical domestic deployments is both appropriate and useful.[3]

Logistics and Infrastructure

Vast distances between southern support bases and operating areas in Canada's Arctic, coupled with a dearth of transportation infrastructure in the region, conspire to create significant logistical challenges. Strategic movement into the region is limited to a few locations with airstrips large enough to handle the biggest aircraft. Tactical movement within the Arctic is similarly restricted by the small number of airfields, limited fuel supplies, and the almost complete lack of reliable, all-season roads outside of the communities.

CAF planners have grappled with these challenges for decades. As Lackenbauer, Eyre, and Kikkert discuss in Chapter Two, moving forty soldiers and scientists across the Arctic tundra during the 1946 Operation *Musk Ox* required a supply 'tail' of more than two hundred supporting personnel as well as nine aircraft to supply the moving force. The difficulties that the Army encountered in keeping the "Muskoxers" alive and moving convinced the military that a large-scale Soviet incursion into the region was implausible. Lt. General Charles Foulkes, Chief of the General Staff, "decried all the poppycock that has been given out regarding such a possibility," and went on to exclaim: "fifty-Seven pounds of freight to maintain a single man. Can you imagine how many aircraft would be needed to keep an enemy force going in the Arctic? The Arctic wastes are our strongest defence."[4] Subsequent activities have reinforced these observations.

Supply lines are often unstable in the Arctic, even in non-combat scenarios, with severe weather and vehicle breakdowns threatening logisticians' abilities to support deployed units.[5] Furthermore, limited sources of local supplies for deployed elements compound these difficulties. In southern Canada, military units have emergency access to items such as food, stores, and spare parts in local population centres. In the Arctic, there are few settlements, and those that exist are far smaller and less well provisioned. Most cannot support anything more than a sub-unit surge.[6] This reality, coupled with extreme weather than can close access to communities for extended periods and requires that CAF deployments be self-sufficient, both for their survivability and for the Northern population that they are assisting.[7]

Air Force and Navy personnel have encountered similar problems over the years. Lancaster and Canso training flights in the early in the 1950s showed how vital these long supply lines were to keeping RCAF aircraft in good working order. The RCN's greatest challenge in its early post-war voyages north was not ice but limited supplies of fuel (Chapter Five). These questions of supply and logistics remain important considerations today, with Operation *Boxtop* demonstrating the importance of a robust supply chain to maintain its aircraft and, in turn, to keep CFS Alert operating on the northernmost extremity of Canada's land mass (Chapter Eleven). Similarly, the RCN faces challenges keeping its warships supplied while operating in the North. There are no deep-water ports in the Arctic apart from Churchill, and nowhere to tie up a ship for provisioning. Away from population centres, such as Iqaluit, moving goods to ships becomes extremely complex. While contracting from the private sector can help to relieve some pressures, it poses its own challenges—availability, delays and uncertain delivery times, and compatibility problems between civilian and military equipment.

In short, the chapters in this volume show how and why the CAF has learned that, when moving any supplies north, considerable time has to be built in to compensate for unexpected delays caused by poor infrastructure, inclement weather, or dangerous sea states. Northern logistics cannot be looked upon as an exact science. Planners and logisticians must prepare for the unexpected, factoring in extra time, diligence, and resources when it comes to moving anything to, and around, Canada's Far North.

Movement

Simply moving into and around the Arctic has long been one of the most difficult tasks for the CAF in the North. Army exercises from the 1940s through to the present have regularly left patrols with hypothermia and frostbite casualties. Even in summer, when the cold ceases to be a serious limiting factor, the Arctic terrain often proves impenetrable. The limitations of cross-country movement, even with all-terrain vehicles and snow machines, remain significant. So too is simple navigation, given the lack of distinguishing topographical features in some areas.

Naval deployments are is similarly hindered by presence of sea ice for much of the year, confining these deployments to late August or early September, when the ice is at its lowest levels. Even in the warmest weather, these movements can be dangerous, as ships crews must keep a watchful eye for bergy bits and growlers – small chunks of ice that float into open water capable of puncturing the hull of a thin-skinned warship. In 1973, when asked about a recent deployment, the Commander of HMCS *Protecteur* told the *Globe and Mail* that "we move about in ice like a porcupine makes love, very carefully."[8] This danger is exacerbated by Canada's limited hydrographic knowledge of the region. Only 10% of Canada's waters were adequately surveyed as of 2015, and only 1% charted to modern standards.[9] For this reason, the RCN's ships typically stay in established sea lanes, a serious restriction to their mobility in anything but a preplanned exercise.

Dealing with the Elements

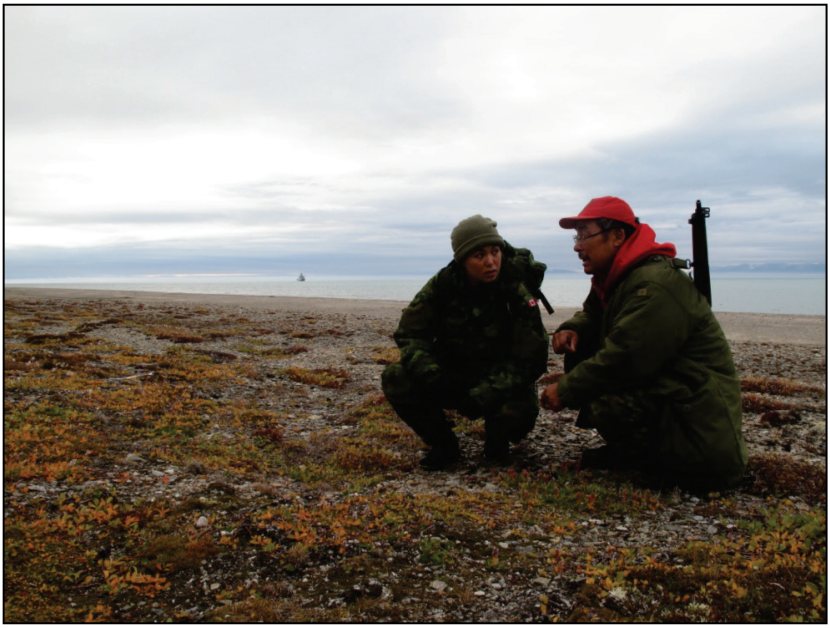
In the popular imagination, the Arctic is defined by extreme weather. This remains a central consideration for military planners and operators. The cold slows and restricts activities, limits travel options, and makes even basic tasks (such as making and breaking camp) onerous. Unpredictable winds, snow, and fog also slow operations and even endanger lives (Chapter Nine, for example). While aircraft are less constrained by extreme temperatures than ground forces, they are expensive tools that require specialized handling and safety precautions to operate in the North.[10] Starting an engine in cold weather or de-icing at remote bases can be difficult, while frigid temperatures can complicate loading and unloading. Likewise, flights are often grounded by unpredictable fog or high winds, and the Arctic's proximity to the magnetic North Pole continues to cause navigational challenges.

An Arctic Mindset

The vast expanses, limited support, extreme cold, and unpredictable weather of the Arctic create unique operating conditions and, experience has shown, requires a unique mindset to manage. In Chapter Fifteen, Canadian Ranger Doug Stern points to the need for CAF personnel to display *ihuma*—an Inuit term meaning reason, wisdom, and knowledge. In the Arctic, practicing *ihuma* means respect for the environment, patience, careful deliberation, cooperation, and flexibility.

Since the Second World War, southern soldiers sent to train in the Arctic continuously emphasize the need to respect the Arctic environment. This lesson, borne of experience, is lost when Arctic operations stop and personnel lose touch with the dictates of northern deployments. Officers leading units in Arctic conditions must be patient, calm, and adaptable. History has shown that, far too often, inexperienced CAF officers think that they can simply import southern approaches to Arctic operations—much as many of the early British explorers sought to conquer the region with leather boots and woolen naval jackets. The most successful European explorers, men like John Rae, adopted clothing and techniques better suited to the environment in which they operated. Similarly, the most successful CAF activities reflect adaptations to a Northern context.

Members of the CAF have learned, time and again, that schedules and plans need to be flexible to respond to operational realities encountered on northern lands and waters. The Arctic is an area where Clausewitzian friction dominates on the environmental and mental planes, grinding down even well-equipped soldiers and undermining carefully-crafted plans. As Canadian Rangers attached to most CAF operations emphasize, flexibility is



the key to success. As German strategist Helmuth von Moltke once quipped, "no battle plan survives first contact with the enemy." In the Arctic, the environment itself is an enemy, if units try to fight against it. Planning is important, but preparations that equip personnel to adjust to changing conditions and improvise as needed are equally essential to effective Arctic operations.

Training and Preparation

Since the Second World War, the CAF has learned that it cannot just send any soldiers north and expect them to function—let alone excel. Given the challenges posed by the physical environment, the lack of infrastructure, and the need for self-sufficiency, personnel operating in the Arctic must be carefully conditioned and trained. After Exercise *Sweetbriar* (1950), reporter Hanson Baldwin concluded that "the idea, once prevalent, that nearly any troops can be taught quickly to fight in the Arctic after a short indoctrination course must be abandoned. Extensive and thorough training is essential in the special techniques of Arctic warfare if excessive casualties are to be avoided."[11] This observation remains relevant today. The CAF has dedicated significant resources over the last decade to creating units comfortable enough with the Arctic environment that they can both take care of themselves and contribute to the mission at hand.[12] This training takes time as Arctic experience cannot be reproduced in the classroom. The Arctic Response Company Group model, built around Primary Reservists with a comparatively low personnel rotation cycle compared to the Regular Force, seeks to institutionalize this lesson by fostering an experienced cadre of Arctic soldiers capable of moving beyond mere survival to the actual conduct of Arctic operations (Chapter Thirteen). Constrained logistics means that large groups are difficult to move and supply, so small elements are preferable where they can achieve the desired operational effects, using fewer resources and leaving a smaller footprint on the Arctic environment. This can lead to friction, however, between the political benefits of showcasing large operations with more "boots on the ground" (usually communicated as a demonstration of sovereignty) with the more practical necessity of deploying small, mission-specific forces that offer less politically appealing optics.

The Navy has derived similar lessons from Arctic exercises and operations. Owing to the expeditionary nature of Arctic voyages, RCN vessels typically bring far more supplies, parts, and replacements with them than would be the case for most domestic deployments. The RCN has also pared down the size of its deployments, from large squadrons sent north in the 1970s, to one or two ship mission by the early 1980s. This deployment pattern continues into the 21st century, with the RCN normally deploying only two ships north each year.

Equipment and Communication

The need for proper equipment has been one of the most consistently obvious lessons taken from the CAF's history in the Arctic. The region's isolation and extreme temperatures often require specialized clothing, tools, vehicles, and gear that covers the entire spectrum of a soldier's activities. Since the 1940s, field trials and exercises have revealed the limitations of traditional winter gear and equipment, from communications devices, to sleep systems, to glasses and thermoses, to snowmobiles, and boats.

Communications between units in the field, headquarters, ships, aircraft, and between the CAF and other government departments, have posed persistent problems for deployed units since the Second World War. The unique atmospheric conditions of Arctic region limits many forms of communication, the high latitude renders satellites less reliable, and the extreme cold drains the batteries that power virtually all modern mobile technology. Resolving technological challenges, and inculcating a culture that encourages units to adapt and improvise solutions, remains essential to Arctic mission success. Coordinating the use of different communications equipment, procedures, encryption technologies, and frequencies across CAF elements and government departments also poses frequent problems, necessitating exceptional planning steps to ensure that vital lines of communication are established and sustained throughout operations.

Learning from the Past

Mark Twain allegedly once said that "history doesn't repeat itself but it often rhymes." This suggests an appropriate way of understanding the history of Canadian military operations in the Arctic. Since the 1940s, the CAF's efforts to develop a northern operational capability have evolved, the technologies and platforms have changed—as have missions and objectives. Several core challenges and obstacles, however, have proven remarkably consistent. New practices, procedures, equipment, and relationships have mitigated some operational friction, but enduring hazards and impediments remain in the form of extreme distances, minimal infrastructure, fragile lines of communication, and the extreme climactic conditions which define the region. At several points during the Cold War, the CAF realized that combat in the Canadian North was highly unlikely. Yet, even without a realistic danger of state-based conflict, the Forces have long recognized the

need to be able to work in the region, and to do so on a level that goes beyond merely projecting the symbolic military "presence" often demanded by politicians. For decades, the CAF has had an important role to play in ensuring public safety and security in the Arctic in response to a broad spectrum of threats and dangers, while assisting other government departments and agencies in fulfilling their mandates.

Building on the successes (and failures of the past) to improve Arctic capabilities means *learning*—and not simply observing—lessons derived from a long history of CAF operations in the region. It also means *disseminating* and *retaining* lessons as they are learned so that they can produce and sustain a critical mass of Arctic expertise in the present. Given oscillating historical cycles of military interest and disinterest in northern operations, we contend that it is equally important to consolidate hard-earned, operational knowledge so that it is not lost if the CAF suffers from yet another of the historical dips in political interest (and therefore investment) in the Arctic.

These historical surges of interest and activity have repeatedly left the Forces with experience, capability, and capacity in the Canadian North, but rarely a deep sense of the importance of the military's deep responsibilities to and in Northern Canada. In taking stock of the twentieth century, strategist Ken Eyre summarized that the North was initially ignored, then seen as a strategic approach (first to Europe and Asia, then to the heartland of North America) during the Second World War and early Cold War, and only later "as having intrinsic value and as such is deserving to be watched protected and, if necessary, defended." Consequently, "while the military has had a considerable impact on the North, the northern fact has had surprisingly little impact upon the Canadian military."[13] Far too frequently, efforts to develop practical military capabilities in the Arctic were abandoned when political winds changed. In the 21st century, we anticipate that the situation has changed. Today, the CAF's interest in Northern operations is derived from enduring factors: climate change, emerging sea lanes, heightened interest in resource development, and the state's obligations to protect and serve its Northern citizens are not going away. As such, the CAF will need to think longer-term about what a sustained effort, and sustainable operations, actually entails. This is no simple task. The

Arctic is challenging, the solutions imperfect, and the conditions ever-changing. Armed with the lessons of the past and present, however, the Canadian Armed Forces are well suited to meet the challenge.

Notes

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[1] Todd Gagnon, interviewed by Nathan Fry, 10 March 2014.
[2] Kenneth C. Eyre, "Forty Years of Military Activity in the Canadian North, 1947-87," *Arctic* 40, no.4 (1987), 293.
[3] See, for example, Canadian Forces Northern Employment and Support Plan (November 2012) [hereafter "NESP"], 3. The CAF defines an expeditionary operation as "the projection of power over extended lines of communications into a distant operational area." Defence Terminology Database (DTB) record AAP-6, listed in the Glossary of Allan English and John Westrop, *Canadian Air Force Leadership and Command: The Human Dimension of Expeditionary Air Force Operations* (Trenton: Canadian Forces Aerospace Warfare Centre, 2007), 237.
[4] *Calgary Herald* (3 July 1947).
[5] Eek, "Maintainability of Military Motor Vehicles under Arctic Winter Conditions."
[6] "Training Implementation Directive – Initial Operating Capability – Arctic Response Company Groups and Arctic Vanguard," 28 March 2011.
[7] NESP, 9.
[8] Lyndon Watkins, "Ship will Visit 13 towns in Eastern Arctic to Conduct Research, Reinforce Sovereignty," *Globe and Mail* (1 August 1973).
[9] Fisheries and Oceans Canada, 'Arctic Charting," www.charts.gc.ca/arctic-arctique/index-eng.asp
[10] RCAF, *Canadian Forces Aerospace Doctrine*, B-GA-400-000/FP-000, December 2010 (Trenton: Canadian Forces Aerospace Warfare Centre, 2010), 25.
[11] Hanson W. Baldwin, "Air Power is Arctic Key: Operations aloft Showed Efficiency in War Game – Ground Forces Profited by Training," *The New York Times* (26 February 1950).
[12] M.Gen Christopher Coates (CJOC), interviewed by Adam Lajeunesse, Ottawa, 23 May 2014.
[13] Eyre, "Forty Years," 292.

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Canadian Arctic Operations, 1941-2015:
Lessons Learned, Lost, and Relearned

Edited by Adam Lajeunesse and P. Whitney Lackenbauer

Over the past decade, the Canadian Armed Forces (CAF) has devoted significant time and resources into a concerted program to develop new Arctic capabilities. Through widely-publicized annual "N-Series" operations (*Nanook*, *Nunalivut*, and *Nunakput*) to a myriad of smaller exercises, the military has demonstrated a significant interest in learning how to operate, survive, communicate, and even fight in the North. While these operations have significantly increased CAF northern capabilities, many of the operational and tactical 'lessons learned' are actually being 're-learned' from previous surges of Northern activity. The chapters in this book analyze a broad range of operational experiences and training activities from the Second World War to present, providing valuable insights into the historical and contemporary Canadian Army, Royal Canadian Navy, and Royal Canadian Air Force capabilities in the Arctic.

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