



# Sic Itur Ad Astra

## Canadian Aerospace Power Studies



Volume 2  
Big Sky, Little Air Force



National  
Defence

Defence  
nationale

Canada



*Sic Itur Ad Astra:*  
**Canadian Aerospace Power Studies**

**Volume 2**

**Big Sky, Little Air Force**  
*Edited by W. A. March*

Catalogue Number: D4-7/2-2011

ISBN Number: 978-1-100-52999-8

This publication is available online at [Trenton.mil.ca/lodger/CFAWC/eLibrary/eLibrary\\_e.asp](http://Trenton.mil.ca/lodger/CFAWC/eLibrary/eLibrary_e.asp) on the intranet or at [www.airforce.forces.gc.ca/cfawc/eLibrary/eLibrary\\_e.asp](http://www.airforce.forces.gc.ca/cfawc/eLibrary/eLibrary_e.asp) on the internet.

Art direction and editing by Canadian Forces Aerospace Warfare Centre Production Section.

This publication was prepared for the Canadian Department of National Defence but the views expressed in it are solely those of the authors. They do not necessarily reflect the policy or the opinion of any agency, including the Government of Canada and the Canadian Department of National Defence.

© Her Majesty the Queen as represented by the Minister of National Defence, 2009

*Cover photo credit: DND*

---

## Table of Contents

<b>Preface</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vii</b>
<b>Chapter 1 The Royal Canadian Air Force and the Road to War</b> .....	<b>1</b>
<i>Carl A. Christie</i>	
<b>Chapter 2 The British Commonwealth Air Training Plan and Limited Liability</b> .....	<b>12</b>
<i>Sandy Babcock</i>	
<b>Chapter 3 The Role Of Ferry, Transport, and Civil Aviation in the Second World War</b> .....	<b>29</b>
<i>Carl A. Christie</i>	
<b>Chapter 4 Bomber Command and 6 Royal Canadian Air Force Group in the Battle Of Berlin</b> .....	<b>42</b>
<i>Christopher Shelley</i>	
<b>Chapter 5 Dining at Separate Tables: Heavy Tactical Air Support in Operation TOTALIZE, 7-10 August, 1944</b> .....	<b>58</b>
<i>Jody Perrun</i>	
<b>Chapter 6 Secret Device: Eastern Air Command's Operational Experience with the Mark 24 Mine, 1943–1945</b> .....	<b>68</b>
<i>Jeff Noakes</i>	
<b>Chapter 7 Tactical Air Power and Canadian Naval Aviation, 1946–1962</b> .....	<b>76</b>
<i>Leo Pettipas</i>	
<b>Chapter 8 Canada's Army Loses its Air Force: The Royal Canadian Air Force and the Origins of 10 Tactical Air Group</b> .....	<b>97</b>
<i>Dean C. Black</i>	
<b>Chapter 9 "Committed to Make a Difference:" Canada's Role in the Inception of NORAD Counter-drug Operations</b> .....	<b>107</b>
<i>Dixie Dysart</i>	
<b>Chapter 10 Canadian Hornets Over Kosovo: A Small Part of a Future Model for Air Power?</b> .....	<b>117</b>
<i>Paul Johnston</i>	
<b>Chapter 11 Rethinking Maritime Air: Preparing and Maintaining Canadian Sea King Helicopters for Operations in the Persian Gulf 1990–1991</b> .....	<b>125</b>
<i>Richard Gimblett</i>	
<b>List of Abbreviations</b> .....	<b>133</b>



## Preface

Canadian aerospace power has proven to be a useful and versatile element of national power. Equally important in peace and war, the multitude and complexity of the missions assigned to the Air Force never cease to amaze me. At one time or another during our history, we have undertaken tasks ranging from dusting crops to fighting in the skies over Europe and Asia to exploring outer space. When you take a step back and look at the over 90 years of military aviation in this country, perhaps the only truism you can point to within our chosen profession is that life is never dull.

Over the years, the diversity of employment of Canadian military aviation has presented us with a vast treasure trove of experience, best practices, pitfalls, and food for thought. Unfortunately, knowing that all this valuable information is out there does not make it useful. Like gold and silver resting in sunken ships at the bottom of a sea, we may know that it exists, but the real work is in finding it, bringing it to the surface, and converting it into a usable currency. It is the currency that we obtain from our “treasure hunting” that permits us to improve our present and influence our future.

This is where the Canadian Forces Aerospace Warfare Centre comes in. In a very real sense, we seek to uncover valuable commodities buried in our past and use these “treasures” to support the Air Force of today and to mould future aerospace capabilities. Never an easy task, the Centre seeks assistance from a variety of sources and agencies, one of which is 1 Canadian Air Division’s Directorate of History and Heritage. Commencing in 1994, the Office of Air Force Heritage and History conducted a number of conferences focusing on the history of military aviation in Canada. Unfortunately, given the resources available at that time, the proceedings had a limited distribution. Many of the papers presented warrant a second look, and beginning with this volume of the *Sic Itur Ad Astra* series, will be published as time and resources permit.

Which brings me to Volume 2, entitled *Big Sky, Little Air Force*. This issue features 11 papers from past Air Force historical conferences held between 1996 and 2005. The papers were selected to give the reader some idea of the diversity of missions, and the challenges therein, that Canadian military aviation has undertaken over the years; all-in-all, not bad for a little Air Force. Enjoy the read.



D. W. Joyce, OMM, CD

Colonel  
Commanding Officer





## Introduction

“We... have done a poor job, so far, of presenting on a large scale and in comprehensive, coherent, interesting and easily grasped forms... [the] lessons of air power.”<sup>1</sup>

Air Marshal Clare L. Annis

I have used and abused this quote from Air Marshal Annis many times because, to my mind, it encapsulates many of the issues that face the Air Force and the study of aerospace power in Canada. First and foremost, it acknowledges that we, in this case, the Air Force, have done a “poor job” when it comes to the study of our chosen profession. This may be a controversial statement, but for the most part, it is true. Throughout our history, we have been very good at parroting air and space power tenets from larger, allied air forces, most notably those of the Royal Air Force (RAF) and the United States Air Force (USAF). Unfortunately, as the Air Marshal recognized so many years ago, it is not enough to state that the perceived air power lessons are important; they have to be studied, understood, and presented in a manner, and perhaps more importantly, in a context that makes sense to Canadians both in and out of uniform.

The second reason that I employ this quote so often is that it originates from a senior Canadian Air Force officer. Finding material that was written by senior Canadian air personnel is like looking for the proverbial “needle in a haystack.” There are bits and pieces here and there, primarily in publications such as the old *Roundel* or in hard copies of speeches and presentations, but they are hard to find. Biographies or autobiographies of senior Canadian commanders are even rarer; hopefully, this will change in the future.<sup>2</sup>

Lastly, I appreciate this quote for what it implies—as Canadians, we need to study aerospace power. Although there has been a significant amount of material written about the Canadian Air Force in all of its guises, the vast majority of the material has been anecdotal in nature. In essence, much of the literature has centred on the exploits of air personnel at war highlighted by various numbers of pictures of aircraft. These tomes go a long way in keeping the interest in aerospace power alive, but in most cases they do not ask the hard questions that lead to an in-depth analysis that helps address such issues as “Why does Canada need an air force?” or “What has aerospace power done for me lately?”

The latter question may seem somewhat facetious, but aerospace power is expensive, and as with most “high-ticket” items, must be continuously examined both for its utility and cost-effectiveness. It is not enough to point out that Canada had the fourth largest Allied air force at one point in the Second World War (WWII),<sup>3</sup> or that since 1945, counting the current conflict in Afghanistan, Canada’s airmen and airwomen have gone to “war” four times.<sup>4</sup> These facts may invoke feelings of pride and accomplishment in some, but they often pale in comparison to the more easily understandable emotions invoked by the ever-increasing price tags associated with acquiring new equipment and capabilities. In order to ensure, as much as possible, that Canadian aerospace requirements are based upon national requirements and rational debate, rather than the most shocking newspaper or blog headline, we need to study the issues with a view to educating all parties concerned.

I firmly believe that Air Marshal Annis expressed this goal in the speech from which I quoted and in numerous other speeches that he delivered throughout his career. This was one of the primary reasons why the Canadian Forces Aerospace Warfare Centre (CFAWC) building, located at 8 Wing Trenton, Ontario, was named in his honour. As a senior Canadian airman, Annis recognized the need to study our chosen profession not only for the benefit of those men and women in uniform, but also to bring a level of aerospace understanding to the Canadian people at large. In short, as we embark upon our research, conceptual and doctrinal projects, we should always keep in the back of our minds that we need to be able to communicate these ideas to the Canadian public in a meaningful way.

To a very large extent, that is the purpose behind the establishment of the *Sic Itur Ad Astra Canadian Aerospace Power Studies* series. The articles contained in this volume come from a mixture of serving members, professional historians, and interested aerospace enthusiasts. However, they all have one thing in common. All of these papers were presented at one of the Annual Air Force Historical Workshops held under the auspices of the Office of Air Force Heritage and History at 1 Canadian Air Division Headquarters in Winnipeg, Manitoba. Commencing in 1994, the Air Force Heritage and History personnel organized and conducted this yearly event until 2007, when by mutual agreement, CFAWC took over responsibility for the workshops. For a variety of reasons, the papers presented prior to 2007, although they contained a wealth of information, had limited distribution. Therefore, it was decided that select papers from previous workshops would be published as part of the *Sic Itur Ad Astra* series to make them more accessible.

The title for Volume Two is *Big Sky, Little Air Force* and may be considered somewhat provocative by certain readers. The title, much like the selection of papers herein, was chosen deliberately. Although the fortunes of Canada’s Air Force have waxed and waned over the years, rarely has Canada ever had what could be considered a large air force, at least when compared to some of our closest allies. However, despite the somewhat diminutive size of our “Little Air Force,” Canadians have expected it to do big things whenever called upon. In other words, despite having limited personnel, resources, and capabilities, Canadians have come to expect its practitioners of aerospace power to fulfil a broad range of demands—to operate anywhere and everywhere in the “Big Sky.” It has been, is, and will continue to be a daunting challenge.

The papers in this volume provide a “taste” of some of the varied challenges faced by the Canadian Air Force during its history. Chapters one through six look at the Royal Canadian Air Force (RCAF) during WWII as it dealt with recruiting, training, transportation, strategic bombing, tactical air support, and maritime warfare. These demands were met and overcome whilst in the midst of a world-wide struggle, but with full national support. In contrast, the final five chapters examine aerospace power in Canada as it applies to naval and army aviation, non-combat roles in the national interest, such as counter-drug missions, and combat operations within NATO and a coalition in Kosovo and the Persian Gulf respectively. These challenges were overcome by Canadian aerospace forces struggling to cope with sometimes rapidly changing levels of national and institutional support resulting from complex external forces. Yet, through it all, this Little Air Force could be found everywhere in the Big Sky.

.....

**Notes**

1. Air Marshal Clare L. Annis, presentation to the Canadian Club of Montreal, 17 March 1952.
2. There are planned biographies of senior Canadian airmen in the works. To date, I know of projects looking at Air Commodore L. Birchall, Air Vice-Marshal C. M. “Black Mike” McEwen, Air Marshal Wilf Curtis, and Lieutenant-General Bill Carr.
3. The Royal Australian Air Force (RAAF) also claims to have been the fourth largest Allied air force during WWII, albeit at a different point. Depending upon the date and data used (number of aircraft, personnel, etc.) both claims are equally valid. For an excellent summary, see the RAAF’s *Pathfinder* 119, September 2009, <http://wirpower.airforce.gov.au/Publications/List/41/Pathfinder.aspx?page=2> (accessed January 15, 2011).
4. For a brief summary of these conflicts and the Air Force’s participation, see “Editor’s Message,” *The Canadian Air Force Journal* 3, no.2 (Spring 2010): 4–7, [http://trenton.mil.ca/lodger/CFAWC/eLibrary/Journal/Archive\\_e.asp?Vol=Vol3-2010&Issue=Iss2-Spring](http://trenton.mil.ca/lodger/CFAWC/eLibrary/Journal/Archive_e.asp?Vol=Vol3-2010&Issue=Iss2-Spring) (accessed January 27, 2011).

## Chapter 1

# The Royal Canadian Air Force and the Road to War<sup>1</sup>

*Carl A. Christie*

Given the downsizing era in which we are living, it might be instructive to take a look at the air force of sixty years ago, when times were even tougher—much tougher—than they are today. The Royal Canadian Air Force (RCAF) of the thirties was hit harder by government restraint than the present-day air force has been, with a similar lack of interest or concern shown by the general public.<sup>2</sup> Even so, the RCAF managed to respond when the country went to war in September 1939, and six years later was one of the great air forces of the world.

At the risk of reading history backwards, it must be said that even in the last couple of years before the war the RCAF was not a particularly impressive organization. Admittedly, if we know how it grew to immense size during the upcoming conflagration, with a peak personnel strength of over 200,000 men and women,<sup>3</sup> and how it did all sorts of impressive things in every theatre of operations as well as at home, we may be able to see the seeds of a real air force. However, if we did not know what was to come and were dropped into the Canada of 1937, we would be dismayed at the state of the RCAF. The official history describes it as “decrepit” at that time.<sup>4</sup>

At the end of March 1937, the RCAF had 148 permanent and 76 non-permanent officers, and 959 permanent and 493 non-permanent warrant officers, non-commissioned officers, and airmen. That makes a total of 1,107 full-timers of all ranks and 569 part-timers,<sup>5</sup> for a grand total of 1,676. In round numbers, 60 years ago, the RCAF had fewer than 1,700 members.

If the manpower strength seems miniscule, the equipment situation was no different. The Department of National Defence report for the fiscal year ending 31 March 1937 admitted that “[t]he aircraft in use in the RCAF are mainly types which are rapidly becoming obsolete.” Even amongst the 31 service types, there were few that would not have been dangerous to take to war. It would have been absolute suicide to fly most of the RCAF’s planes into an operational theatre. If the quality was suspect, quantity was no better, with only 135 machines on the total inventory.<sup>6</sup> Men and machines were stretched very thin, flying out of a mere handful of stations from Vancouver to Dartmouth.<sup>7</sup>

It is fascinating to remember, as we look back on what was going on in Canada, that since the First World War some people had come to the conclusion that air power was going to win the next war. Billy Mitchell in the United States<sup>8</sup> and Giulio Douhet in Italy<sup>9</sup> told all who would listen that the bomber was now the key weapon. The American air power “agitator” (as at least one historian of the United States Air Force has tagged Mitchell)<sup>10</sup> showed, by practical demonstration, that aircraft could sink an unmanned, defenceless old battleship.<sup>11</sup> Douhet advocated an independent air force, completely separate from the army and navy. In fact, he went further, arguing in 1928: “The Air Service in relation to the Army and to the Navy is overwhelmingly more important as to functions, organization and methods of employment.”<sup>12</sup> He reiterated this the following year, writing that wise nations would “concentrate the bulk of all national resources in the decisive field, the air.”<sup>13</sup>

The persuasive argument coming so soon after the impressive debut of the aeroplane before a mass audience in the Great War convinced more than just airmen. In Britain, for example, even that great sailor, Admiral Jackie Fisher, seemed won over to the side of air power. “By land and by sea,” the famous First Sea Lord wrote that

the approaching aircraft development knocks out the present fleet, makes invasion practicable, cancels our country being an island, transforms the atmosphere into a battleground of the future. There is only one thing to do to the ostriches who are spending their vast millions on what is as useful for the next war as bows and arrows. Sack the lot. As the locusts swarmed over Egypt, so will aircraft swarm in the heavens, carrying inconceivable cargoes of men and bombs, some fast and some slow. Some will act as battle cruisers and others as destroyers. All cheap and—this is the gist of it—requiring only a few men as crew.<sup>14</sup>

In the thirties, Canada went in the opposite direction, moving from a small air force to a smaller one.<sup>15</sup> After having officially begun life with 260 members on 1 April 1924, and grown to a total strength of 906 officers and airmen by 31 March 1931, the permanent RCAF dropped almost a quarter in size, to 694 souls, two years later.<sup>16</sup> The Great Depression, and the government's reaction to it, brought "The Big Cut" in the defence budget.<sup>17</sup> The portion dedicated to Air Services shrunk from expenditures of \$7,147,018 in the 1930–31 fiscal year to \$4,129,790 the following year, to \$1,731,220 in 1932–33 and to \$1,684,562 in 1933–34, before very gradually starting to climb again.<sup>18</sup>

Early in 1932, Major-General A. G. L. McNaughton, the Chief of the General Staff (CGS), was attending the Geneva Disarmament Conference when he received blunt news of the slashing. His response: "The Air force, of course, is entirely shot to pieces."<sup>19</sup> More flippantly, Flight Lieutenant C. C. Walker, writing (on behalf of the senior air officer) the Fortnightly Intelligence Summary to Squadron Leader Grandy, the RCAF liaison officer in London, added a personal, longhand postscript: "P.S. The House tabled the estimates yesterday. Instead of the \$5,350,000 asked by CCA [Controller of Civil Aviation], CGAO [Civil Government Air Operations] & RCAF, the total given to the Air Services is \$1,750,000. Better get ready—it's starvation diet. Whoops."<sup>20</sup>

Ironically, The Big Cut—or at least anticipation of something like it—may have had a positive influence on the RCAF as a military air force. The official history comments that "paradoxically, however, as the funds, declined, defence analyses became sharper, distilled to bare essentials. And the RCAF found itself taking on the central responsibility for Canada's home defence."<sup>21</sup>

Officials in Ottawa undertook serious studies of the military organization needed for national defence. The CGS himself was a pragmatist wishing to make the most efficient use of dwindling resources. Under the circumstances, he became increasingly supportive of the RCAF, considerably less so towards the militia, and almost antagonistic towards the Royal Canadian Navy (RCN). Because "the substantial reduction in funds called for could not be whitewashed across the whole three Services," he warned Prime Minister R. B. Bennett about further proposed cuts in June 1933, "having regard to efficiency it would be necessary to concentrate on the absolute essentials, i.e., the Militia Forces and the Air Force."<sup>22</sup> This would eliminate the Navy, whose ships were too expensive. Besides, he added, it was "of the nature of naval forces that they cannot be rapidly expanded to meet emergencies, and in consequence, it seems to me that little purpose is served in maintaining a small nucleus."<sup>23</sup>

McNaughton also wrote on a subject closer to our narrow interests:

On the other hand, Air Forces even in small numbers are a definite deterrent in narrow waters and on the high seas in the vicinity of the shore; they can be developed with considerable rapidity provided a nucleus of skilled personnel in a suitable training organization is in existence; the pilots engaged in civil aviation can be quickly adapted to defence purposes; civil aircraft are not without value in defence, and any aircraft manufacturing facilities are equally available to meet military as well as civil requirements. That is, from a comparatively small current expenditure a considerable deterrent can be created in a relatively short time, and this is particularly the case in Canada where aviation plays a large part in the economic life of the country, a part which is increasing naturally at a rapid rate.<sup>24</sup>

The dominant figure in the nation's defence establishment concluded: "This being so, it appears to me that the most important element in defence which should be retained is the nucleus Air Force."<sup>25</sup>

Bennett appears not to have bought the argument. Defence expenditures for 1935 were lower than those for 1931, and the aircraft inventory was singularly unimpressive. In October 1935, the RCAF had 174 planes, including 8 Siskins and 15 Atlases (both built by Armstrong-Whitworth), 5 Vickers Vancouver flying boats, and 4 Blackburn Shark torpedo bombers. As the official history comments: "It was not much from which to fashion a fighting machine capable of carrying out its function as the first line of the country's defence."<sup>26</sup>

When McNaughton retired as COS in 1935, he wrote a paper on the defence of Canada. In it he discussed the international crises of the previous decade and stressed the importance of building and

maintaining an adequate air force.<sup>27</sup> In the same year, William Lyon Mackenzie King and the Liberals were returned to power by the people of Canada.

It took the returning Prime Minister a year to get around to it; however, we know from his diary that Mackenzie King was given a copy of McNaughton's valedictory defence appreciation paper, and read it in August 1936. He did so to prepare for the first meeting of the high-level Canadian Defence Committee, a new coordinating body he established and chaired, with the ministers of finance, justice, and defence as members.<sup>28</sup> The Prime Minister was obviously concerned about the dangers of the world situation and the lack of Canadian preparedness. Following a Cabinet meeting, he confided to his diary: "the Minister of Labour, Norman Rogers, reported on pilots, about 450 available (an hour's shooting in a world conflict); medical supplies, etc., in good shape. I urged getting training underway in air as rapidly as possible—unemployed to be encouraged to get in—for forest fires, survey, mail, etc., but to be ready for emergencies—also I urged need for coast defence on Atlantic & Pacific, mine sweepers & a few cruisers—we were all agreed a terrible situation might come in Europe at any moment."<sup>29</sup>

In this climate, perusing McNaughton's paper thus appears to have confirmed the Prime Minister's worst fears. He commented privately upon the document: "It discloses a complete lack of any real defence. I feel we must get aircraft equipment & look after our coasts—defend our neutrality, & be prepared to mobilize industry, and arrange for effective co-operation of Govt. departments."<sup>30</sup> King would have to walk the tightrope between doing enough to augment the armed forces to be prepared, but not enough to antagonize the isolationist segment of the population; and, to use the kind of language popular today, whatever was done, it would have to be done in a fiscally responsible manner. This was a tricky assignment for the Prime Minister and his officials as the international situation continued to worsen without any noticeable increase in interventionist sentiment in Canada.<sup>31</sup>

The Liberals assumed power in Ottawa in October 1935, just as the world was trying to come to grips with the Italian invasion of Ethiopia. The following March, Hitler sent German troops into the Rhineland, and four months later civil war broke out in Spain. Persistent Japanese aggression resulted in all-out war with China a year later, in July 1937. Each of these crises drove another nail into the coffin of the League of Nations, the great hope of the Paris Peace Conference. While it may not have been obvious at the time, the archival record—particularly the diary of William Lyon McKenzie King—makes it clear that the Prime Minister favoured the air force as the key to solving Canada's defence problems. The views of the much respected former Chief of the General Staff pulled him in this direction, as did those of Air Commodore G. M. Croil. King commented about the Senior Air Officer:

Commodore [sic] Croil, of the Air Force, impressed me very favourably—he used this memo as notes, and made a good presentation... sound and convincing... The impression left on my mind was of the complete inadequacy of everything in the way of defence—the need in view of changed methods of warfare of having some coast agreement against raiders, chance attacks by sea and air. It is going to be extremely difficult to do anything effective without a cost which this country cannot bear.<sup>32</sup>

Even the British Prime Minister, Stanley Baldwin, expressed views that King took as supporting expansion of the RCAF. After his October 1936 visit to London, King wrote that Baldwin thought that

we should give attention mostly to the air force; while Canada might be the last country to be attacked, the air force would be the most helpful of any in case of attack, and training of men for the air and plenty of air equipment was the essential of modern warfare. He did not seem to think the navy was the thing to be concerned about, nor did he speak at all of the army.<sup>33</sup>

King had obviously convinced himself. He had a little more trouble with the Cabinet and the House of Commons. The tri-service Joint Staff Committee recommended, in the fall of 1936, that defence expenditures be increased in a balanced fashion and that all three services be strengthened dramatically. The recommendation called for almost \$200 million over a five-year period, starting



with \$65 million in the first year, or approximately \$12 million more than the usual annual militia expenditure.<sup>34</sup> King and his Minister of National Defence, Ian Mackenzie, put the case to Cabinet, with the Prime Minister arguing that “we needed at least something that appeared like a protection of the gateway to Canada at the mouth of the St. Lawrence and something which might serve emergency purposes at harbours on the Pacific... putting most of our expenditure into aircraft which could be available to move from one part of Canada to another, and some anti-aircraft guns at the coast.”<sup>35</sup>

Mackenzie wanted almost \$57 million. However, with the Minister of Finance preoccupied with reducing the deficit, he had to settle for \$32,835,239, almost one-third for the RCAF. Still, this was almost double the sum military aviation received for the previous year, and about six times its allotment only five years earlier.<sup>36</sup>

After convincing the Liberal caucus of the need to drastically increase defence expenditures, King and Mackenzie had to get it through the House of Commons. The Minister of National Defence, in his speech during the debate of February 1937, stressed the advances in long-range flying that meant Canada was no longer immune to attack from the air. To counter the threat, he said:

We are prepared to build a hundred aeroplanes.... These, sir, are not necessarily finally localized in any portion of this dominion. They would be machines of high velocity, capable of being moved within a few hours for the defence of any portion of Canada—available for the protection of the great St. Lawrence River, available for the protection of Montreal, available for the protection of Quebec, available for the protection against any raid that might be made on the grain elevators of this country. In this day of aircraft carriers it is quite conceivable that enemy nations might raid this nation....<sup>37</sup>

The Prime Minister later was more understated, admitting to the House that “[r]elatively, our danger is small.”<sup>38</sup> Even so, his government would not shirk its responsibilities. He then launched into a speech that was a marvel of circumlocution, giving comfort to all, no matter where they stood on the continuum between outright isolationism, adventurous interventionism, and full subservience to the Mother Country as a member of the British Empire. At the conclusion of the debate, the government was supported in a rearmament programme that can be seen in retrospect as tentative.<sup>39</sup> It was, however, a start, and it was one that gave the RCAF primary responsibility for the nation’s defence.

Getting more money was not a panacea. Croil recognized that his service did not yet have the critical mass that would allow it to grow quickly. His approach was slow and sure, never wishing to go too far too fast, and never wanting to waste energy or money. For example, the RCAF refused to consider any unproven aircraft that might result in a false step. Every purchase had to be of equipment known to be sound and reliable. The Senior Air Officer admitted:

I have consistently resisted anything in the nature of experimental types. We cannot afford to embark upon the manufacture of an aircraft which, when complete, will turn out a failure; therefore, we must wait until the Air Ministry has tested the first of the type we desire, in order to be sure that type when completed will be satisfactory.<sup>40</sup>

Note as well, the preoccupation with British aircraft. The government did not want to buy American because of concern that the United States might remain neutral in any upcoming war. In addition, King was concerned about appearances and the political consequences. As late as March 1939, he confided to his diary:

I took the view which I think Council generally supported that if war came, it would come probably this year. That we would not have the planes in time if ordered from the United States. If orders were given in the States and no war came, we would be confronted through a campaign with having given [an] order of millions to American factories instead of our own. It was better, therefore, to give orders in Canada though they would be about a year later in being delivered.<sup>41</sup>

Besides, the RCAF itself preferred British aircraft because of the wish to remain compatible with the equipment and ways of the Royal Air Force (RAF)<sup>42</sup> to which Canadian airmen looked for

leadership and inspiration. The RCAF procurement policy meant that most of those acquired were obsolete by the time they were taken on strength. Once war came it quickly became apparent that between the demands of war, the limitations of British industry, and the U-boat gauntlet in the North Atlantic, the RCAF would have to buy and fly many American-built aircraft. Indeed, by the summer of 1940, even the RAF had to buy American.<sup>43</sup>

Spurred by McNaughton's words and actions earlier in the decade, and also, one suspects, by the worsening world situation, Air Force Headquarters (AFHQ) had been carefully considering the role of the RCAF in the country's defence. In the technical and equipment sense, the air force may not have been ready for the war when it came in September 1939. Intellectually, it probably was. Through the thirties, a small number of RCAF officers—Group Captain J. L. Gordon and Squadron Leader G. V. Walsh are a couple who come to mind—thought and wrote about defence problems. Some of them attended the RAF Staff College, welcoming the time to think about strategic and tactical questions.<sup>44</sup>

As these men looked at Canada's unusual, and blessed, geopolitical situation, they realized that they did not really have to fear an attack from the United States. Our Atlantic coast, protected as it was by the Royal Navy,<sup>45</sup> seemed almost as secure as our southern boundary. Nobody was as sure about the Pacific coast. Defence problems there, if not an outright attack, seemed less unlikely. As Japan flexed its muscles in Asia, people on the western coast of the United States, and to an extent in British Columbia, worried about their safety. Officials in Washington and Ottawa had a similar reaction, concerned that Japanese coastal or commerce raiders might establish bases amongst the coastal islands off Canada's West Coast.

In Canada's case there was an added fear. If we did not do something to protect our Pacific coast, our American friends might move in—uninvited—and do it for us. The RCAF official history mentions this. So does Roger Sarty, the respected historian of coast defence in Canada. After noting the preoccupation of the Navy with the region, he points out very clearly:

The vulnerability of the West Coast had also been the initial impetus for the air force programme. Warships alone could not hope to keep an effective watch over that vast littoral. The priority in US rearmament for the air services and coastal bases left no doubt about the Americans' readiness to do the job in default of Canadian action.<sup>46</sup>

The big advantages of the air force were, of course, its mobility and its flexibility. Everyone assumed it would be easier to move an air squadron to wherever it was needed—from coast to coast, or even overseas—than to move a regiment or a ship, and especially the latter.<sup>47</sup> The air force also appeared to Mackenzie King, and perhaps to others, to offer a way of helping Mother Britain in any future conflict while avoiding the high casualties of another Western Front, and the imposition of conscription that might follow high wastage rates. This would mean a much more palatable war of limited liability and less strain on Canadian unity.

Beyond the limited liability that the air force appeared to offer—even if sent overseas—the RCAF and its supporters had another issue with which to convince the government that an improved air force was required, and that was that global advances in air power were threatening Canada's invulnerability. Croil played on official fears when he wrote in the summer of 1938:

Air action against air-borne [sic] attack is a problem that is becoming more complex every day. We have been more fortunate that until the last few years the defence of our sea-borne trade, ports, industries and cities has been a comparatively simple problem compared with that facing us today. The advent and rapid development in the performance of aircraft has immeasurably added to and will continue to add to the complexities of the problem. We are by no means immune to air attack today. Very definitely, at the moment, attack by airships from an overseas base, or by aeroplanes launched from ships, is a probability. Direct attack by aeroplanes from an overseas base is also possible, and it will only be a short time before such will become probable... if we recollect, the last war proved that aircraft development is considerably more rapid under war conditions, and we have every reason to consider that the same will hold good in any future war. Even if peace continues, records of today will be normal performance five or six years hence.<sup>48</sup>

As he penned these words, Croil was lobbying for changes in the RCAF's outdated organizational and administrative structure. The most notable anachronism, to an airman, was the lack of independence. The RCAF was officially part of the militia, with its senior air officer reporting to the Chief of the General Staff. This took some time to fix. It was not until almost the end of 1938 that the RCAF achieved complete autonomy. Croil would henceforth chair an Air Council of senior air force staff officers and would report directly to the Minister of National Defence. The service's increased stature was reflected in a new title for its head, Chief of the Air Staff.<sup>49</sup>

By the time these changes were made at the top, the RCAF had acquired a new command structure to deal with its increased responsibilities and the perceived threats of the late thirties. As a reflection of the area of greatest concern, in the spring of 1938, the commander of RCAF Station Vancouver, Group Captain G. O. Johnson, assumed command of the newly created Western Air Command (WAC), reporting directly to Croil at AFHQ in Ottawa.<sup>50</sup> On 1 August 1938, WAC took charge of units west of Ontario, in particular those on the Pacific Coast, where the RCAF was the predominant partner in the Defence plans.

Spurred on by the Munich Crisis of September 1938, Eastern Air Command at Halifax and Air Training Command at Trenton arrived on the scene a few weeks later, with obvious mandates: to defend the East Coast and to oversee all RCAF training activities.<sup>51</sup> The formation of the three commands freed AFHQ to concentrate on the service's expansion and on planning for the worst.

The increase in defence expenditures and the expansion of the RCAF appear to have been accepted, not only because of fears engendered by events abroad, but also because some of the traditional Canadian reticence about the defence establishment lessened when it came to the air force in the late thirties. Unlike the militia and the Royal Canadian Navy, which seemed to predicate their plans on overseas commitments, the RCAF could be used simply to defend Canadian territory. Who could argue against that in such dangerous times? After all, the RCAF's liaison officer at the Air Ministry, Squadron Leader F. V. Heakes, commented that they were living in "times of chaos" in "a sinking world."<sup>52</sup>

From London, Heakes kept RCAF Headquarters up to date, not only on happenings in the RAF and developments in the British aircraft industry, but also provided a running commentary on the deteriorating international situation. His liaison notes are a fascinating read, and proof that at least one Canadian Air Force officer was a very astute observer of the world scene. He did everything he could to help prepare his service and his country for a war that appeared to be virtually inevitable. On 25 January 1939, he wrote: "My own impression is that the next few months will be extremely trying, that progressively, they will move to a crisis equalling or exceeding Munich."<sup>53</sup>

As an astute and observant spectator at the periphery of great events, Heakes took time from his discussion of aircraft performance and production figures to comment on foreign affairs. Still in January 1939, after noting that "Barcelona is falling"<sup>54</sup> and the Italians were moving troops nearer the French frontier he wrote:

Other portents of the future are the projected visit of Count Ciano to Hitler... to confer, it is alleged, on the next joint action to be taken by the Berlin-Rome axis. Also, Hitler is to give an anniversary speech to the National-Socialists in Germany: such speeches always dealing with the "glorious" history of the Nazi regime and spurious attacks upon the democracies. The democracies are invariably shown in the light of violent and potentially dangerous enemies of Nazi-ism. Year by year, the tempo of such speeches is increasing. They are becoming more and more violent. And they often afford the popular occasion for the announcement of further violent policies—the precursor of fresh "incidents," further attacks and restrictions on the Jew. The tendency is to put the blood-pressure of the nation up to and beyond dangerous limits. One is reminded of the old Roman arena, where the crowd shouted for more Christians to be thrown to the lions, differing in but one respect—Hitler anticipates the demands of his hysterical followers by providing new and ever greater spectacles—the end of which no man can foresee. And how are these met by the democracies? Retreat after retreat.<sup>55</sup>

Heakes was not completely pessimistic, however. For he added:



But it is not always ignoble to retreat—even though a retreat may sometimes result in a debacle. He who fights is wise to choose his own time and his own grounds. Looking to this purpose, there may be no war. Because a wise general does not attack (if he can avoid it) a strongly entrenched foe. But several questions arise from this. Will the choice be long ours? In the Czech incident it seemed that the volition rested with us. But it need not necessarily continue to do so, particularly as the totalitarian states must [sic] needs march on and cannot long pause from further aggressive action.<sup>56</sup>

Our liaison officer devoted considerable time to the dispatch of information, and to developing opinions about what action the RCAF should take, about the nomination of cadets, for entry into Cranwell, about how the RAF looked after important things like aircraft maintenance, and about specific types and pieces of equipment, such as bombs and bomb-sights, and including top-secret subjects like radar and gas warfare, and about aircraft development. He went into considerable detail on the progress of the design and production of aircraft such as the Supermarine Spitfire and the Bristol Beaufighter, as well as their characteristics and performance figures. He particularly watched over the Hawker Hurricane, scheduled to go into service with the RCAF.

Heakes interspersed his notes with occasional comments that suggest a certain prescience. On 6 February 1939, he commented that “the general situation... appears to be very bad from a strategic point of view. Most authorities, including statesmen & politicians, consider that there is a grave likelihood of ‘The Balloon going up’ in the spring or early summer – and WITHOUT WARNING.”<sup>57</sup>

On a tangential note, Heakes did not sugar-coat his observations. He wrote that the Dominion liaison officers were often “left on their own” to pick up “bits and parts of what was going on, and the general impression was ‘confusion.’”<sup>58</sup> He found himself frustrated with the British reaction and complete lack of interest in Canada’s problems. At one point, following a meeting with the RAF’s Deputy Chief of the Air Staff at the Air Ministry, he confided, “that particular interview put my ‘back-up’ to quite a degree as it led to a discussion of Canada’s defence problem and of why we required such information.” Summed up, his remarks were that Canada had no defence problem, and to quote him literally, “All we want of Canada in a war is pilots and aircraft.”<sup>59</sup> The Canadian officer underlined this last sentence in his liaison notes, the only non-heading that this reader has observed to be so treated.

In fact, there is much truth to what Heakes said. In 1938, Canada declined an Air Ministry request that the Dominion train aircrew for the RAF, but left the door ajar ever so slightly.<sup>60</sup> A year later, of course, after the balloon had gone up, the British had more success in negotiations that resulted in the British Commonwealth Air Training Plan. The official RCAF history makes it clear that Air Ministry officials saw this as primarily a way to get manpower for the Royal Air force. Throughout the war, they tended to look aghast at Canadian moves to create our own national air force.

Frankness is apparent as Heakes looked back on the Munich Crisis of September 1938. To again quote him at some length:

Our officers all reported a similar state of affairs in the units, including almost unbelievable stories of lack of equipment (particularly armament), and vital armament, such as the guns on the Hurricanes, being found useless owing to overheating. The crisis served a most useful purpose for the R.A.F. It showed their weakness in planes, organization and equipment. It showed that things which should have been done had not been done. It is not anticipated that they will ever have a second chance to review their position, as resulted from the Sept. crisis. The best informed opinion is that Hitler when and if he strikes (and most opinion is that he will) it will be without warning. Consequently the R.A.F. must be put and maintained on a war footing, and be kept ready for immediate action. This leads me to a suggestion having a twofold purpose, namely the advantage of sending over for attachment to the various Command headquarters in England a number of RCAF staff officers to thoroughly familiarize themselves with R.A.F. Command war organization, war plans, mobilization, etc. Then, should war start, we would have the nucleus of a trained staff, familiar with the detail of how the R.A.F. actually works and how it prepares to work. For, what impressed me was the failure of perfectly good theoretical peacetime

plans in their application to a near state of war. These plans, however, and methods to implement them, have since been reviewed. Therefore, it can be expected that when and if a second emergency arises, the difficulties of organization at least will have been overcome. Consequently, whether war comes or not, our officers would have the advantage of excellent training in the methods of the force with which ultimately we will be working.<sup>61</sup>

Heakes also had practical advice for his colleagues at home:

My mind is continually revolving about the problems that would immediately arise, including, primarily the great difference such a force would find owing to climactic differences and the eternal cloud, mist, fog and rain they would suddenly be confronted with, and the difficulty of navigation, in fast modern aircraft, in these circumstances. The question of whether a Canadian Force could be thrown into the thick of it, or could be located on a relatively quiet sector for training, would arise: or alternatively whether units might better be temporarily attached to R.A.F. formations. What is quite clear to me is that the RCAF should avail itself of all the bad weather it can, in order to approximate the low standard of weather here. Looking for bad weather is rather a change of venue for any air force. But winter flying conditions in England are really atrocious. But fly they must, regardless of weather, for there is always the danger of the other fellow operating from weather secure bases.<sup>62</sup>

While Heakes was reporting from Britain, his colleagues at home steered the RCAF down the road to a war that seemed increasingly inevitable. We should not think, however, that the air force was fully prepared when it came. Compared with what was to come, with what was needed to contribute to the Allied victory in the Second World war, the figures for expenditures as well as for personnel and aircraft strength, for the final few months of peace, while larger than those for previous years, seem rather puny. Ian Mackenzie requested a total of \$60 million for the Department of National Defence for the 1939–40 fiscal year. The share for the air service would be almost one-half, an increase of 150 per cent over the previous year. In fact, the department received only \$34,799,192, with \$11,216,055 earmarked for the air.<sup>63</sup>

The minister's objective was a permanent RCAF of 525 officers and 4,500 airmen, backed up by 220 officers and 2,014 airmen for the non-permanent force.<sup>64</sup> Even so, by 5 September 1939, the RCAF could boast only 4,153 officers and airmen, noticeably fewer than the establishment that, by then, had been raised to 7,259.<sup>65</sup> AFHQ spent the last months of peace almost frantically ordering new aircraft. Yet, when the balloon went up in September 1939, as Heakes had predicted it inevitably would, the RCAF had a total of only 270 planes, including obsolete ones in storage. The eight permanent squadrons flew the most modern aircraft on the inventory: Hurricanes, Atlases, Vancouvers, Sharks, and Supermarine Stranraers, as well as Westland Wapitis and Northrop Deltas.<sup>66</sup> Those on order included the Bristol Bolingbroke, Westland Lysander, Douglas Digby, and North American Harvard, as well as additional Deltas, Sharks, and Stranraers.<sup>67</sup>

Obviously, when it comes to aircraft and personnel strength, the RCAF was not really ready to go to war in September 1939. Of course, it had no choice. Even so, this brief survey should demonstrate that in other ways the air force was ready for war, or at least not completely unprepared. It had spent the previous couple of years educating key members of the government on the value of having a viable air force. (Although, when one considers what the wastage rate in Bomber Command did to Mackenzie King's war of limited liability, it may have been a pyrrhic victory.)

Perhaps most significantly, the RCAF had developed a number of able senior officers, and at the same time, improved its organization and administrative procedures. Both achievements would allow it to undergo an unprecedented expansion in only a few short years and to help win the war. All things considered, especially when coping with fiscal restraint and a somewhat unsympathetic government and Canadian public, the preparations undertaken by the RCAF in the lead-up to the war were quite remarkable. For all the glitches that occasionally occurred over the next six years, the systems were in place by the summer of 1939 to cope with whatever the future might bring, and cope they did, in a marvellous way.

.....

## Notes

1. The essentials of this paper were included as the second half of a longer presentation, entitled “The RCAF and the Coming of War,” made at the National Convention of the Canadian Aviation Historical Society (CAHS) in Ottawa, June 7, 1997. It placed more emphasis on the RCAF in 1937 (the year being commemorated by the CAHS at its convention) and how the air force got to that point, before continuing along the lines of this particular paper. I am indebted to Tim Dubé, President of the host Ottawa Chapter of the CAHS, for asking me to participate in an enjoyable conference and for supplying the subject and title of my talk. I must also thank Major Bill March (then Senior Staff Officer History at Air Command Headquarters), for suggesting that I could give the talk again a week later to a different audience at the Air Force Historical Conference. The two gatherings provided interesting and informative “book-ends” to a very pleasant week. For more on the things discussed in both papers, see my history of the RCAF, which was scheduled for publication by the University of Toronto Press in the spring of 1999.

2. When one looks through Canadian newspapers of the interwar period as part of a search for information on this subject, there appear to be more articles about the Royal Air Force than about the Royal Canadian Air Force. Upon reflection, this should not be surprising, because many Canadians of that era still identified closely with the Mother Country and the Empire, and because it seems that more of them joined the British air force between the wars than joined that of their own country. See Leslie Roberts, *There Shall Be Wings: A History of the Royal Canadian Air Force* (Toronto: Clarke, Irwin, 1959), 112. Fred Hatch indicates that more than 400 Canadian aircrew candidates alone joined the RAF during the interwar period, along with a similar number of ground crew. See F. J. Hatch, *The Aerodrome of Democracy: Canada and the British Commonwealth Air Training Plan, 1939–1945*, Directorate of History Monograph Series No. 1 (Ottawa: Department of National Defence, 1983), 5. For a quick, general appreciation of how the press reflected this reality, see the uncatalogued scrapbook collection of aviation clippings (unfortunately, too frequently unidentified) currently held at the Department of National Defence’s Directorate of History and Heritage (DHH) in Ottawa.

3. For a useful list of RCAF strength over the years, see H. A. Halliday, “Chronology of Canadian Military Aviation,” National Museum of Man, Mercury Series, Canadian War Museum Paper No. 6 (Ottawa: National Museums of Canada, 1975), 164.

4. W. A. B. Douglas, *The Creation of a National Air Force*, vol. 2. *The Official History of the Royal Canadian Air Force* (Toronto: University of Toronto Press, 1986), 139.

5. Report of the Department of National Defence Canada for the Fiscal Year Ending 31 March 1937 (Ottawa: King’s Printer, 1937), 73 (hereafter cited as Report 1937). In fact, it was only in 1935 that the total personnel strength of the RCAF had exceeded 1000 for the first time. Roberts says this did not happen until the fall, Roberts, 100; an appendix to Hugh Halliday’s Chronology... records the strength on 31 March 1935 as 1102, up considerably from 726 a year earlier, Halliday, 164.

6. Report 1937, 67.

7. *Ibid.*, 66–73.

8. While William Mitchell spoke and wrote as an advocate of the air force for much of his adult life, his basic ideas can be gleaned from his book *Winged Defense: The Development and Possibilities of Modern Air Power, Economic and Military* (New York: Putnam, 1925). For one of the most recent of several books about Billy Mitchell and his controversial career, see Alfred E. Hurley, *Billy Mitchell, Crusader for Air Power* (Bloomington, Indiana: Indiana University Press, 1975). Perhaps the newest discussion of the man and his ideas is an article by Elihu Rose “The Court Martial of Billy Mitchell,” Special Issue (on Air Power) of *MHQ: The Quarterly Journal of Military History* 8, no. 3, Spring 1996, 16–26.

9. Douhet’s *The Command of the Air* was originally published in Italy in 1921. The most accessible version of Douhet’s theories for English-speaking readers today is the 1942 translation by Dino Ferrari for Coward-McCann, Inc., as reprinted in 1983 by the US Office of Air Force History and incorporating later changes and other writings by the Italian general. See Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (Washington: Office of Air Force History, 1983).

10. Carroll V. Glines Jr., *The Compact History of the United States Air Force*, new and rev. ed. (New York: Hawthorn Books, 1973), 111.

11. *Ibid.*, 111–15; Herbert Molloy Mason Jr., *The United States Air Force: A Turbulent History* (New York: Mason Charter, 1975), 75–80; Charles D. Bright, ed., *Historical Dictionary of the U.S. Air Force* (Westport, CT: Greenwood Press, 1992), 389–91.

12. Louis A. Sigaud, *Douhet and Aerial Warfare* (New York: Putnam’s, 1941), iv.

13. Douglas, 199. Douhet, in emphasizing the “battleplane,” or bomber, tended to overlook the importance of fighters. See Bright, 189–90. For a recent discussion of Douhet’s ideas, see John Prados, “The Strategic View: The Prophet of Bomber War,” Special Issue of *MHQ: The Quarterly Journal of Military History* 8, no. 3, spring 1996, 14–15. For a good, brief summary of the views and impact of Douhet, Mitchell, and other air power theorists of their day, see Michael S. Sherry’s chapter on the subject, “The Age of Prophecy,” in *The Rise of American Air Power: The Creation of Armageddon* (New Haven, CT: Yale University Press, 1987), 22–46. David MacIsaac builds from a discussion of the early thinkers on air power to present a contemporary consideration

of the subject in David MacIsaac, "Voices from the Central Blue: The Air Power Theorists," in *Makers of Modern Strategy*, ed. Peter Paret (Princeton, NJ: Princeton University Press, 1986), 624–47.

14. Glines, 112.

15. The tiny, non-permanent Canadian Air Force, recommended by the Air Board and by order-in-council PC 395 of 18 February 1920, had no official connection with the short-lived, two-squadron Canadian Air Force that was formed in Britain as part of the Royal Air Force at the end of the First World War, nor with the Royal Canadian Naval Air Service (RCNAS) which was going to undertake anti-submarine patrols from Dartmouth and North Sydney until it too expired in 1919. On 1 April 1924, the CAF became permanent and officially acquired the prefix "Royal." For a good discussion of the birth and early development of the RCAF, see Douglas, 1–151. For the first CAF overseas and the RCNAS, see S. F. Wise, *Canadian Airmen and the First World War*, vol. 1, *The Official History of the Royal Canadian Air Force* (Toronto: University of Toronto Press, 1980), 579–621. The first Canadian Air Force (CAF) and the RCNAS will be discussed in my own forthcoming RCAF history. For PC 395, see the appendix to James Eayrs, *From the Great War to the Great Depression*, vol. 1, *In Defence of Canada* (Toronto: University of Toronto Press, 1967), 332–34.

16. Halliday, 164.

17. C. P. Stacey, *Arms, Men and Governments: The War Policies of Canada, 1939–1945* (Ottawa: Department of National Defence, 1974), 1.

18. Comparative Statement of Expenditure, Militia, Naval, Air and Other Services for Ten Years from 1927–28 to 1936–37, Report 1937, 13. See also E. W. Stedman, *From Boxkite to Jet: The Memoirs of an Aeronautical Engineer*, National Museum of Man, Mercury Series, Canadian War Museum Paper No. 1 (Ottawa, National Museums of Canada, 1972), 157.

19. Douglas, 125; John Swettenham, *McNaughton*, vol. 1, 1887–1939 (Toronto: Ryerson, 1968), 266, where a footnote adds that McNaughton may have already received the news, through his wife, from Sir George Perley, "of a cataclysmic blow to our hopes for Canada's future in the air."

20. Flight Lieutenant C. C. Walker, Report to Squadron Leader Grandy, Fortnightly Intelligence Summary, 15 February 1932, in file labeled, Copies of Monthly News Letter, A.S.D. 1 Branch, DHH 181.002 (D15).

21. Douglas, 125.

22. *Ibid.*, 126.

23. *Ibid.*

24. *Ibid.* For more on the CGS's views, see Swettenham, 300–17.

25. Douglas, 126.

26. *Ibid.*

27. *Ibid.*, 126–27; Stacey, 3.

28. See King's Diary, 19 August 1936 (handwritten, page 525, typed 291), microfiche copy of original held at the National Archives of Canada (NA), DHH 83/530.

29. King's diary, 5 August 1936 (handwritten 497, typed 276).

30. King's diary, 25 August 1936 (handwritten 543, typed 299); Douglas, 131.

31. See H. Blair Neatby, *The Prism of Unity 1932–1939*, vol. 3, *William Lyon Mackenzie King* (Toronto and Buffalo: University of Toronto Press, 1976), 180–81.

32. King's diary, 26 August 1936 (handwritten 544, typed 299), microfiche copy, DHH 83/530.

33. Douglas, 132.

34. Stacey, 3.

35. Douglas, 33.

36. Canada, Department of National Defence, "Comparative Statement of Expenditure, Militia, Naval, Air and Other Services for Ten Years from 1929–30 to 1939–40." Report of the Department of National Defence Canada for the Fiscal Year Ending March 31, 1939 (Ottawa: King's Printer, 1939), 12–13.

37. Douglas, 33–34.

38. *Ibid.*, 134.

39. Stacey, 3.

40. Douglas, 140.

41. Roger Sarty, in his important paper, "Mr. King and the Armed Forces," in *A Country of Limitations: Canada and the World in 1939*, ed. Norman Hillmer, Robert Bothwell, Roger Sarty, and Claude Beauregard (Ottawa: Canadian Committee for the History of the Second World War, 1996), 228.

42. Air Vice-Marshal E. W. Stedman recalls "buy British" as a definite and deliberate RCAF policy. See his memoirs, Stedman, 169.

43. Carl A. Christie, *Ocean Bridge: The History of RAF Ferry Command* (Toronto: University of Toronto Press; Leicester, England: Midland Publishing, 1995), 25–26.

44. Douglas, 124.

45. Sarty, 219.
46. *Ibid.*, 220.
47. The difficulty of moving the aircraft and men of RCAF squadrons in the late summer of 1939 demonstrated how naively optimistic was this view. See F. H. Hitchins, *Air Board, Canadian Air Force, and Royal Canadian Air Force*, National Museum of Man, Mercury Series, Canadian War Museum paper No. 2 (Ottawa: National Museums of Canada, 1972), 389–93. The daily diaries and operations record books of the squadrons and stations involved, held by the National Archives of Canada, but also available on microfilm through interlibrary loan, provide more—if spotty—detail of the problems encountered during these movements.
48. Douglas, 130.
49. Stacey, 5; Douglas, 138.
50. Chris Weicht, *Jericho Beach and the West Coast Flying Boat Stations* (Chemainus, BC: MCW Enterprises, 1997), 50; Stacey, 5.
51. *Ibid.*; Hitchins, 358–59.
52. Francis Vernon Heakes Papers, National Archives of Canada (NA) Manuscript Group (MG) 30 3 546, file 1, fols 3 and 4. An original member of the RCAF, Heakes was promoted wing commander on 1 April 1939, was designated Officer Commanding RCAF Overseas in January 1940, when the Liaison Office closed, and returned to AFHQ in Ottawa in August 1940. In December 1942, he became Air Officer Commanding (AOC) No. 1 Group, St. John's, Newfoundland, and in August 1944, AOC Western Air Command. He received a Mention in Dispatches and was named a Commander, Order of the Bath, and Commander, Legion of Merit (United States) for his wartime contributions, with particular note made of his role in the air side of the Battle of the Atlantic. For the citations, preceded by a brief sketch of Heakes' career, see Hugh Halliday's RCAF awards database available on computer diskette as well as on the Air Command home page on the Internet.
53. Heakes Papers, NA, MG 30 E 546, file 1, folio 64. It is not clear what use was made of these notes and who read them at the time. From the wording, and also from the occasional marginal notation in a different hand—initialed “GMC”—they appear to have been directed to the Chief of the Air Staff, Air Vice-Marshal G. M. Croil, with franker comments than could be found in the Chief Liaison Officer's official dispatches from London. I am indebted to Tim Dubé of the National Archives' Manuscript Division for drawing this collection to my attention and for urging me to have a look at it.
54. *Ibid.*, file 1, fols 66–68.
55. *Ibid.*
56. *Ibid.*, file 1, fols 68–69.
57. *Ibid.*, file 3, fol. 29 (Heakes' capitalization).
58. *Ibid.*, file 3, fol. 32-3. On another occasion, Heakes complained about “the tendency around here to let the Dominions ‘paddle their own canoe.’ They make no fuss whatever about reconciling whatever we get with the official conscience.” *Ibid.*, 46.
59. *Ibid.*, file 3, fol. 47.
60. See James Eayrs, *Appeasement and Rearmament*, vol. 2, *In Defence of Canada* (Toronto: University of Toronto Press, 1965), 92–102.
61. Heakes Papers, NA, MG 30 E 546, file 3, fols 33–35.
62. *Ibid.*, file 3, fols 48–50.
63. Report, 12-13; Halliday, 165. Wing Commander Hitchins, in Kitchens, 373, has slightly more generous, rounded figures.
64. *Ibid.*
65. Douglas, 343. For the personnel strength of the RCAF, from 1924 to 1967, see Halliday, 164.
66. Hitchins, 382.
67. For more on RCAF aircraft procurement and development during the interwar period, see Stedman.

### ***Carl A. Christie***

*Carl A. Christie is the author of Ocean Bridge: The History of RAF Ferry Command (University of Toronto Press and Midland Publishing, 1995); and Truly Royal: The History of the Canadian Air Force (University of Toronto Press, forthcoming).*



## Chapter 2

## The British Commonwealth Air Training Plan and Limited Liability

*Sandy Babcock*

*If the Battle of Waterloo was won on the playing field of Eton, the historian of the Second World War may, with some justification, record that the air battle in Europe was won on the fields of the BCATP.*

Fred H. Hitchens<sup>1</sup>

The British Commonwealth Air Training Plan (BCATP) remains a popular example of a significant Canadian contribution to the Second World War (WWII). The BCATP has been credited with spurring economic prosperity within Canada, especially across the western provinces. It sponsored nation building, as regions of Canada cooperated in a single, massive effort. The “Plan” was also instrumental in developing a modern transportation infrastructure across the country.<sup>2</sup> It produced an incredible number of trained aircrew in a short time, with over 131,000 students successfully completing training between 1940 and March 1945.<sup>3</sup> However, it is important to understand the original context and purpose of the BCATP before anointing it an unqualified success.

As WWII approached, the Mackenzie King government, and for that matter, Canadians in general, sought a way of avoiding the tragedies of 1914–18. Almost 60,000 Canadians died and over 150,000 suffered injuries during the Great War.<sup>4</sup> Moreover, Canada suffered through a conscription crisis, which placed English and French Canadians on opposite sides. These issues were to dominate the government’s approach to anything that gave the appearance of a military commitment.

This paper will examine the BCATP as a strategy by the government to limit Canada’s personnel and financial liability to the war effort. In examining this issue, the BCATP negotiations, signing, and implementation will be reviewed, followed by an assessment of the practical results, issues and problems of the BCATP as a limited liability strategy. Subsequently, a short case study will attempt to illustrate some relevant issues and concerns.

For the purposes of this paper, a policy of limited liability entails the commitment of the fewest possible troops, perhaps even none, to a wartime alliance.<sup>5</sup> One of the foremost proponents of this policy, British military historian B. H. Liddell Hart, argued during the 1930s against the commitment of a large British land force to continental Europe in the event of the outbreak of war. He considered the British poorly prepared for such a conflict and sought to avoid a repetition of the high casualties of the First World War (WWI). Subsequently, in the event of another European conflict, he proposed that the British limit their liability by providing a naval blockade and playing a strategic bombing role, instead of dispatching a large land expeditionary force. This approach held merit for many with memories of WWI.<sup>6</sup>

### The British Commonwealth Air Training Plan

As war approached, the Canadian government sought means of limiting potential casualties. The need to balance between the concerns of pro-British English Canadians and isolationist French Canadians was never far from the mind of Prime Minister William Lyon Mackenzie King and others within the Liberal Government.

Still, the prospect of another European war could not be ignored. King and his government had been considering their options for some time. It was assumed that if war were declared, Canada would come to the aid of Great Britain; of that, there was little doubt. The issue was what form this help would take.<sup>7</sup> This led the government in 1937 to choose the Royal Canadian Air Force (RCAF) as the principal element of Canadian military strategy. For Mackenzie King, this represented a defence policy that would use the “growing influence of airpower” to “appeal to moderate opinion,”<sup>8</sup> since it provided a means of contributing in the event of a European conflict without committing significant Canadian resources.

It must be remembered that Canada and the other British dominions had provided a much-needed manpower pool throughout the 1914–18 war. The high number of casualties and resultant decision to implement conscription during that war resulted in a crisis between English- and French-speaking Canadians. It was because of this that avoidance of a major contribution of soldiers to any future war effort was seen by King as crucial to Canadian national interests.<sup>9</sup>

Concerns about military commitments were a recurring theme for Mackenzie King. On 30 March 1939, he indicated in the House of Commons that “the days of great expeditionary forces of infantry crossing the oceans are not likely to recur.”<sup>10</sup> That month, King also pledged that there would be no conscription for overseas military service. Consequently, if war came, Mackenzie King wanted to concentrate Canadian support to the British in the air force;<sup>11</sup> in the 1939–1940 defence budget, almost \$30 million, which represented nearly half of the projected total defence expenditures, was allocated for the RCAF.<sup>12</sup> He even announced on 26 April 1939 that the “first line of defence for Canada must be the air force.”<sup>13</sup> Since service in the air force continued to be voluntary, the designation of a small air force contingent for overseas duty in the event of war had the significant advantage of limiting the numbers of potential casualties.<sup>14</sup>

In addition to the various political problems associated with entry into another war, the Undersecretary for State of External Affairs, O. D. Skelton, provided dire financial predictions. He warned that “Canada was having a hard time paying for the First World War; how could it even begin to pay for a Second?”<sup>15</sup> He also foresaw that the new war would threaten “political and racial division... and financial bankruptcy.”<sup>16</sup> These political and financial concerns combined to find expression in the government’s initial wartime “policy of rigorous restraint.”<sup>17</sup>

Despite this recent increase in spending, the RCAF approached the war with few combat-capable aircraft. In 1939, the RCAF Regular Force had 298 officers and 2,750 airmen dispersed amongst eight squadrons. There were 270 aircraft, which included 23 different aircraft types; only 37 of these aircraft were remotely capable of combat.<sup>18</sup>

On 24 August 1939, O. D. Skelton advised the Prime Minister that, in the event of war, Canadian interests should be put foremost. For example, he suggested that any offer of military assistance in the event of war should be “within the measure of our capacity;” aid to Newfoundland and the West Indies were used as examples.<sup>19</sup> Additionally:

If any military action is to be taken overseas, it should, in the first instance, be in the air service rather than by military contingents. An announcement of an immediate and intensified programme of building planes and training men for air service in Canada and for a Canadian air force operating in France would be effective from the standpoint both of military value and of consolidation of public opinion.<sup>20</sup>

This kind of advice was certainly in accordance with Mackenzie King’s own thinking. He was determined to avoid the mistakes of Sir Robert Borden in WWI, conscription being the most obvious pitfall. However, profiteering, hoarding, and inflation were also concerns. In the coming war, “Canada would not fight to the last man and dollar: the war effort presumed limited liability.”<sup>21</sup>

The preferences of the Canadian government appeared to have been well-known by this time. Just before Great Britain declared war on Germany, RCAF liaison staff in London were approached about increased training capacity in Canada based upon similar WWI cooperation. The liaison staff expressed the opinion that Canada would be “quite willing to concentrate on training rather than forming additional operational units.”<sup>22</sup>

When Great Britain declared war on Germany on 3 September 1939, there was no doubt that Canada would soon follow. The issue was placed before Parliament, and on 10 September, Canada was at war. In the interim, a memorandum forwarded on 6 September by the British government to O. D. Skelton suggested that, in relation to the air force, “the best way in which Canada could assist would be to concentrate first on the individual training of pilots, observers, and particularly air gunners and [wireless telegraphy] W/T operators, rather than by forming and training complete units

for dispatch to Europe (Canadian expeditionary force units excepted).<sup>23</sup> An annual target of 2,000 pilots and as many observers and air gunners as possible was recommended.<sup>24</sup>

Mackenzie King responded with a promise to rapidly expand training. At the same time, British and Canadian air staffs were beginning to develop a better understanding of the training requirements. For example, intense air operations were expected to result in high casualty levels.<sup>25</sup> Subsequently, the estimate of the annual requirement for trained pilots rose from 2,000 to approximately 8,000.<sup>26</sup> At a 10 September 1939 meeting in London between Air Ministry and RCAF representatives, Royal Air Force (RAF) Air Vice-Marshal C. F. A. Portal emphasized that “all Canadian resources should at first be concentrated on training.”<sup>27</sup> Given the proposed scope of the training effort, the head of the RCAF, Air Vice-Marshal G. M. Croil, believed that all available aircrew were required for training duties, and that any thoughts of sending an expeditionary air force had to be changed.<sup>28</sup>

On 13 September 1939, the Canadian and Australian High Commissioners to London, Vincent Massey and Stanley Bruce respectively, approached Anthony Eden, the Dominions Secretary, and other members of Cabinet with a proposal to train personnel from across the Commonwealth in Canada.<sup>29</sup> This proposal found support amongst the British.

Meanwhile, in Canada, Mackenzie King and the Canadian government prepared to send an army expeditionary force overseas. Although King would have preferred to avoid this, he realized that the tradition of sending an expeditionary force established during WWI meant that it was politically inevitable.<sup>30</sup> On 16 September 1939, the Chiefs of Staff were advised that one division would be dispatched overseas.<sup>31</sup>

On 26 September 1939, British Prime Minister Neville Chamberlain sent a cable to Mackenzie King which stressed the urgent requirement for an intensified aircrew training effort. The effectiveness of the German air force in helping with the rapid defeat of Poland was noted, and the resultant need for “an overwhelming air force” to counter the German threat was mentioned. Although some aircrew training would take place in the United Kingdom, there was not sufficient air space or training facilities to accommodate the projected annual requirement for 20,000 pilots and 30,000 other aircrew. It was suggested that Canada could assume the responsibility for half of the required training establishments, or about 50 training schools, which could not be accommodated by the British. Trainees for these schools would come from across the British Empire. If the Canadian government was “in agreement with this proposal, the British government was prepared to dispatch a negotiation team to Ottawa to work out the details.”<sup>32</sup>

Mackenzie King quickly saw this request as a great political prize; it was “a form of military effort that likely would not lead to enormous casualties, [and] a positive inducement for French Canada to admire the government’s wise management of affairs.”<sup>33</sup> This urgent request for assistance from the British Prime Minister himself must have seemed the answer to King’s prayers;<sup>34</sup> here was a way to limit Canada’s liability.

On 28 September 1939, the Canadian government cabled its agreement in principle to the proposal. In reference to air training support, Mackenzie King indicated that “Canadian co-operation in this field would be particularly appropriate and probably the most effective in the military sphere which Canada could furnish.”<sup>35</sup> He also outlined three outstanding areas of concern about the proposal: the availability of training aircraft from the United Kingdom, the loan of training personnel from the United Kingdom, and the negotiation of costs. The British offer to send a negotiation team to Canada was accepted.

Advisers to Mackenzie King expressed concerns about the impact of this training assistance on Canada’s war effort. The Minister of Finance, Colonel J. L. Ralston, suggested that “the greatly increased emphasis upon the air arm, evident from Mr. Chamberlain’s cable, and the part Canada might be called upon to play in that sphere, might result in considerable modifications of the Canadian war programme in other respects.”<sup>36</sup> O. D. Skelton also expressed strong views on the matter. On 29 September, he wrote to the Prime Minister that:



Again, it is not merely an air training scheme. It is an expeditionary air force scheme of a colossal scale. It would be difficult to train tens of thousands of Canadians as pilots and gunners, etc., and then restrict ourselves to sending over a dozen squadrons.... We would be faced with trying to maintain in France a tremendous Canadian Air Force. What would be the cost of this?<sup>37</sup>

This same piece of correspondence from Skelton suggested that the training proposal could be used as an opportunity to share in the direction of the war. Since Canada was “sharing in a colossal air attack,” he asked, “[s]hould there not be consultation on objectives and policy, and not merely instructions on how to help them in a policy they have formed?”<sup>38</sup> The Canadian government apparently did not heed this advice.<sup>39</sup>

If there is no indication of the government seeking a role in higher war direction, there is certainly ample evidence of concern about the cost of the war in general and of the training plan in particular. Skelton warned the Prime Minister of the “Money Factor.” Aerodromes, ground equipment, training planes, maintenance, and instruction would all cost a great deal of money. He projected the cost for training planes alone to be “well over a billion dollars.” While believing that “a great deal of this total cost will be borne by the United Kingdom, Australia and New Zealand,”<sup>40</sup> the cost of this venture was to be a central concern of the government. A factor related to this issue was the recent warning by the governor of the Bank of Canada, Graham Towers, that war expenditures should be limited to \$500 million. “Any more would risk failure and the breakdown of the war effort,” he said.<sup>41</sup>

The British and Canadian governments proceeded to negotiate the wording for a public statement and it soon became evident that they had divergent interests. King wanted the statement to clearly indicate that the training request was a British initiative, that the training would be “the most essential and effective form of military co-operation open to Canada,”<sup>42</sup> and that the plan’s scale and financing had yet to be determined.<sup>43</sup> The British suspected that Mackenzie King was trying to have them accept the air training scheme as Canada’s major contribution to the war effort. Winston Churchill, then the First Lord of the Admiralty, told the British Cabinet that he “strongly deprecated that we should lend ourselves to a statement which might encourage the Canadians to believe that we should be content with little more than a contribution of Air Forces.”<sup>44</sup> The two governments eventually settled on ambiguous wording, specifically that “this co-operative effort may... prove to be of the most essential and decisive character.”<sup>45</sup>

The United Kingdom Air Training Mission, headed by Lord Riverdale, sailed for Canada on 7 October. While en route, Riverdale’s team determined their negotiation position. Of the 20,000 pilots and 30,000 other aircrew required annually, less than half could be trained in Britain. Of the remainder, Canada would provide 48 per cent of the trainees, Australia 40 per cent, and New Zealand 12 per cent. Each country would provide its own elementary flight training, after which Canadian-based schools would provide the advanced and specialist training. To accomplish this, Canada would require 72 aircrew schools plus a large support infrastructure.<sup>46</sup>

The cost of the infrastructure, equipment, and instruction had been estimated by the RCAF at \$900 million over three years. Riverdale established the negotiation position that Britain’s contribution of aircraft and equipment worth \$140 million plus \$81 million in spares and replacements, for a total of \$221 million, would represent Britain’s share. He then allocated half of the outstanding balance (\$340 million) to Canada; Australia and New Zealand were given the responsibility for the remaining amount. Upon learning of this proposal, Britain’s High Commissioner in Ottawa, Gerald Campbell, concluded that the Canadian share would “amount to about twice the amount provided to be raised by taxation in Canada’s war budget for the first year of the war.”<sup>47</sup> Campbell also realized that, for Canada, air training would be linked to an agreement with Britain on the price of wheat.<sup>48</sup> Britain had been pressing for concessions on wheat prices, which, in the view of the Canadian government, impacted Canada’s ability to finance their war effort.

The Canadian government was to take issue with many of Riverdale’s assumptions; the tone for the negotiations was certainly not helped when, during his first meeting with Mackenzie King, Riverdale referred to the training assistance as “your scheme.”<sup>49</sup> For King, such a statement implied commitment. Furthermore, the Prime Minister was irritated that Britain was not seeking to negotiate

a plan, but to dictate terms. He also revived concerns that the British were using a training scheme as a basis to recruit Canadians into the RAF.

Canadian financial concerns were immediately put on the table. The Finance Minister bluntly stated that Canada could not come within “shooting distance” of the 40 per cent share allocated.<sup>50</sup> It is noteworthy that during the spring of 1939, the British had abandoned “limited liability” in reference to financial matters. Canada had not done so and Mackenzie King indicated that his government “could not afford so cavalier an attitude.”<sup>51</sup> The British left negotiations “blue and depressed.”<sup>52</sup>

The arrival of the Australian and New Zealand delegates further complicated matters. They rejected Canadian cost-sharing proposals since the financial benefits of the training taking place within Canada had not been considered. Furthermore, they demanded that recruiting be based upon a scale proportional to their population. This resulted in the calculation that 57 per cent of the recruits should be from Canada, 35 per cent from Australia, and the final 8 per cent from New Zealand. On top of this, Australia demanded that roughly 80 per cent of their recruits be trained at home. The Australian and New Zealand teams were not prepared to negotiate these points. If these terms were not accepted, they would simply conduct all of their own air training.<sup>53</sup>

The RCAF reworked the costs again, factoring in the Australian training initiative, and a new total of \$607 million over three years was arrived at. Following a British donation of \$185 million in aircraft and equipment (the balance of the original contribution of \$221 million was directed to Australia), the balance of \$356 million was divided between Canada, Australia and New Zealand based upon the number of trainees to be contributed by each. This resulted in a 80.64/11.28/8.08 per cent division respectively. Considering that the Cabinet had initially established an upper limit of \$237 million for all military expenditures during the first year of the war, this financial commitment by Canada was huge.<sup>54</sup>

The Australian and New Zealand delegates initialled the agreement and departed Ottawa at the end of November. Obtaining Canadian agreement would take a while longer. Before signing, Mackenzie King wanted settlement of the outstanding wheat issue and a statement from the British government emphasizing that the air training plan should take priority over all other Canadian military commitments.<sup>55</sup> The wheat issue was quickly resolved to Canada’s satisfaction. The issue of a statement on Canadian military priorities required further negotiations.

After consultation with Canadian government officials, Campbell reported back to the British government the “clear impression that the Canadian Government intended to avail themselves of the admission that the United Kingdom Government agree that the Empire training scheme is Canada’s main war effort as an excuse from refraining, at any rate in the near future, from dispatching [a] second division overseas.”<sup>56</sup> In view of this, the Chamberlain government attempted to side-step the issue by advising Mackenzie King that “it was for Canada to decide on the priority of her effort, and we should not think of interfering with Canada’s opinion.”<sup>57</sup>

But Mackenzie King was not to be put off so easily. As he explained in a cable, although Canada would determine its own policies, “it was essential to consult our associates in the conflict,”<sup>58</sup> and it was for this reason that the opinion of the United Kingdom was sought. The British government finally gave in. On 1 December, Chamberlain agreed that Mackenzie King, in announcing the plan, could state:

The United Kingdom Government have informed us that, considering present and future requirements, they feel that participation in the Air Training Scheme would provide for more effective assistance towards our ultimate victory than any other form of cooperation which Canada can give. At the same time they would wish it to be clearly understood that they would welcome no less heartily the presence of Canadian land forces in the theatre of war.<sup>59</sup>

The proposal by Mackenzie King to add “at the earliest possible moment” to the final sentence was accepted by the British.<sup>60</sup>

Notwithstanding these agreements, a number of issues remained to be settled before King would agree to sign the plan. These included issues associated with ground crew and the designation of squadrons as RCAF. Eventually, agreement was reached, and Mackenzie King was prepared to endorse the training plan.

The final point of disagreement was resolved on 16 December 1939, when Riverdale agreed to remove a paragraph of the agreement which attempted to tie the number of RCAF squadrons allowed to a financial formula. In its place, a paragraph was added on the incorporation or organization of Canadian graduates of the training into units and formations of the RCAF.<sup>61</sup>

Although the training plan documentation was dated the 16th of December, the final details of the plan had been worked out just past midnight on the 17th. Mackenzie King then requested that the date of the documents be changed to the 17th in honour of his sixty-fifth birthday.<sup>62</sup> This last concession was diplomatically agreed to and the BCATP finally came into being.

Mackenzie King announced the BCATP on the 17th during a radio address. As chance would have it, the 1st Canadian Division was on its way to Britain at that time. It has been suggested that the arrival of these troops “at the earliest possible moment” could have been interpreted as Canada’s contribution to land forces. C. P. Stacey, historian and one-time head of the Canadian Army’s Historical Section, suggested that King’s message to the Canadian people was that, in reference to land forces, “it was more important that they should reach the theatre soon than... reach it in strength.”<sup>63</sup>

Mackenzie King’s final diary entry for the 17th clearly expressed his belief that in the BCATP, Canada had acquired a suitable war role. He wrote:

I felt immensely relieved having both the Agreement concluded, and the broadcast over. It was certainly a memorable birthday. I suppose no more significant Agreement has ever been signed by the Government of Canada, or signature placed in the name of Canada to definitely define obligation in human life and in dollars and cents. I could not have put my signature to it, had I not believed, that, in the end, it meant the saving of life and the earlier restoration of peace.<sup>64</sup>

Clearly, the BCATP was a role King wanted for Canada. He believed that the acknowledged priority of the BCATP over the provision of land forces reduced the risk of high casualties, and thereby avoided the divisive issue of conscription.<sup>65</sup> While still providing strong support to Britain, which believed that the “supreme effort was to be made in the air,” Canada had apparently limited the manpower commitments to a European war.<sup>66</sup>

However, events were to prove Mackenzie King wrong. The war claimed many casualties and Canadians were again subjected to conscription. Furthermore, Canada’s financial obligations resulting from the war far exceeded expectations. The next section will examine the practical results, issues, and problems for a limited liability strategy resulting from the BCATP.

## The BCATP and WWII

Following the signing of the agreement, various schools were established across the country. These included training schools for pilots, air observers, bombers and gunners, and wireless operators. A most important factor in the selection of school locations was whether the site was within a Liberal constituency.<sup>67</sup> This prospect for economic prosperity following the depression helped convince many to vote Liberal in the 26 March 1940 general election; Mackenzie King and his party were returned with a massive majority, winning 181 of 245 seats.<sup>68</sup>

It is worthwhile at this point to examine the domestic political issues of the time. On 25 September 1939, looking to capitalize on public concerns about the war, Quebec’s Union Nationale Premier, Maurice Duplessis, unexpectedly called a provincial election. Duplessis was to argue that Canada was doing too much towards the war effort. In response, Mackenzie King’s powerful Quebec ministers, Ernest Lapointe, “Chubby” Power, and P. J. A. Cardin, were to campaign vigorously for the provincial Liberals. An important part of their campaigning was their promise

to resign from Cabinet should conscription be introduced. On 25 October, the provincial Liberals, under Adélard Godbout, swept into power with over 50 per cent of the popular vote.<sup>69</sup>

While the government's actions were being represented in Quebec by Duplessis as being too much, in Ontario the accusation was that the government was not doing enough. Ontario's Liberal Premier, Mitchell Hepburn, gathered evidence of a lack of preparedness for war on the part of the federal government.<sup>70</sup> Then, on 18 January 1940, Hepburn sponsored a resolution in the Ontario Legislature "regretting that the Federal Government at Ottawa has made little effort to prosecute Canada's duty in the war in the vigorous manner the people of Canada desire to see."<sup>71</sup> Mackenzie King responded on 25 January with the dissolution of Parliament and a call for an election. The federal Liberals campaigned on a promise of no conscription, which contributed to the aforementioned 26 March election landslide.<sup>72</sup>

Mackenzie King had to balance on this tightrope between English and French Canadian expectations throughout the war in order to maintain Canadian unity. As well, it was important to keep both English and French Canadians content so as to keep his party in power. However, despite its outward appearance of cohesion, there was to be disagreement within King's Cabinet about the war effort. This internal disagreement will be dealt with later on.

Air Force war planning was to go through a number of changes during the course of the hostilities. Just prior to the outbreak of war, the head of the RCAF, Air Vice-Marshal G. M. Croil, recommended the mobilization of a total of twenty-three squadrons. Seventeen of these squadrons were to remain in Canada, mostly based around the Atlantic and Pacific coasts, and three bomber and three army cooperation squadrons were tasked as part of an expeditionary force.<sup>73</sup>

However, as early as 5 September 1939, he was to change his mind. Croil now advised Cabinet that there was no reason for all RCAF units to remain in the country. Although the "odd bomb" might fall "here and there," there was not sufficient threat to necessitate the RCAF to concentrate in North America.<sup>74</sup> Shortly thereafter, preliminary planning towards setting up the BCATP caused Croil to reassess his plans, which led him to decide that only three squadrons would go overseas so that other resources could be channelled into instructional duties.<sup>75</sup> The Defence Minister, Norman Rogers, thought that such a small contribution to Europe would not "satisfy public sentiment," and, in time, Croil agreed with this viewpoint. On 23 November 1939, the Chief of the Air Staff wrote: "[It is] detrimental to Canada's prestige as a nation to restrict its official air effort to training or to allow its overseas contribution to be swallowed up in the RAF. Canadians by temperament would 'prefer to be at the front' in Canadian units. No fewer than twelve squadrons should go."<sup>76</sup>

Notwithstanding such advice, the government was reluctant to commit Canadian resources. Only a single squadron was dispatched in support of the 1st Canadian Division. During these early months of the war, the RCAF had a large instructional role to fulfil. At any rate, the Canadian government was not prepared at this time to finance a larger role for the RCAF in the war. The air force's initial wartime budget estimate of \$136 million for the period ending 30 August 1940 was reduced by the government to \$77 million. Although RCAF plans called for 574 aircraft, budgetary constraints reduced the actual number of aircraft to 167.<sup>77</sup>

Once the BCATP came into full production, this state of affairs was to change. Although Canadian aircrew during WWI had served overseas as part of the Royal Flying Corp / Royal Air Force (RFC / RAF), and many did so again during WWII, Canadians demanded the formation of RCAF units. The British resisted this, but "the political factor was too strong."<sup>78</sup> Financial considerations at first influenced the number of RCAF squadrons overseas; 25 new RCAF squadrons were created only after a May 1941 agreement that the British would pay for them. Subsequently, an additional 10 squadrons were formed in 1942, 4 in 1943, and 3 in 1944, at which time 6 other squadrons were transferred from Canada. At the end of the war, 46 RCAF squadrons operated overseas and another 40 were based in Canada. The full cost of these squadrons was finally assumed by the Canadian government from 1943 onwards.<sup>79</sup>

The lethal nature of air warfare soon became evident. On 26 August 1940, during the Battle of Britain, the first RCAF squadron entered into battle, and by the end of October, 16 of 18 Hurricanes

had been lost in action. Also, 3 pilots were dead and another 10 had been injured.<sup>80</sup> Similarly, of the first 37 navigators to graduate on 25 October 1940 from Trenton under the BCATP, half were dead within a year and several others had been taken prisoner.<sup>81</sup> Limited liability clearly did not extend to aircrew!

An aspect apparently overlooked by the government was that the location of such a huge air training effort in Canada would naturally attract large numbers of young Canadian men. Air travel was still a novelty and the lure of flight training proved to be strong.<sup>82</sup> Furthermore, the RCAF's "seemingly insatiable appetite for high quality recruits"<sup>83</sup> was influenced by the unchecked expansion of the BCATP until late 1943 and the high casualty rates for aircrew.

As an example of the BCATP's unchecked expansion, a total of 25,120 trainees were planned for between April and December 1940; trainee intake was actually 39,609 during that period. Furthermore, Canadians represented 83.2 per cent of the trainees versus the 80.6 agreed upon in 1939.<sup>84</sup> By June 1942, the BCATP had graduated 23,802 aircrew, 17,464 of which were Canadians. Well over 13,000 of these Canadians were sent directly overseas to RAF or RCAF squadrons.<sup>85</sup>

In May and June 1942, the BCATP was renegotiated without many of the problems encountered in 1939. The plan was extended to March 1945, and enlarged to allow 3,000 graduates monthly, with Canadians representing about half of these.<sup>86</sup> By February 1944, it was evident that the war was coming to an end and there were more than enough aircrew for the number of available planes; also, casualty rates were not as high as projected. Accordingly, a 40 per cent decrease in the BCATP was negotiated. In October 1944, it was decided to end the plan on 31 March 1945.<sup>87</sup>

Turning now to review Canada's overall war effort, consider that the government's pre-war plans included a large land expeditionary force, which comprised up to five divisions, two brigades and support troops.<sup>88</sup> As mentioned, in accordance with the government's desire to limit Canadian liability, the initial commitment for land forces was in fact kept to the 1st Canadian Division. However, the fall of France in June 1940 was to profoundly affect the conduct of war for the Canadian government. Canada was now the senior ally for Great Britain, and the limited liability strategy was becoming less of an option.<sup>89</sup>

Just prior to this, Mackenzie King was beginning to acknowledge that Canada had to play a larger role than just providing air assistance. In his diary on 17 May 1940, he wrote: "I... discussed with my colleagues at length the situation from our point of view. Got their agreement to send a 3rd division; establish a Canadian Corps of Ancillary troops [sic] in England; advance the time for the departure of the 2nd division; and arrange for a reserve division in Canada."<sup>90</sup>

For Stacey, this was evidence that while the BCATP continued to have importance, it was no longer given the overriding priority originally intended. The Canadian Army went on to grow significantly in size.<sup>91</sup>

By late 1941, public sentiment favoured a more active role for the Canadian Army. While acceding to this pressure,<sup>92</sup> Mackenzie King and his government continued to avoid large scale land commitments. The government intentionally exaggerated the direct threat to Canada and kept a large Home War Establishment (HWE) to provide domestic security.<sup>93</sup> The entry of Japan into the war provided a justification for troops to be used for home defence. In December 1941, the government decided to deploy the 7th Canadian Division in British Columbia.<sup>94</sup> This led to the observation that "Canadian military policy was sometimes governed by political considerations to the exclusion of genuine military considerations and professional military advice."<sup>95</sup> Notwithstanding concerns about naval or air attacks, such a large commitment towards home defence was certainly at odds with the legitimate threat or the WWI experience, at which time domestic security was provided by a few thousand troops.<sup>96</sup>

A similar example of avoidance of large scale land commitments is provided by the actual structure of Canadian forces in Europe. Of the approximate 250,000 troops overseas in late 1944, only some 34,000 were infantry. This was the highest "tail to teeth" ratio of all the major allies.<sup>97</sup>



Furthermore, the Canadian Army experienced greater difficulty in attracting volunteers than either the RCAF or the Royal Canadian Navy (RCN). In fact, in May 1942, J. L. Ralston, who had taken over the National Defence portfolio in September 1939, criticized the RCAF and RCN for taking the “cream of the volunteers;” the army also needed such men as specialists and non-commissioned officers.<sup>98</sup> The RCAF even recruited in surplus of their requirements, which, in October 1944, led the Minister of National Defence for Air to curtail BCATP training and to channel some trainees to the Canadian Army.<sup>99</sup>

Although the RCAF was to suffer a high casualty rate, there was never a shortage of volunteers.<sup>100</sup> In fact, the formation of No. 6 RCAF Group at the beginning of 1943 to act “in combination” with the RAF’s Bomber Command contributed significantly to the number of Canadian casualties.<sup>101</sup> This was influenced by the RAF’s decision to wage air warfare through long-range bombing.<sup>102</sup> Additional detail regarding this issue will be provided in the forthcoming case study.

These recruiting patterns, and, as will be described later, the methods used to assign personnel, were factors in the forthcoming Canadian Army manpower shortage. The government’s response to this shortage was also influenced by domestic politics. People, newspapers, and organizations such as the Canadian Legion began to question the government’s support of the war effort because of the lack of conscription.<sup>103</sup> Despite the manoeuvring and best efforts of Mackenzie King and the government, conscription was not an issue that could be avoided.

The *National Resources Mobilization Act* (NRMA), which was passed into law following the fall of France, required men to register and undergo a short period of military training for the purpose of providing home defence. Although overseas service was explicitly forbidden under the NRMA, many men went on to volunteer for general service.<sup>104</sup> However, a shortfall of this legislation was the number of men allowed to remain in non-essential industries as a means of avoiding consumer shortages and rationing.<sup>105</sup> Accordingly, the NRMA did not result in the registration of all able-bodied men.

In light of past promises not to introduce conscription, the passing of the NRMA could have caused significant problems for the government, especially within Quebec. Acutely aware of this, Mackenzie King had involved Lapointe and Power in the drafting of the NRMA legislation.<sup>106</sup> The restriction of NRMA service to Canada allowed the Quebec ministers to support the bill and Lapointe, Power, and Cardin all spoke out in favour of it.<sup>107</sup> When Montreal Mayor Camillien Houde urged people not to register, he was arrested and was kept in custody for the next four years. The NRMA registration then proceeded without further difficulty.<sup>108</sup>

In the December 1941 to January 1942 period, there were greater demands for military manpower. The Japanese entry into the war opened a new front and the combined requirements of army, navy, and air force for the period ending March 1943 was for an additional 214,000 men.<sup>109</sup> Furthermore, Winston Churchill, who became the British Prime Minister following the fall of France, visited Ottawa in December 1941 and requested the creation of another Canadian armoured division.<sup>110</sup> The government’s limited liability strategy was becoming increasingly untenable.

Although Ralston and King argued over the need for conscription to meet these requirements, in the end, Cabinet decided to provide the new division without imposing overseas conscription. In his diary for 5 January 1942, Mackenzie King recorded that “I have felt strongly that Ralston would resign if he did not get the extra armoured division and that Angus Macdonald [Minister of National Defence for Naval Services] would follow his example.”<sup>111</sup> These pro-conscription forces, originating from outside the province of Quebec, were to place increasing pressure on King.

Ernest Lapointe had died in November 1941 and was replaced in Cabinet by Louis St-Laurent following a February 1942 Quebec by-election.<sup>112</sup> Importantly, St-Laurent had not promised to oppose conscription during the 1939 Quebec provincial elections.<sup>113</sup>

In view of the growing manpower shortages, Mackenzie King decided to hold a plebiscite over whether the government should be released from its 1940 promise to oppose overseas conscription. Promising “not necessarily conscription, but conscription if necessary,” on 27 April 1942, English Canadians voted four to one to release the government from its promise. French Canadians voted

against the measure by the same four to one margin.<sup>114</sup> Subsequently, the NRMA provision limiting service to Canada was removed, and, if it so decided, the government was free to enforce overseas conscription.

Since St-Laurent was not bound by a past promise to oppose conscription, the government was able to present a united front to the electorate.<sup>115</sup> The sole exception to this was P. J. A. Cardin, who had provided such a promise and felt compelled to submit his resignation.<sup>116</sup> “Chubby” Power stayed on in Cabinet at this time. Noting that Mackenzie King had promised to impose overseas conscription only if required to win the war, Quebecers remained angry but hopeful that such a measure would not be necessary.<sup>117</sup>

On the other hand, Ralston, who had served with distinction during WWI while commanding a battalion, expressed dissatisfaction with the Prime Minister’s intention not to impose conscription, if need be, solely on the basis of plebiscite results.<sup>118</sup> Instead, Mackenzie King intended to return to Parliament for permission should such a decision be required. Ralston wrote: “That course of action gives an impression of indecision and evasion of responsibility from which I must disassociate... myself.”<sup>119</sup> Ralston submitted a letter of resignation on 7 July 1942, but was convinced by the Prime Minister to remain. Notably, King did not return the letter of resignation, but rather kept it on file.<sup>120</sup>

Following the invasion of Europe, Canadian Army requirements for replacements became more pronounced. One reason for this was the method used for allocating replacement personnel. Although the infantry suffered ten times the casualty rate of any other arm of the Canadian Army, replacements were not provided on this basis.<sup>121</sup>

This led to great frustration for Mackenzie King in October 1944, when he found that “an army of half a million men... could not find 15,000 infantry replacements”<sup>122</sup> to replace casualties in Europe. Ralston had recently returned from an inspection of troops in Italy and northwest Europe, where he found poorly trained replacements and soldiers recently recovered from wounds being forced to the front lines because of shortages. Ralston insisted to King that conscription was now “necessary.”<sup>123</sup> Any last remaining claim to a limited liability strategy had to be abandoned.

In another attempt to avoid the imposition of overseas conscription, on 1 November 1944, Mackenzie King informed Ralston that his 1942 letter of resignation was now accepted. In his place, King appointed General McNaughton, who was popular with the troops and the public, and he opposed conscription. It was believed that McNaughton could attract the number of volunteers required without having to resort to conscription.<sup>124</sup>

McNaughton’s appointment failed to generate the anticipated number of volunteers; instead, McNaughton was publicly held in contempt for his support of the no-conscription policy.<sup>125</sup> In late November 1944, Mackenzie King finally accepted the need for conscription, and overseas compulsory service became law. It is noteworthy that of the 16,000 men conscripted for overseas service, only about 3,000 reached their units by Victory in Europe (VE) Day.<sup>126</sup> In hindsight, given the minimal impact these men would have made to the fighting in Europe, it appears that Canada likely could have avoided imposing conscription.

Domestically, Quebec politicians and newspapers protested the change in the overseas conscription policy. “Chubby” Power, as he had promised to do, resigned his Cabinet post. Meanwhile, in English-Canada, King was criticized for his long delays. A vote of confidence was held in the House of Commons, which King survived. The departure of pro-conscriptionist Ralston and anti-conscriptionist Power was seen as evidence of King’s policies of moderation.<sup>127</sup>

A review of statistics provides a useful basis for assessing the success of the government’s strategy of using the BCATP as a means of limiting liability. The BCATP, by its windup in March 1945, passed 131,533 of 159,340 trainees. This included 72,835 of 91,166 Canadian participants.<sup>128</sup> Fully 44 per cent of Commonwealth aircrew were trained via the BCATP.<sup>129</sup>

As previously stated, casualties amongst aircrew were high. Including the Canadians that served with the RAF, 17,101 Canadians died during WWII in the service of the air force.<sup>130</sup> The number of

overall deaths compared to casualties within the RCAF is noteworthy, since 92 per cent of all air force casualties were fatal. As a comparison, within the Canadian Army, 30 per cent of casualties were fatal. As an overall comparison, the RCAF represented 25 per cent of the total strength of Canadian forces during WWII, but also represented 40 per cent of the fatalities.<sup>131</sup> From this, it is quite evident that the attempt to concentrate Canada's war effort on the air force as a means of avoiding high casualties during WWII was misplaced.

Finally, it is necessary to consider the long-term success of the limited liability strategy from a financial perspective. As previously noted, the government exercised great caution on fiscal matters at the start of the war. This too was to change in 1940, at which time the government abandoned peacetime notions of economy and treasury control.<sup>132</sup>

Final costs of the BCATP were much higher than had been originally envisioned: Canada paid \$1.6 billion of the total \$2.2 billion cost of the plan.<sup>133</sup> Furthermore, while first demanding that the British pay the costs for RCAF overseas squadrons, Canada took over this financial responsibility during the spring of 1943.<sup>134</sup>

Overall direct war costs were estimated at about \$21.8 billion by the end of the 1949–50 fiscal year, or roughly 185 times the cost of the first year of the war (\$118 million),<sup>135</sup> which had been a commitment of great concern to the government in 1939. Indirect war costs, including pensions but not medical costs, were estimated at \$1.6 billion in 1966.<sup>136</sup> In view of these figures, any attempt by the Mackenzie King government to limit financial liability during WWII through the BCATP must be considered a failure.

Notwithstanding this, Canada's economy was to prosper during the war. Wartime manufacturing provided wide-spread employment and increased production capacity. The 1941 Hyde Park agreement essentially integrated the Canadian and American economies, which kept trade and settlements in balance.<sup>137</sup> The economy was so prosperous that Canada wrote off \$3.5 billion in British debt following the war.<sup>138</sup>

Furthermore, the government was able to institute a number of social welfare programmes. Unemployment insurance was established in 1940.<sup>139</sup> Following an 11 June 1945 general election, the Liberal Party established family allowances.<sup>140</sup> Moreover, the Canadian economy did not lapse into a post-war depression, and workers won concessions during a series of 1946 strikes. By 1947, Canada's Gross National Product was to eclipse wartime production levels by reaching \$15.5 billion.<sup>141</sup>

As a point of interest, Mackenzie King's Liberals were returned to power in the June 1945 elections, although King suffered personal defeat as many service members switched their votes in his Prince Albert, Saskatchewan riding to express displeasure with his conduct of the war.<sup>142</sup> The Liberal's victory was by a mere five seats<sup>143</sup> and, once again, they could attribute their success to their Quebec power base. Apparently conceding that King had done all he could to avoid overseas conscription, Quebecers gave the Liberals over 50 per cent of the popular vote and 53 seats. As one writer put it, Quebec "saved our King."<sup>144</sup>

As has been seen, the government had difficulty in maintaining a strategy of limiting personnel and financial liability through the BCATP. The next section will provide a short case study of the limited liability strategy within Bomber Command.

### Case Study

Following the fall of France and the withdrawal at Dunkirk, the Allied war effort was left without any effective means of engaging the enemy by land in Europe. For British Prime Minister Churchill, this left "only one sure path" to victory, to send heavy bombers "from this country upon the Nazi homeland."<sup>145</sup> Production of a bomber fleet was given priority, which went on to become the RAF's largest component.

The effectiveness of massive bombardment was apparently demonstrated on 30 May 1942, when a 1,000 bomber force attacked Cologne. The Commander-in-Chief of Bomber Command, Air Chief Marshal Sir Arthur Harris, claimed to have destroyed the city: "a leading asset to Germany [was]



turned in one night into a vast liability.”<sup>146</sup> In fact, this was somewhat inaccurate; Germans were to show the same stoic qualities as the British had in 1940–41, and within two weeks Cologne was functioning almost normally.

Still, Harris pressed Churchill for a mandate to use air power to prosecute the war to a “speedy and quick” victory. He wanted to consolidate bombers under his command<sup>147</sup> and indicated that:

We are free, if we will, to employ our rapidly increasing air strength in the proper manner. In such a manner as would avail to knock Germany out of the war in a matter of months, if we decide upon the right course. If we decide upon the wrong course, then our air power will now, and increasingly in the future become inextricably implicated as a subsidiary weapon in the prosecution of vastly protracted and avoidable land and sea campaigns.<sup>148</sup>

Wishing to avoid the bloody battlefields of the First World War, Churchill backed Harris.<sup>149</sup>

Bomber Command went on to carry the war to Germany for three years at ever-mounting costs. Tour lengths were designed to provide aircrew with a 50–50 chance of survival;<sup>150</sup> by May 1943, Bomber Command tour lengths had been set at 30 sorties during a first tour and not more than 20 sorties during a second tour.<sup>151</sup>

The Canadian experience within Bomber Command is worth reviewing. Notwithstanding British preferences to the contrary, Canada sought the creation of national air force units. The Canadian air force presence in Great Britain continued to grow and eventually culminated in the formation of No. 6 Bomber Group at the start of 1943.<sup>152</sup> However, this large Canadian presence in Bomber Command was to exact a high cost. Fewer than one-third of those within No. 6 Group Bomber Command survived a 30-mission tour; between March and June 1943, chances of surviving a tour were one in eight.<sup>153</sup>

Bomber Command undoubtedly encountered some successes. Significant damage was done to German industry. German morale may not have been broken, but many people undeniably had a deep sense of discouragement. Furthermore, German resources had to be diverted to such purposes as anti-aircraft defences, construction of shelters, and repairs to damage.<sup>154</sup>

However, it must be remembered that the Allied bombing campaign came with a great cost. Canadian fatalities within Bomber Command were greater than those experienced by the Canadian Army fighting from Normandy to the Hochwald Forest.<sup>155</sup> Certainly, air power proponent Lord Trenchar’s predictions that a population subjected to bombing would be “easy prey to hysteria and panic” was inaccurate.<sup>156</sup>

In the end, the RAF saw the loss of 70,253 lives during WWII operations, 47,268 of which were from Bomber Command. Another 8,305 lives were lost within Bomber Command to non-operational flying or accident.<sup>157</sup> Tragically, many of those lost were from the nation’s elite, of similar quality as the officers that had perished in the battlefields of 1914–18.<sup>158</sup> The RCAF incurred 9,919 aircrew deaths within Bomber Command;<sup>159</sup> other Canadians perished as part of the RAF crews. Given the RCAF’s recruiting pattern, many of these casualties represented the best the country had to offer.

The Canadian government’s role in this cannot be overlooked. Between the significant Canadian manpower contribution to the RCAF and RAF and its role as a major aircrew trainer via the BCATP, the Canadian government possessed the ability to influence RAF policy. It failed to do so. Although the government’s initial wartime strategy of limited liability was intended to minimize casualties, by the last half of the war it had effectively abandoned this policy.

## Conclusion

The BCATP was established to provide trained aircrew in support of the Allied war effort. That it accomplished this is without question. The “Plan” efficiently turned out a steady stream of pilots, navigators, bombers, gunners, and wireless operators. The BCATP also sponsored economic prosperity across the country, helped develop a sense of nationalism, and provided transportation infrastructure.

Traditions started by the BCATP were to survive the war. With the formation of the North Atlantic Treaty Organization (NATO), Canada offered to train alliance pilots and navigators. Soon thereafter, 1,400 candidates were being trained annually.<sup>160</sup> Similarly, when North American Air Defence (NORAD) was formed, Canadians easily bought into the advantages of shared air defence responsibilities.<sup>161</sup>

Yet, it must be remembered that the BCATP role was assumed by Mackenzie King and his government as a means of limiting Canada’s personnel and financial liability during WWII. Such a policy was certainly in accordance with the concerns of a population which still had memories of the bloody toll in Flanders. Furthermore, the spectre of conscription and the resultant division between English and French Canadians weighed heavily on King and the government.

Events were to change the degree and nature of Canada’s commitment to the war. German battlefield successes and the fall of France necessitated greater participation from Canada in support of Great Britain’s continued struggle. Domestically, English Canadians, but not French Canadians, supported such an increased contribution to the war effort. A part of the Canadian response was a larger commitment of land forces, the avoidance of which had long been a priority for the government.

In the end, casualties mounted and conscription was imposed. Factors that contributed to the manpower shortage for the infantry in Europe included over-recruitment by the RCAF, the maintenance of a large Home War Establishment, a large “tail to teeth” ratio, and the failure to allocate replacements according to casualty rates; all of these factors fell within the authority of the government to change. It failed to do so.

Furthermore, Canada failed to seek a large role in determining Allied war policy. Although the largest ally to Great Britain between the fall of France and the entry into the war of the Soviet Union and the United States, Canada appeared to have simply acquiesced to British leadership in most matters.

Nor were the economic aspects of the government’s limited liability strategy satisfied. The frugality of the government in 1939 necessarily gave way to greater financial obligations as the war proceeded. However, this last point is moot, since Canada was to enjoy economic prosperity during and after the war.

Limited liability had proven to be a difficult strategy to implement in practice. Even Liddell Hart came to accept that limited liability was not a realistic WWII strategy for the British to follow regarding France.<sup>162</sup> In recognition of strategic realities and alliance commitments, as early as April 1939, Britain was to revert to its WWI pattern of committing large land forces to continental Europe; by 1942, there were 55 British divisions ready for an Allied offensive.<sup>163</sup>

In conclusion, the Canadian Government failed in its attempt to follow a limited liability strategy during WWII. Domestic and political pressures forced the government to abandon this strategy once it became apparent on the battlefield that a greater Allied effort was required. As a consequence of this, the government had to assume greater risks and obligations than originally had been foreseen. Therefore, while the BCATP undoubtedly contributed to the success of the overall Allied war effort, it must be viewed as having been less than successful as a limited liability strategy.

.....

**Notes**

1. Spencer Dunmore, “Wings for Victory: The Remarkable Story of the British Commonwealth Air Training Plan in Canada,” *The Roundel*, December 1949 (Toronto: McClelland & Stewart Inc, 1994), 13.
2. Peter C. Conrad, *Training for Victory: The British Commonwealth Air Training Plan in the West* (Saskatoon: Western Producer Prairie Books, 1989), ix and 92.
3. W. A. B. Douglas, *The Creation of a National Air Force, vol. 2, The Official History of the Royal Canadian Air Force* (Toronto: University of Toronto Press, 1986), 293.
4. Desmond Morton and J. L. Granatstein, *Marching to Armageddon: Canadians and the Great War 1914–1919* (Toronto: Lester & Orpen Dennys Limited, 1989), 250. Although some Canadians were injured more than once, others suffered mental or emotional damage that went undiagnosed.

5. Brian Bond and Martin Alexander, "Liddell Hart and De Gaulle: The Doctrines of Limited Liability and Mobile Defense," in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, ed. Peter Paret (Princeton: Princeton University Press, 1986), 612.
6. *Ibid.*, 599–612; and, G. D. Sheffield, "Blitzkrieg and Attrition: Land Operations in Europe 1914–45," in *Warfare in the Twentieth Century: Theory and Practice*, eds. Colin McInnes and G. D. Sheffield (London: Unwin Hyman, 1988), 66.
7. Dunmore, 21.
8. Allan Douglas English, *The Cream of the Crop: A Study of Selection, Training, and Policies Governing Lack of Moral Fibre in Aircrew of the Royal Canadian Air Force 1939–1945* (Kingston: McGill-Queen's University Press, 1996), 18.
9. *Ibid.*
10. C. P. Stacey, *Arms, Men and Government: The War Policies of Canada 1939–1945* (Ottawa: Queen's Printer, 1970), 20.
11. Morton and Granatstein, 9.
12. Stacey, 20.
13. English, 18. This measure came too late to make much of a difference. By the outbreak of war in September, the RCAF was still at just over half its authorized strength of 7,259.
14. Dunmore, 21.
15. English, 19.
16. *Ibid.*
17. *Ibid.*
18. Morton and Granatstein, 7.
19. Stacey, 9.
20. *Ibid.*
21. Desmond Morton, *A Military History of Canada* (Edmonton: Hurtig Publishers, 1985), 180.
22. Douglas, 203–04.
23. David R. Murray, ed., *Documents on Canadian External Relations* 6, no. 1073 (Ottawa: Department of External Affairs, 1974), 1302–05.
24. *Ibid.*
25. Douglas, 204.
26. F. J. Hatch, *The Aerodrome of Democracy: Canada and the British Commonwealth Air Training Plan 1939–1945* (Ottawa: Directorate of History, Department of National Defence, 1983), 12–13.
27. *Ibid.*
28. Douglas, 204–05.
29. *Ibid.*, 205. Interestingly, both Massey and Bruce claim to have originated the idea. Although no definitive proof has been found either way, only Massey's diary makes mention of such a plan at that time.
30. W. Pickersgill, *The Mackenzie King Record, vol. 1, 1939–1944* (Toronto: University of Toronto Press, 1960), 30.
31. Stacey, 13.
32. Murray, vol. 7, part 1, 549–52.
33. Douglas, 205.
34. Stacey, 20.
35. Murray, vol. 7, part 1, no. 690, 556–57
36. Douglas, 206.
37. Murray, vol. 7, part 1, no. 691, 557–58.
38. *Ibid.*
39. Stacey, 20.
40. *Ibid.*
41. Douglas, 207.
42. *Ibid.*, 206.
43. *Ibid.*
44. *Ibid.*, 206–07.
45. *Ibid.*
46. *Ibid.*, 207.
47. *Ibid.*, 208.
48. *Ibid.*

## Chapter 2

49. Ibid., 209–10.
50. Ibid., 210.
51. Stacey, 21–22.
52. Ibid.
53. Douglas, 210.
54. Ibid.
55. Hatch, 22.
56. Douglas, 211–12.
57. Ibid., 212.
58. Ibid., 212–13.
59. Ibid.
60. Ibid., 213.
61. Ibid., 219.
62. Conrad, 1.
63. Hatch, 23.
64. Pickersgil, 59.
65. Conrad, 6–7.
66. English, 20.
67. Conrad, 16.
68. Morton and Granatstein, 13.
69. Ibid., 12–13.
70. Morton, 180–81.
71. Morton and Granatstein, 13.
72. Ibid.
73. Douglas, 343.
74. Ibid., 344.
75. These re-evaluations were undoubtedly influenced by RAF Air Vice-Marshal Portal's statements regarding the importance that should be given to the training role. See page 5 of this paper.
76. Douglas, 344.
77. Ibid., 344–345.
78. Sir John Slessor, "Central Blue," in *A Party Politician: The Memoirs of Chubby Power*, ed. Norman Ward (Toronto: Macmillan, 1966), 235.
79. Morton, 202; and, Douglas, 345.
80. Morton and Granatstein, 101.
81. Douglas, 237.
82. English, 20–21.
83. Ibid., 306.
84. Douglas, 241.
85. Ibid., 247.
86. Stacey, 282.
87. Douglas, 292.
88. English, 303.
89. Ibid., 302.
90. Stacey, 36.
91. Ibid.
92. English, 303.
93. Stacey, 48.
94. Ibid. Another example of exaggerated HWE requirements is provided by the 18 March 1942 War Committee decision to increase the RCAF HWE by an additional 49 squadrons. Although the HWE was never actually to reach this number, this total exceeds the highest number of squadrons posted overseas. In early 1945, RCAF strength overseas reached 46 squadrons. Also, see Douglas, 345.
95. Ibid.
96. Morton, 193.
97. English, 308.
98. Stacey, 417.

99. Ibid., 418.
100. Douglas, 192.
101. Stacey, 289.
102. English, 21.
103. Morton and Granatstein, 29.
104. Stacey, 33.
105. English, 303.
106. Stacey, 33.
107. Morton and Granatstein, 29–30.
108. Ibid., 30.
109. Stacey, 45.
110. Ibid., 45.
111. Ibid.
112. Robert Bothwell and William Kilbourn, *C. D. Howe: A Biography* (Toronto: McClelland and Stewart Ltd., 1979), 166.
113. Ibid., 166.
114. Morton, 190.
115. Bothwell and Kilbourn, 167.
116. Ibid.
117. Morton and Granatstein, 49–50.
118. Stacey, 402.
119. Ibid., 401.
120. Ibid.
121. English, 308.
122. Morton and Granatstein, 228–29.
123. Ibid.
124. Ibid.
125. Ibid., 230.
126. Stacey, 481.
127. Morton and Granatstein, 231.
128. Douglas, 293.
129. English, 21.
130. Morton and Granatstein, 118.
131. English, 5.
132. Stacey, 49–50.
133. Morton and Granatstein, 100.
134. Stacey, 306–07.
135. Ibid., 532.
136. Ibid., 66.
137. Morton, 184 and 225.
138. Ibid., 225.
139. Ibid., 226.
140. Morton and Granatstein, 240–41.
141. Morton, 227.
142. Ibid., 223.
143. Ibid.
144. Morton and Granatstein, 241.
145. English, 22–23.
146. John Terraine, *The Right of the Line: The Royal Air Force in the European War 1939–1945*, (London: Hodder and Stoughton, 1985), 488.
147. English, 24.
148. Terraine, 425.
149. English, 24.
150. Terraine, 522.
151. Ibid., 527.

## Chapter 2

152. English, 26; Morton and Granatstein, 116.
153. Morton and Granatstein, 116.
154. Terraine, 683.
155. Morton, 207.
156. Terraine, 488.
157. Ibid., 682.
158. Ibid.
159. English, 25.
160. Morton, 236.
161. Ibid., 240.
162. Bond and Alexander, 623.
163. Sheffield, 66.

### **Sandy Babcock**

*Since completing a 29-year career with the Canadian Forces in 2002, Sandy Babcock has worked with Defence Research and Development Canada as an operational analyst. In this role, he has researched and written on the areas of concept development and experimentation, analytical support to operations, and network enabled operations. His work as a historian has largely focused on RCAF related topics, including the RCAF Auxiliary, civilian participation in air defence, the BCATP, and air force leadership. His doctoral thesis was entitled "The Making of a Cold War Air Force: Planning and Professionalism in the Postwar Royal Canadian Air Force, 1944–1950," which is being further developed with a view towards publishing. He has also published on the efficacy of peacekeeping, civil-military relations, and improving governmental responses to crises. He is currently at the Canadian Forces Warfare Centre, Ottawa.*

## Chapter 3

## The Role of Ferry, Transport, and Civil Aviation in the Second World War

*Carl A. Christie*

Whenever military historians and policy-makers refer to and discuss air power, it invariably becomes clear that they are usually talking about the exciting “sharp end” of war, and, in particular, the delivery of ordnance against an enemy. In most cases this takes the form of air superiority, or what is generally referred to as strategic bombing, but occasionally we hear about other forms of air warfare, like close air support, battlefield interdiction, and anti-submarine operations. Rarely do we hear anyone mention logistical questions, such as how the aircraft, personnel, and materiel got where they were needed, when they were needed. This is undoubtedly not news to airmen at every level; they have all too frequently had to worry about such mundane matters after they have received their marching orders.

It is not really clear why this situation happens because, as air force personnel know only too well, their service invariably does much more than simply bomb and strafe. Nor is this news to people familiar with the contributions of many air forces in peace and war. Americans may have the best appreciation of the non-fighting dimension of air power. The seventh and final volume of the official history of the United States Army Air Force (USAAF) in World War II, entitled *Services around the World*, begins:

By no means least among the achievements of the AAF [Army Air Force] in World War II was its development of a world-wide system of air transport. The transport aircraft—a carrier of freight, passengers, and mail which could double as a troop carrier or as an ambulance—lacked the popular appeal belonging to the bomber or fighter plane. Nevertheless, it added a new dimension to the art of warfare, and around its varied capacities the AAF built an air transportation system such as had never before been envisaged. That system, and its functions, soon became synonymous with the organization which controlled it, the Air Transport Command.<sup>1</sup>

A similar pronouncement could be made about the Royal Air Force (RAF), although, in some respects, it conducted transport operations in an even more haphazard fashion than the USAAF, at least for the first half of the war. The RAF official history admits:

For the first three and a half years of the war, British air transport was, it is true to say, conducted by a variety of bodies, acutely short of aircraft, and maintaining themselves by a system of more or less successful improvisation. Not until a larger number of suitable aircraft were produced could matters be placed on a more rational basis. The opportunity came early in 1943, when about ninety York aircraft, a transport version of the Lancaster bomber, became available. Accordingly, on 25th March of that year, Transport Command came into being and was placed in the capable hands of Air Chief Marshal Sir Frederick Bowhill, who set up his headquarters at Harrow. The new command was made up of No. 44 Group in the United Kingdom, No. 45 Group (up till then Ferry Command) in Canada, with two wings, one, No. 112, operating over the North Atlantic, the other No. 113, over the South, No. 216 Group in the Middle East and No. 179 Wing in India. Its relations with the British Overseas Airways Corporation (BOAC), with which it was to work in close co-operation, were settled by the end of March.<sup>2</sup>

BOAC, as successor to Imperial Airways, the designated British civilian flag-carrier on world air routes, flew tens of thousands of miles in support of the war effort, most notably operating a Return Ferry Service on the North Atlantic for Ferry Command / No. 45 Group and maintaining a regular contact with neutral Sweden. Even so, the more purely military service of the RAF recorded impressive numbers in its own right. The official historian concludes: “Altogether, aircraft of Transport Command flew more than a million hours between 1st April, 1943, and the end of the war.”<sup>3</sup>

To some extent, the Royal Canadian Air Force (RCAF) offers a similar story, although usually subservient to the RAF, or at least viewed as part of British or Commonwealth expansion in these



areas. In fact, the Canadian experience with air transport operations can almost be taken as a representative microcosm. The introduction to the brief section on Air Transport in the latest volume of the RCAF official history begins with a nice summary of the Canadian situation:

The Royal Canadian Air Force regularly carried men, materiel, and mail as it fulfilled its responsibilities connected with civil government air operations between the two world wars. As in most other air forces at the time, however—including the RAF—Canada’s “bush pilots in uniform” rarely thought about the potential of tactical air lift or using air transport to supply armies in the field, and no transport squadrons were mobilized in September 1939. Indeed, as late as 1 January 1943 there were only two true Royal Air Force transport squadrons based in England, and seven in the Middle East. When a separate Transport Command was established two months later it was regarded primarily as a successor to Ferry Command, and its main task was to deliver North American-built aircraft from the factory to active theatres of war.<sup>4</sup>

Few people are aware of Ferry Command’s unsung contribution to the Allied victory in the Second World War, or the big influence it and related operations had on the post-war world. Ferry Command, from headquarters in Montreal, not only delivered almost 10,000 aircraft, as well as some key military personnel and *materiel*, to the battlefronts of the world, it also laid the foundations for the system of civil aviation we now take for granted.

While we wish more people were aware of significant contributions made in the past, and of the roots of services now taken for granted, we cannot simply decry the level of ignorance of history in the population at large. Historians themselves too often ignore the more mundane aspects of their discipline. One such important consideration that military historians have long neglected is the significance of logistics in war. Many have made this observation, but few have done much to overcome the deficiency.<sup>5</sup>

Just this past winter (1996–97), the Air Force Historical Foundation in the United States (US) published, with some fanfare, Sir Michael Howard’s article, “The Concept of Air Power.”<sup>6</sup> In this “provocative appraisal,” as the editor of *Air Power History* described it,<sup>7</sup> the much respected British military historian makes no mention of air transport, supply, or any other matter that could be remotely categorized as having anything to do with logistics. Interestingly, Howard compares the concept of air power with Alfred Thayer Mahan’s earlier theory of sea power. However, he manages to do this without discussing any underlying elements—or civilian basis of air power—even though Mahan’s understanding of a country’s geography and of its civilian seafaring activities, such as the commercial fisheries as a nursery for seamen, were an important and integral part of his view of sea power. Howard’s article, originally presented to a Pentagon audience in 1984, elicited some strong reactions from *Air Power History* readers. None of these incensed airmen, however, mentioned anything about air supply or transport operations; rather, their concerns were about the dangers of the air force being used in only a tactical role and thus losing its independence to the army.<sup>8</sup>

We must admit that, while we usually do no more than pay lip service to logistical considerations, occasionally a scholar breaks new ground by concentrating our attention on the importance of supply in the military equation. Martin van Creveld did this with his book *Supplying War*. However, important as this work was, in many respects it did little more than point the way. For example, he largely ignores aircraft, surely one of the most significant additions to the logistics inventory for all military powers.<sup>9</sup>

John Lynn, in *Feeding Mars*, goes a little further. In his introduction to the book’s final section, entitled “Modern Logistics, 1815–1991,” he mentions the advent of the aeroplane, but seems to underplay its logistics role in the Second World War. After a couple of paragraphs on the truck as an important new carrier, he writes:

Eventually the airplane also carried cargo; however, it did not become a major factor in the shipment of war material until after World War II. In that war, it engaged in only a few limited, extremely expensive but highly publicized supply efforts such as flying over the “hump” into China. When the Germans tried to supply their troops in Stalingrad by air, they failed. Probably the first successful use of military airplanes to haul masses of cargo in lieu of overland transport



was the Berlin airlift of 1948. Ships continued and continue to this day to carry most of the materiel consumed in war. Aircraft have proven highly valuable in transporting men, as they did in Vietnam and the Gulf War. In addition, the massive cargo aircraft developed after World War II can be employed to airlift a limited amount of equipment, food, ammunition, and fuel for rapid deployment. Tactically, this airborne transport duty can be passed on to helicopters. However, the physics of air transport are so inferior to those of water and land shipment that heavy equipment and the bulk of cargo still need to travel by ship at a snail's pace.<sup>10</sup>

Generally, this is true; however, Lynn misses a couple of key points. First, while aircraft did not move a large volume of cargo during the Second World War, they did make some very significant contributions in a few specific instances. Lynn acknowledges, in the passage quoted above, the famous airlift of supplies over the "hump" in Asia. In fact, that operation may have played a more important role than his rather offhand comment implies. James Huston wrote in *The Sinews of War*:

A long line, carrying supplies brought in by ship and air, extended across Africa to Karachi and Calcutta, picked up the route from Bengal to Assam, then crossed the Hump to Kuming in China. The long and often seemingly futile effort to fly supplies into China received more public attention than any other [USAAF] Air Transport Command operation. Air delivery of gasoline, munitions, and other supplies to China reached a peak of 71,000 tons during the month of July 1945. The total for the war was 650,000 tons. Two convoys of thirty-five Liberty ships each could have carried that amount. To what extent the strategic results justified the logistical effort remains open to question, but it is a clear demonstration of what could be done in an emergency situation.<sup>11</sup>

On this operation, the British official history of the war against Japan concludes: "Losses were... heavy in the early days. Nevertheless the American pilots persevered and were later so successful that in 1943 the ferry command was greatly expanded, and eventually was delivering more supplies to China than ever passed along the old Burma Road."<sup>12</sup>

Lieutenant-General William Slim, who had unsuccessfully advocated such a use of air capability years earlier, could not have had much success in Burma without air transport. Indeed, it has been said that he revolutionized the Burma campaign of 1944–45, "by the way in which he supplied his army by air...."<sup>13</sup> Readers can probably think of other examples of air supply during the war that Lynn and other historians have missed. Some were crucial.

RAF Ferry Command, the inspiration for this paper, made its own key but generally unknown contribution to the British Eighth Army's success in North Africa by flying desperately needed anti-tank and other ammunition from New York to Cairo in July 1942. This quick infusion of essential materiel may well have helped General Bernard Montgomery halt Field Marshal Erwin Rommel's advance on Egypt in the crucial Battle of Alam el Halfa the beginning of September.<sup>14</sup>

The second, and perhaps most important, thing that Van Creveld, Lynn, and many other historians neglect is the supply of the aircraft themselves. When we talk about the various roles of air power, too often we fail to consider how this powerful new weapon of war reached the base where it was needed when it was needed. And, to zero in on the basic theme of this paper, both of these wartime activities—delivering by air crucial supplies and personnel, as well as the aircraft themselves—required the development of expertise, routes, infrastructure, and procedures that had a lasting impact on all our lives in the postwar world. Just as railways and road networks built for military reasons later benefited civilian societies,<sup>15</sup> so too did a world-wide network of airways.

When war erupted in September 1939, few doubted that the aeroplane would play a key role in its outcome. Indeed, some people, following the highly publicized views of air power theorists like the Italian General Giulio Douhet and Major-General William "Billy" Mitchell of the US Army Air Corps,<sup>16</sup> believed that aircraft alone would decide the issue by giving the nation with the strongest air force the ability to destroy the enemy's will to resist in a few short weeks by targeting its major cities and industrial centres.<sup>17</sup>

Somewhat paradoxically, despite the great faith that some pre-war proponents had in the overwhelming military might of air power, civilian and commercial aviation was still in its infancy.

By 1939, many countries could boast a growing network of domestic air services; internationally, however, the new mode of transportation had not advanced nearly as far. In Europe, where the distances were short, airlines connected virtually all the key cities with regularly scheduled service. In turn, designated national carriers linked the major European centres with overseas destinations through a developing series of air bridges, with short spans providing an opportunity to refuel and service the machines, to change aircrew, and to give the limited number of passengers who could afford the exciting new means of travel a brief rest on terra firma.<sup>18</sup>

Those involved in the burgeoning aviation industry—designers and engineers, aircraft manufacturers, bureaucrats, aviators, airline executives and visionaries—worked tirelessly to push the envelope.<sup>19</sup> All knew that convenient intercontinental air travel would come; they did not know how soon, or in what form.<sup>20</sup> As history unfolded, the Second World War gave the entire process a tremendous impetus. There is probably no way of proving the hypothesis, but it appears clear to this observer at least, that the continents of the world were linked by regular airline service far more quickly and fully in the late 1940s and 1950s than they would have been had the war not happened.

In 1935, even before technology had caught up to the vision, the United Kingdom, the Irish Free State, Newfoundland, and the Dominion of Canada had signed an agreement to develop the potential of the untapped North Atlantic air route.<sup>21</sup> At the same time, Juan Trippe, on behalf of Pan American Airways, arranged for his company to work with Britain's Imperial Airways towards the same goal.<sup>22</sup> Still, by September 1939, when Nazi Germany invaded Poland, transatlantic commercial aviation was only at an essentially experimental stage. Few paying passengers had flown from North America to Europe (or vice versa, against the prevailing winds). In fact, there had only been about thirty commercial flights, and then only in the relatively good weather of the summer months and only in flying boats, since no landplane yet had the requisite combination of range and carrying capacity.<sup>23</sup> And not even the most courageous adventurer had flown the treacherous North Atlantic in the fall or winter.<sup>24</sup>

Not surprisingly, when Britain and France ordered a large number of American-built military aircraft, nobody appears to have considered flying them across the Atlantic under their own power. Initially, all went by ship through the U-boat gauntlet, a time-consuming process. No scholar appears to have done any detailed research on this, but it must have taken weeks, if not months, to get a new plane from the factory, usually in the western United States, to a port on the eastern seaboard. There it had to be partially disassembled, loaded into the hold or lashed to the deck of a freighter, kept waiting for the formation of a convoy, transported across the ocean—losing many to marauding U-boats—unloaded at a British port, reassembled, test flown, and finally ferried to an operational unit. In terms of time, money, and personnel, this was a terribly inefficient way to deliver desperately needed new aeroplanes to an overseas air force.

Eventually, sometime in the summer of 1940, after the fall of France, the British government, suddenly confronted with the added burden of assuming responsibility for French orders for war materials—just when the U-boats were sending more and more merchant ships (and their precious cargoes) to the ocean floor—arranged for all newly purchased aircraft that could manage it to be flown to the British Isles. How the Ministry of Aircraft Production managed the tedious details of organizing and launching this operation is related in my book *Ocean Bridge; The History of RAF Ferry Command*.<sup>25</sup>

Suffice it to say, an organization was quickly created, and from headquarters in Montreal, grew and expanded. By the middle of the war it was regularly flying large numbers of North American built aircraft to operational squadrons of the Commonwealth air forces in virtually every corner of the globe. By the time it closed down after the war, Ferry Command had flown thousands of planes overseas. At the same time, the Americans had delivered thousands themselves. The Allied air forces exhibited an unheard of degree of cooperation at every level to help each other accomplish their ferry and transport goals. This formidable achievement helped win the war; it also laid the basis for the tremendous growth of civil aviation in the postwar world. In September 1939, only the brave or the foolhardy would try to fly across the Atlantic Ocean;<sup>26</sup> six years later the feat was almost commonplace—anyone and everyone would soon be doing it.

RAF Ferry Command cannot claim all the credit for this great advance in air communication. Similar operations by other air forces made their own contributions,<sup>27</sup> as did some commercial airlines

flying in support of military operations,<sup>28</sup> but Ferry Command was the first and often showed the way. Its civilian precursor, the Canadian Pacific Railway (CPR) Air Services Department, ferried the first aircraft across the Atlantic (seven Lockheed Hudson Mark IIIs), for the British Ministry of Aircraft Production, the night of 10/11 November 1940. With that success, the Atlantic Ferry Organization (ATFERO) literally took off; in July 1941, it was militarized as RAF Ferry Command. In March 1943, it evolved into RAF Transport Command, with the original ferrying job assigned to No. 45 Group, still with headquarters in Montreal.<sup>29</sup>

In the case of the Americans, they provided considerable assistance (both officially and unofficially) to the British ferry operation from the beginning (and even before) and formed their own Ferrying Command of the US Army Air Corps in May 1941. The US Army Air Force (as the Air Corps became in June 1941) beat the RAF in administratively recognizing the evolution of ferry operations into an additional air supply role; Air Transport Command of the USAAF was created in July 1942.<sup>30</sup>

It is also worth noting that, originally, all that the participants wanted to do was get the aircraft to the other side as quickly and safely as possible; however, as the tide of war gradually changed in favour of the Allies, people involved in air ferrying started to realize that they were helping to usher in a new era of fast, relatively convenient travel between the continents. Even the governments were aware that a new age was dawning. One historian has commented: “Civil aviation was of major concern during the Second World War precisely because all parties involved recognized that it would maintain its importance long after the war had ended. Clearly, few long-term arrangements could be worked out during the volatile and uncertain conditions early in the war; but, nevertheless, preparations were being made from the very beginning, in anticipation of future developments.”<sup>31</sup>

In fact, even while they pursued their more obvious war aims, governments prepared for another, postwar struggle in the field of civil aviation.<sup>32</sup> Inevitably, some individuals and organizations tried with varying degrees of success to take advantage of the situation, or at least to put themselves or their country in a position to do so as soon as the war was over. One can see this from any reading of bureaucratic memoranda and private correspondence. The same concerns are evident in memoirs of participants from every level and type of activity. At times, when reading these sources, one can almost forget that there was a war going on.<sup>33</sup>

This should not surprise us; the opportunities for potential profit from aviation in the post-war world must have been obvious to many people during the conflict, and especially to those working to fly the constantly improving aeroplanes, along with their important passengers and cargoes, around the world. They could see that their work, beyond contributing to the Allied war effort, was directly and indirectly bringing immense changes that could be taken advantage of at war's end.

We have seen that the pre-war world boasted only a limited network of developing international air routes and very few of the required physical facilities. In some respects, the North Atlantic offered an exception. Despite the slow progress in launching transatlantic air services in the 1930s, Britain, Newfoundland, and Canada had cooperated in the building of a massive airport at Hattie's Camp near Gander Lake in the Newfoundland wilderness, as part of British Commonwealth preparations for the expected launch of regular commercial air travel across this most treacherous of routes.<sup>34</sup> Canada had prepared by extending its own trans-Canada airway to its island neighbour off the Atlantic coast. Underutilized before the war, these facilities proved extremely useful for ferry operations.

When Montreal, conveniently located on the great circle route, became Britain's overseas air ferry headquarters in the fall of 1940, aircraft were flown there from the factories on the US West Coast, many via the trans-Canada airway. From there they flew to Gander, Newfoundland, the jumping off point for the long transatlantic flight to Britain. As soon as the first deliveries in the winter of 1940–41 proved the viability of the scheme to ferry planes across the Atlantic, Gander experienced a boom.<sup>35</sup> With the airport utilized as Ferry Command's key jumping off point on the Atlantic coast of North America, as well as an operational base for Canadian and American squadrons active in the Battle of the Atlantic, Gander ended the war as one of the largest and most modern airports in the world, capable of serving any civilian airline and its fare-paying passengers, and conveniently located for refuelling stops between Europe and North America.

At the same time, Dorval, just west of Montreal, as the headquarters for Ferry Command, had become one of the busiest airports in Canada. When its military users ceased operations, its facilities suddenly became available for increased commercial use.<sup>36</sup> Similarly, communities across Canada found themselves with airports that the air force no longer needed, or was at least willing to share. Some, like McGill Field at Brandon (home during the war for the RCAF's No. 12 Service Flying Training School), Stevenson Field in Winnipeg (No. 5 Air Observer School and No. 3 Wireless School), and Crumlin Airport at London, Ontario (No. 4 Air Despatch Service (ADS) and No. 45 Group's Mosquito Preparation and Despatch Unit), survive today as municipal airports with regularly scheduled service by commercial airlines. Others, like that built at Debert, Nova Scotia, for the RAF's No. 31 Operational Training Unit to prepare transatlantic ferry crews, are now used by local flying clubs and charter operators. No. 14 Elementary Flying Training School at Portage la Prairie has survived as an aircrew training centre. Goose Bay, Labrador, built initially as a ferry base, is now primarily a North Atlantic Treaty Organization (NATO) training establishment, but serves the civilian population of the region as well.<sup>37</sup>

Some airfields still in use today were originally constructed for the British Commonwealth Air Training Plan (BCATP) or the RCAF's Home War Establishment; others, like Gander, had been simply upgraded for the heavier wartime demands of the military. Some were later abandoned, but many were subsequently employed by a variety of civilian operators. Even auxiliary fields for BCATP schools could be put to good use by local communities after the war.<sup>38</sup>

Airports and aircraft offer only the most obvious and most visible legacy of the wartime expansion in aviation. Equally important were the radio, meteorological, and air traffic control facilities and procedures that were developed under the pressure of wartime exigencies, and that suddenly became available for civilian use after the summer of 1945. And, of course, we should not forget the thousands of individuals—ground crew as well as aircrew—who trained and gained experience in all facets of the new world of aviation during the Second World War.

Ferry Command's contribution was crucial in all these areas, especially when considering long-distance international flying. In fact, it was often impossible, even during the war, to separate military and civilian aspects of the air ferrying operation. The job could not have been done, at least not as quickly and smoothly as it was, without the existence of the kind of civilian infrastructure and experience that Sir Michael Howard neglected in his thoughts on "The Concept of Air Power," or, indeed, without the cooperation of the Canadian Department of Transport and commercial operators, like Canadian Pacific and Trans-Canada Airlines (TCA), as well as the RCAF. The Department of Transport willingly provided both new and upgraded airports and radio range facilities, as well as air traffic control equipment and expertise, while also loaning weather specialists and a large number of radio operators. TCA loaned personnel to help maintain and fly the planes.<sup>39</sup>

In the example being discussed here, that of Ferry Command, the "Mahanian" interpretation of air power (if I may call it that) may be right. All these things had to be available already, even if merely in embryonic form, or they could not have been provided on short notice to the new transatlantic ferry organization or any other military user. Still, wartime improvements and advances in all these areas played a crucial role during the war, and they were later taken advantage of by civilian companies. The interplay of civilians and the military created an exciting synergism that got the job done during the war and left us with an enduring legacy.

One of the less understood key ingredients of any large-scale aviation system is that of air traffic control. As long as few aircraft are flying in the same general area, no organized control is required; however, as soon as the air space becomes crowded, the principal users have to agree upon some controlling procedures and authority. This is what happened during the war, and at least for civil aviation, it may be one of the most significant legacies of the conflict.

When the earliest wartime delivery and occasional transportation flights took place in 1940 and 1941, nobody saw any need to impose any system of control. This situation soon changed. General Curtis LeMay wrote in his memoirs about flying as a pilot with the USAAF's early transatlantic passenger service in the summer of 1941. Then a major, he recalled:

The lovely part about this career was the complete absence of traffic control. There just couldn't be any traffic control. It must be remembered that a great percentage of the traffic... consisted of brand new airplanes which were being ferried over to England... Sometimes there would be as many as thirty or forty planes ganged up on the ground back in Newfoundland, waiting for halfway decent weather... Then... they would all take-off at five-minute intervals and head for Prestwick... We on the passenger ferry, on the other hand, were flying both ways across the Atlantic. These combat aircraft were coming one way only, but there were so many of them... There were no special altitudes assigned... No restriction whatsoever; every pilot chose his own altitude. Thus when we went into a [weather] front we went in absolutely blind. I suppose we would have had a hard time arranging to hit somebody on purpose. Mathematical chances were against it, but still there was nothing in our outlined procedure to prevent it.<sup>40</sup>

While LeMay exaggerated the situation, since Ferry Command pilots and navigators did not have *carte blanche*, as he implies, there was a growing need for more control.

In 1942, a British air force officer wrote: "By August this year it was felt, both by the Americans and by ourselves, that we should have to reach some sort of agreement about the control of aircraft moving over the North Atlantic."<sup>41</sup> After some false starts, representatives of RAF Ferry Command and USAAF Air Transport Command discussed mutual concerns in this area at a conference in Montreal in November 1942. They agreed "to set up a form of joint control over the route." Neither would give up ultimate control to the other, but they did reach a workable compromise: "Joint liaison and operations rooms would be established. The [USAAF] Air Transport Command and RAF would have their separate communication systems and meteorological services at the joint control centres. At all staging points along the route communication between [US]AAF aircraft and ground stations would normally be carried out by [USAAF] Air Transport Command control offices."<sup>42</sup>

The parties agreed to a surprising degree of overall joint control, setting up a committee "to decide the powers to be held by the combined liaison and operations rooms and upon the housing necessary at the various control centres. This Committee consisted of three US colonels, two RAF wing commanders, and one RAF meteorological (Met) officer." The six officers, including the civilian Canadian Department of Transport (DOT) meteorologist Dr. Patrick McTaggart-Cowan, as the RAF Met Officer, appear to have worked well together. They visited the various stations and staging posts and initiated a number of changes that led to improved procedures throughout their extensive jurisdiction.<sup>43</sup>

Air traffic control, of course, is impossible without good communication. To some degree the same can be said of adequate weather forecasts, which must be communicated to crews. The three subjects were therefore interconnected, and a constant concern of military and civilian officials from the United States, Britain, Canada, and Newfoundland. The British ferry operation, from its headquarters at Montreal, was central to the entire issue. On 31 March 1942, in a letter dealing with the details of improving the direct teletype links between the US Weather Bureau in Washington and the Atlantic Forecasting Centre at Dorval, J. A. Wilson, Director of Air Services with DOT in Ottawa, emphasized that the information moved over these lines "is required almost wholly for the work of the Ferry Command..."<sup>44</sup>

It seems only a small leap, therefore, to claim that Ferry Command initiated and inspired crucial improvements in these areas that made possible the postwar boom in civil aviation. The RAF certainly appreciated the importance of the wartime advances. A document apparently drafted late in the war at Coastal Command headquarters spelled this out quite clearly:

In order to ensure the safe passage of reinforcements from America and Canada personnel were posted to the main starting point at Gandar [sic] Newfoundland, while control centres known as Transatlantic Aircraft Control... (Prestwick) and Overseas Aircraft Control (Gloucester) were set up in this country [Britain]. Stepping stones in Iceland and Greenland were also created and an organization born which, developing into [RAF] Transport Command has seen the passage of many thousands of aircraft across the North and South Atlantic Oceans, with a percentage of loss which is amazingly small. Without this control organization it is doubtful whether such formidable numbers of aircraft could ever have arrived.<sup>45</sup>



At the start of the war, air traffic control in Canada was the responsibility of the Department of Transport, but wartime conditions brought a tremendous growth in military flying that forced the civilian authority to accept changes.<sup>46</sup> While the airlines continued to provide passenger and airmail service, the skies were more and more filled with air force planes on operational and training missions—too crowded for the old, informal ways to continue, in much the same way as increased traffic brought some order to the skies over the Atlantic. An RCAF officer summarized the problem and concluded:

The unification of the Air Traffic Control System along airways routes and within the Training Commands would ensure the proper routing and the safety of both civil and Service aircraft flying within those areas. The standardization of local (aerodrome) procedures and the provision of fully trained and experienced Flying Control Officers would not only greatly increase the safety of the aircraft at present operating, but would facilitate and ensure that the anticipated increased numbers of aircraft could be handled both expeditiously and safely under all weather conditions. In view of the present unsatisfactory situation in relation to Air Traffic Control both in Training Commands and along civil air routes, the Deputy Minister for Transport in a communication to the Deputy Minister for Air requested that the question of the unification, standardization of Service and civil air traffic together with the possible embodiment of certain civil air traffic personnel should be examined. In accordance with the Deputy Minister for Air's instructions, a conference was held to discuss questions relating to the above. The conclusion reached was that in the main it would be advantageous both to the Service and to the Department of Transport for such unification and embodiment to take place. Therefore, it is recommended that the provision of a Flying Control, Aircraft Safety and Sea Rescue Organization be approved and the questions relating to the unification of the Air Traffic Control System and the embodiment of civil air traffic personnel be fully examined.<sup>47</sup>

The process initiated here led to greater coordination between the RCAF and DOT in the essential area of air traffic control, and to the opening of an RCAF school of flying control at Patricia Bay, British Columbia.<sup>48</sup>

While officials from the Department of Transport and Air Force Headquarters tried to smooth over their differences and develop a coordinated air traffic control system, events had been moving ahead quite independently in different regions, causing local commanders to come up with their own solutions.

We have already seen how people involved in transatlantic flying worked together. At the same time, improvements were being made across Canada, and particularly on the West Coast, that later had an impact on the way in which air traffic control was handled in the rest of the continent, and eventually, beyond. Less than two weeks after the Japanese attack on Pearl Harbor, in an atmosphere of extreme concern about the security of the Pacific Coast, the Canada-United States Permanent Joint Board on Defence passed its 22nd recommendation. It authorized regional US and Canadian commanders "to effect by mutual agreement any arrangements they deem necessary for the perfection of preparations for the common defence, including but not limited to the installations of accessory equipment in the territory of either, the transit of armed forces, equipment or defence materials into or through the territory of either, and the utilization by either nation of the base and military facilities of the other."<sup>49</sup>

Informal cooperation eventually led to a formal agreement for the West Coast that, in time, formed the basis of a continent-wide system of air traffic control. Urgent air defence requirements, shared on the Pacific Coast by several commands of the two countries, brought the RCAF, the US Army, and the United States Navy (USN) to set up overlapping air patrol networks and to exchange information about air movements as a matter of routine. The RCAF and the USN even established joint communications procedures for the region.<sup>50</sup> This led, three months later, to an agreement between Western Air Command of the RCAF, Northwest Sea Frontier of the USN, Western Defense Command of the US Army, and Air Transport Command of the USAAF, to set up a system of air traffic control across the entire region. The JAN-CAN (Joint Army–Navy–Canadian) Agreement established a special ongoing JAN-CAN Committee to implement and monitor a more centralized system of control.<sup>51</sup>



The higher authorities in Ottawa and Washington took a hard look at what had been accomplished on the West Coast, particularly when they realized that the commanders there had overcome the worst of their quite complex air traffic control problems. With the needs growing for greater coordination of air movements throughout the northern half of North America, Canadian and American officials met to come up with a more universal system. What they agreed upon was essentially an extension to the rest of the continent of the procedures being followed in the West.<sup>52</sup>

Canadian and US regional commanders thus reached important air traffic control agreements that, in the end, had far-reaching implications. However, it was the needs of Ferry Command to impose order on the eastern air approaches to North America that led to their wider application. Thinking that they had come up with a good system, the Americans and the Canadians decided to push for its wider international acceptance. With the United States so often viewed with suspicion, Canada did the bulk of the international lobbying, in particular at the Chicago civil aviation conference in November 1944. The general acceptance of the Canadian proposals was a vote of confidence in the air traffic control procedures worked out in North America during the war. The selection of Montreal as the headquarters for the new Provisional International Civil Aviation Organization can be taken as a recognition of the significant role that city had assumed in the world of aviation as Ferry Command's centre of operations, as well as, of course, the key role played by Canada both in the air war and in the preparations being made for the post-war world.<sup>53</sup>

The Second World War brought great advances in aviation. Ferry Command, in particular, made extremely important contributions. This was most obvious by helping to win the war by delivering almost 10,000 aircraft to operational squadrons overseas, but also by carrying important supplies and passengers. However, none of this could have been accomplished without training and giving crucial experience to thousands of ground crew and aircrew. Nor could it have been done without the construction of airports and other facilities. Equally significant was the development of widely accepted procedures in the area of weather forecasting, communications, and air traffic control. We should all remember this the next time we fly across the country or overseas in the comfort and security of a modern airliner.

We should also remember that the great strides made during the war could not have been made had not some basic civil aviation systems and a few experienced operators already been in place. This all adds up to a chicken and egg conundrum that Alfred Thayer Mahan and other writers on sea power would have loved. Maybe it is time for someone to write "The Influence of Air Power upon History."

.....

#### Notes

1. John D. Carter, "The Air Transport Command," in *The Army Air Forces in World War II, Services around the World*, vol. 7, eds. Wesley Frank Craven and James Lea Cate (Chicago: The University of Chicago Press, 1958; reprinted, Washington: Office of Air Force History, 1983), 3.

2. Hilary St. George Saunders, *The Fight is Won*, vol. 3, *Royal Air Force, 1939–1945* (London: Her Majesty's Stationery Office [HMSO], 1954), 184–85.

3. *Ibid.*, 187.

4. Brereton Greenhous, Stephen J. Harris, William C. Johnston, and William G. P. Rawling, *The Crucible of War, 1939–1945*, vol. 3, *The Official History of the Royal Canadian Air Force* (Toronto and Ottawa: University of Toronto Press in cooperation with the Department of National Defence and the Canadian Government Publishing Centre, 1994), 875. This volume contains only one other indexed reference to Ferry Command, when the authors expand on a point made in the passage quoted above: "Under the circumstances, the RAF had little to offer the army in the way of tactical airlift and supply, and that did not change when a separate Transport Command was established in March 1943. The new organization was regarded primarily as a successor to Ferry Command, and its principal responsibility was the delivery of North American built aircraft from the factory to active theatres of war." *Ibid.*, 879. We should note that volume 2 of the RCAF Official History devotes an appendix to Ferry Command. See W. A. B. Douglas, *The Creation of a National Air Force*, vol. 2, *The Official History of the Royal Canadian Air Force* (Toronto and Ottawa: University of Toronto Press, 1986), 642–51.

5. Some of the British and American official histories, although not widely read, are an exception to this sweeping statement. See, for example, titles in the *History of the Second World War, United Kingdom Civil Series*, such as, M. M. Postan, *British War Production* (London: HMSO, 1952); J. D. Scott and Richard Hughes, *The Administration of War Production* (London: HMSO, 1955); H. Duncan Hall, *North*

*American Supply* (London: HMSO, 1955); and H. Duncan Hall and C. C. Wrigley, *Studies of Overseas Supply* (London: HMSO, 1956); and, several volumes of the voluminous “green series,” from the Office of the Chief of Military History, United States Army, including Roland G. Ruppenthal, *Logistical Support of the Armies: The United States Army in World War II* (Washington: 1953); Ruppenthal, *The European Theatre of Operations: The United States Army in World War II* (Washington: 1959); James A. Huston, *The Sinews of War: Army Logistics, 1775–1953*, Army Historical Series (Washington: 1966); Irving Brinton Holley Jr., *Buying Aircraft: Materiel Procurement for the Army Air Forces: The United States Army in World War II*, Special Studies (Washington: 1964); Robert M. Leighton and Robert W. Coakley, *Global Logistics and Strategy*, vol. 1, *The United States Army in World War II* (Washington: The War Department, 1955); Robert W. Coakley and Robert M. Leighton, *Global Logistics and Strategy*, vol. 2, *The United States Army in World War II* (Washington: The War Department, 1968); and, John D. Millett, *The Organization and Role of the Army Service Forces: The United States Army in World War II* (Washington: The War Department, 1954). Another book that is not exactly a conventional work of history has recently been reprinted by the US official historians, and also bears mention: *Logistics in World War II*, Final Report of the Army Service Forces: A Report to the Undersecretary of War and the Chief of Staff, by the Director of the Service, Supply, and Procurement Division, War Department, General Staff (Washington: Center of Military History, 1993 [originally published in 1947]). For the USAAF, see Wesley Frank Craven and James Lea Cate, *Men and Planes*, vol. 6, *The Army Air Forces in World War II* (Chicago: The University of Chicago Press, 1955). With its more modest official histories programme, Canada’s Department of National Defence has published no studies of the logistical aspects of our military history. The Department of Munitions and Supply did sponsor the useful book: J. de N. Kennedy, *History of the Department of Munitions and Supply Canada in the Second World War*, vol. 1 & 2 (Ottawa: King’s Printer, 1950).

6. Michael Howard, “The Concept of Air Power: An Historical Appraisal,” *Air Power History* 42, no. 4 (winter 1995), 4–11.

7. Comment by the journal editor, Jacob Neufeld, *ibid.*, 3.

8. “Readers’ Forum,” *Air Power History* 43, no. 1 (Spring 1996), 66–67.

9. See Martin van Creveld, *Supplying War: Logistics from Wallenstein to Patton* (Cambridge, London, New York, Melbourne: Cambridge University Press, 1977), which has no references to aeroplanes, aircraft, aviation, or anything similar in the index.

10. John A. Lynn, ed., *Feeding Mars: Logistics in Western Warfare from the Middle Ages to the Present* (Boulder, San Francisco, and Oxford: Westview Press, 1993), 185. In fact, without even looking at balloons, one can trace the origins of aerial resupply to the First World War. See, for example, Walter Raleigh, *The War in the Air: Being the Story of the Part Played in the Great War by the Royal Air Force*, vol. 1 (Oxford: The Clarendon Press, 1922), 8.

11. Huston, 513–14; Coakley and Leighton, esp. 524–28; and, Carroll V. Glines, *The Compact History of the United States Air Force*, rev. ed. (New York: Hawthorn Books, 1973), 252.

12. S. Woodburn Kirby, *The War against Japan: India’s Most Dangerous Hour*, vol. 2, *History of the Second World War, United Kingdom Military Series* (London: HMSO, 1958), 242.

13. Greenhous, 878. It might also be noted that there appears to have been an almost constant struggle for aircraft (and other resources) between those wishing to use them to supply China over the Hump and others in Southeast Asia, such as Slim, who wished to use the planes elsewhere. There was a chronic shortage of transport aircraft during the war, and as a consequence, almost constant Allied infighting for their allocation.

14. See Carl A. Christie, *Ocean Bridge: The History of RAF Ferry Command* (Toronto: University of Toronto Press; Leicester: Midland Publishing, 1995), 157–60; Van Creveld, in *Supplying War* (1977) credits the British victory at Alam Halfa, at least partially, to the failure of the Germans to “fly in 500 tons of fuel a day” to Rommel, as he was allegedly promised. He does not mention any British aerial supply effort.

15. Anyone who has visited Germany knows, for example, that Adolf Hitler built the famous autobahn highway network more for military than for civilian reasons. C. E. Black and E. C. Helmreich, *Twentieth Century Europe: A History*, 3rd ed. (New York: Alfred A. Knopf, 1966), 457.

16. Lest readers are confused about the use of the terms USAAC and USAAF, they should remember that the US Army Air Corps became the US Army Air Force on 20 June 1941. The United States Air Force as a completely autonomous service dates from 18 September 1947. Charles D. Bright, ed., *Historical Dictionary of the U.S. Air Force* (New York, Westport, CT, and London: Greenwood Press, 1992), 598–601 and 590–91; Glines, 152 and 290.

17. For a summary of the views of the interwar air power theorists, see Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (New Haven and London: Yale University Press, 1987), especially chapter 2, “The Age of Prophecy,” 22–46. A briefer description of these ideas can be read in James L. Stokesbury, *A Short History of Air Power* (New York: William Morrow, 1986), 126–28.

For the influence of these views on the RAF, see Scot Robertson, *The Development of RAF Strategic Bombing Doctrine, 1919–1939* (Westport, CT: Praeger, 1995). The tables summarizing RAF expansion schemes A to M, on 169–74, underline the emphasis placed on this aspect of air power by noting the large number of bombers called for by the RAF planners.

18. See John Stroud, *Annals of British and Commonwealth Air Transport, 1919–1960* (London: Putnam, 1962), especially 165–75; and Robin Higham, *Britain's Imperial Air Routes, 1918 to 1939: The Story of Britain's Overseas Airlines* (Hamden, CT: Shoe String Press, 1961).

19. In some cases, such as that of Juan Trippe, the visionary, yet ruthless head of Pan American Airways, one person could play more than one role in this drama. See Robert Daley, *An American Saga: Juan Trippe and His Pan Am Empire* (New York: Random House, 1980), and Marilyn Bender and Selig Altschul, *The Chosen Instrument: Pan Am, Juan Trippe, The Rise and Fall of an American Entrepreneur* (New York: Simon and Schuster, 1982).

20. For a time, many thought the future of long distance air travel lay with lighter-than-air flying machines; however, even the airship's greatest proponents abandoned the field to heavier-than-air machines after the Hindenburg disaster at Lakehurst, New Jersey, in May 1937. British and Commonwealth confidence in the airship ended almost seven years earlier with the loss of the R101 on its maiden flight to India, in October 1930. For a discussion of Canada's brief flirtation with this form of air travel, see Christie, 12–13.

21. See Paul Bridle, ed., *Documents on Relations between Canada and Newfoundland*, vol. 1, 1935–1949 (Ottawa: Department of External Affairs, 1974), 1063–66; Alex I. Inglis, ed., *Documents on Canadian External Relations (DCER)*, vol. 5: 1931–1935 (Ottawa: Department of External Affairs, 1973), 617–35; Higham, 186–90; Peter Neary, *Newfoundland in the North Atlantic World, 1929–1949* (Kingston and Montreal: McGill–Queen's University Press, 1988), 110; and David MacKenzie, *Inside the Atlantic Triangle: Canada and the Entrance of Newfoundland into Confederation, 1939–1949* (Toronto: University of Toronto Press, 1986), 117.

22. Daley, 126–27; Bender and Altschul, 212–14.

23. Henry Ladd Smith, *Airways Abroad: The Story of American World Air Routes* (Washington: Smithsonian Institution Press, 1950; reprinted 1991), 42 and 64; Stroud, 169–72; and, Higham, 195–97.

24. Few even dared try. An exception, Frances Grayson, was lost with her pilot, navigator, and engineer when their Sikorsky amphibian disappeared over the Atlantic in December 1927. Basil Clarke, *Atlantic Adventure: A Complete History of Transatlantic Flight* (London: Wingate, 1958), 36–37.

25. Christie. See also Carl Christie, “Atlantic Bridge: Canadian Contributions to Ferry Command during the Second World War” (paper presented to the annual meeting of the Canadian Historical Association, University of Prince Edward Island, Charlottetown, June 1, 1992).

26. For an indication of what it was like to cross the Atlantic as an airline passenger at this early stage in the development of the route, see Lester B. Pearson's account of his flight from New York to Britain on a Pan American Airways' clipper in August 1939. Mike: *The Memoirs of the Right Honourable Lester B. Pearson, PC, CC, OM, OBE, MA, LLD*, vol. 1, 1897–1948 (Toronto: University of Toronto Press, 1972), 134–35.

27. For the RCAF's transatlantic involvement, see Carl Christie and Fred Hatch, “The Directorate of Air Transport Command and the Growth of RCAF Transport Operations during the Second World War,” *Canadian Defence Quarterly* 16, no. 1 (Summer 1986), 50–57; C. R. Vincent, *Consolidated Liberator and Boeing Fortress* (Stittsville, ON: Canada's Wings, 1975); Z. L. Leigh, *And I Shall Fly* (Toronto: CANAV Books, 1985), chapter 23, 145ff. The basic operational archival record can be found in the daily diaries of the RCAF's Air Transport Command (especially folder k) and 168 Squadron, National Archives of Canada (NA), Record Group (RG) 24, vol. 22516, and 22634.

28. The Americans were more active in this respect than any other Allied country. The USAAF command structure included a coordinating Directorate of Civil Airways (Craven and Cate, 36). With respect to the British Commonwealth, BOAC operated a Return Ferry Service to get Ferry Command aircrew back to Montreal, and the Canadian Government Trans-Atlantic Air Service was a thinly disguised TCA operation. See Christie, 95–96, 278–85, and 290–92.

29. For the details of this administrative history, see Christie.

30. Craven and Cate, 66–67; Glines, 152–53; Bright, 383.

31. MacKenzie, 121.

32. See, for example, J. Parker van Zandt, *Civil Aviation and Peace*, vol. 2, *America Faces the Air Age* (Washington: The Brookings Institution, 1944).

33. For example, see the documents printed in John Hilliker, ed., DCER, vol. 11: 1944–1945, Part II (Ottawa: Department of External Affairs, 1990), 292–573, where the primary consideration, perhaps understandably, seems to be Canada's place in post-war aviation. See also J. W. Pickersgill, *The Mackenzie King Record*, vol. 1, 1939–1944 (Toronto: University of Toronto Press, and Chicago: The University of

Chicago Press, 1960), 539–40, 551, and 645–49; Robert Bothwell and William Kilbourn, *C. D. Howe: A Biography* (Toronto: McClelland and Stewart, 1979), 190–91; David Mackenzie, “The Creation of the First Canadian Transatlantic Air Service, 1935–1943,” *Aerospace Historian* 34, no. 4 (Winter/December 1987), 253–61.

34. Bridle, 1066–68. The airport was constructed at Hattie’s Camp and only came to be known as Gander after Ferry Command started using it on a regular and heavy basis during the war. For a discussion of the siting and building of the Newfoundland Airport, as it was first officially named, see Christie, 18–20.

35. Newfoundland Airport Watch Log, copy, DHist 79/1 LG; Public Record Office (PRO), AIR 38/3 and AIR 38/4; and RCAF Station Gander, daily diary, NA, RG24, vol. 22544 (NA mfm nos C–12186 and C12187).

36. When Ferry Command moved to the new airport at Dorval, just west of Montreal, from St. Hubert, southeast of the city, in September 1941, it was joined by a handful of commercial airlines that had shared the old field with the military. Even so, the Department of Transport considered Ferry Command to be Dorval’s primary tenant.

37. There are many other examples from across the country. Those mentioned here were chosen because of their wartime contributions to transatlantic ferry operations. For the construction and early history of RCAF Station Goose Bay as an alternative to Gander, see Christie, 127–30. For brief descriptions and histories of individual airfields, see T. M. McGrath, *History of Canadian Airports*, 2nd ed. (Ottawa: Lugus Publications in cooperation with Transport Canada and the Canadian Government Publishing Centre, Supply and Services Canada, 1992).

38. For example, No. 14 Service Flying Training School’s spartan relief field, adjacent to Ontario’s Highway 3, half-way between Aylmer and St. Thomas, became the latter’s municipal airport, and, apparently, a factor in attracting new industry, such as the Ford assembly plant at nearby Talbotville, and the autoparts factory of Magna International.

39. For RCAF, TCA, and Ferry Command cooperation on radio and teletype facilities and radio range charts, see file HQ 10081–166 pt 4, NA, RG 24, vol. 4896. For the experience of a TCA pilot who spent some time seconded to Ferry Command, see George Lothian, *Flight Deck: Memoirs of an Airline Pilot* (Toronto: McGraw–Hill Ryerson, 1979), 73–127, and appendix, 197.

40. Curtis LeMay with Mackinlay Kantor, *Mission with LeMay: My Story* (New York: 1965), 203–04.

41. Memorandum by Wing Commander A. A. Adams, December 18, 1942, PRO, AIR 38/86. Other detailed letters and memoranda, such as those in PRO, AIR 38/7, AIR 38/8, AIR 38/14 and AIR 38/16, support the view that the prime US and British users of the transatlantic route realized they had to come to some sort of agreement on weather forecasting, air traffic control, and communications matters. For a report on these problems with respect to Bermuda operations, see PRO, AIR 38/9. The case of Goose Bay, Labrador, is documented in PRO, AIR 38/6.

42. Adams memo, December 18, 1942, PRO, AIR 38/86. While beyond the primary concerns of this paper, it is interesting that the agreement evidently stipulated: “The final control over entry of aircraft into the U.K. will rest with the RAF Fighter Command.”

43. *Ibid.* The Americans retained control of the South Atlantic ferry routes, as well as the North East Staging Route through the Northwest Territories and Labrador to Greenland. Note by W/C Adams, “South Atlantic Ferry Route,” December 18, 1942, and C. Costley White, Office of the High Commissioner for the United Kingdom, Earncliffe, Ottawa, to G. B. Shannon, Dominions Office, London, 6 October 1943 (Secret), PRO, AIR 38/86.

44. J. A. Wilson to Sir Frederick Bowhill, Air Officer Commanding-in-Chief RAF Ferry Command, 31 March 1942, PRO, AIR 38/16. See also further communications (many full of technical details) on these important matters, by officers of the organizations and countries involved, in *Ibid.* The original agreements launching the British transatlantic ferry scheme placed the new organization (and then Ferry Command) in a strong controlling position, or at least one of considerable influence. See “Memorandum of an Agreement between the Government of Canada and the Government of Newfoundland” regarding the Newfoundland Airport, April 17, 1941, and subsequent correspondence modifying the arrangements, in PRO, AIR 38/8.

45. “Flying Control in the RAF during the War,” paragraph 18, “Overseas Requirements,” PRO, AIR 20/4018/92550.

46. W. J. Ellwood, “Air Traffic Control Then and Now,” *The CAHS Journal* 15, no. 3 (Fall 1977), 72–76; D. Lewis, “Facing the Challenge: Cogent Observations on the Past, Present and Future of the Air Traffic Control System in Canada,” *Canadian Flight*, May–June 1991, 26–27.

47. A handwritten note by the Senior Air Staff Officer (SASO) dated 8 August 1942 and attached to this unsigned document claims that it had been prepared by “Wg Comdr Andrews.” RCAF file S.204–2–1 pt 1, “Operations-Operational Procedure & Control-WAC” DHist 181.002 (164).

48. Minute, Hull to AOC, August 9, 1942, DHist 181.002 (0164); “Secret Organization Order No. 93,” August 12, 1942, No.1 School of Flying Control, daily diary, RG 24, vol. 22727 (also NA mfm no. C-12325; formerly DHist diary no. 49-7).

49. The complete recommendation (accepted by both governments by the middle of January 1942) is printed in Appendix A of Stanley W. Dziuban, *Military Relations between the United States and Canada, 1939-1945: United States Army in World War II*, Special Studies (Washington: Center of Military History, 1959; reprinted 1990), 356. C. P. Stacey summarized this and other PJBD recommendations in *Arms, Men and Governments: The War Policies of Canada, 1939-1945* (Ottawa: Queen’s Printer, 1970), 345-46.

50. “Joint Agreement between the Commander, Northwest Sea Frontier, US Navy and the AOC Western Air Command, RCAF”: November 10, 1942, WAC HQ, daily diary, NA, RG24, vol. 22510 (also NAmfm no. C-12160; formerly DHist, diary no. 4-3).

51. “Joint Agreement between the Air Officer Commanding, Western Air Command, R.C.A.F., the Commander, Northwest Sea Frontier, U.S. Navy, the Commanding General, Western Defence Command, and the Commanding General, Alaskan Wing, Air Transport Command, USA Air Forces:” DHist 181.009 (D6249). See also the more polished “Joint Agreement between CNWSF, WAC woe and ATC February 17, 1943,” and “Minutes of Meeting of the JANCAN Committee at Western Defence Command on June 23rd, 1943”: DHist181.002 (164); and, RCAF file 1-42-1, “WAC-Policy-Co-operation with U.S. Forces: Defences of Pacific Coast-NW Staging Route, July 2, 1942 to July 4, 1956.” DHist181.003 (D5204).

52. Christie, 296-303. See also Carl A. Christie, “The Northwest Staging Route: A Story of Canadian American Wartime Co-operation” in *For King and Country: Alberta and the Second World War*, ed. Ken Tingley (Edmonton: Provincial Museum of Alberta, in cooperation with Reidmore Books, 1995), 213-28, especially 220-24.

53. J. R. K. Main, *Voyageurs of the Air: A History of Civil Aviation in Canada, 1858-1967* (Ottawa: Queen’s Printer, 1967), 187-94.

### **Carl A. Christie**

*Carl A. Christie is the author of Ocean Bridge: The History of RAF Ferry Command (University of Toronto Press and Midland Publishing, 1995); and Truly Royal: The History of the Canadian Air Force (University of Toronto Press, forthcoming).*



## Bomber Command and 6 Royal Canadian Air Force Group in the Battle of Berlin

*Christopher Shelley*

*We can wreck Berlin from end to end if the USAAF [United States Army Air Force] will come in on it. It will cost between us 400–500 aircraft. It will cost Germany the war.*

Sir Arthur Harris, Air Officer Commanding-in-Chief, Bomber Command,  
to Sir Winston Churchill, 3 November 1943.<sup>1</sup>

In these few lines Sir Arthur's obsession with defeating Germany through area bombing is made manifest. That he addressed them directly to the Prime Minister illustrates his powerful and privileged position in the Royal Air Force (RAF). Understanding the obsession and the power of Sir Arthur is the first step to understanding the wherefore and the why of the Battle of Berlin.

The Battle of Berlin is generally understood to comprise the five-month long air campaign that ran from 18 November 1943 until 31 March 1944, in which Harris directed the priority of Bomber Command's effort against Berlin with the object of knocking Germany out of the war. Major raids on other German cities also took place during this period, and they are included as part of the battle. It is of more than passing interest to Canadians, as not only did 6 Royal Canadian Air Force (RCAF) Bomber Group (hereafter referred to simply as 6 Group) take part in the battle, but Canadians also represented 25 per cent of the strength of Bomber Command.<sup>2</sup> More importantly, 6 Group became a mature fighting formation during the battle, shaking off the problems which had plagued it since its formation on 1 January 1943.

Air warfare is especially sensitive to the technical characteristics of the aircraft, weapons, and command and control systems employed. Therefore, this paper will examine the Battle of Berlin as a campaign where the technical capabilities of the equipment employed were insufficient to meet the strategic objective set by the commander, and will propose that this result could have reasonably been foreseen. To set the stage, it will be necessary to sketch the background of the Allied Combined Bomber Offensive (CBO) in 1943, to outline the development of Bomber Command, and to discuss the objectives of Sir Arthur Harris and his superiors. Harris' conduct of the Battle of Berlin will be discussed, and as a sub-theme the participation of 6 Group will be highlighted, particularly where it can be demonstrated how the group matured during the battle. Throughout, it will be necessary to go into some technical detail about aircraft, navigation systems, and tactics, as these all relate to the outcome of the campaign. Finally, the paper will suggest, not from the comfortable viewpoint of 1994, but from the rather harsh situation of 50 years earlier, why Bomber Command failed to crush Berlin and Germany during the long winter of 1943–44.

The overall direction for Bomber Command's air offensive against Germany in 1943–44 derived from the Combined Chiefs of Staff Directive for the Bomber Offensive from the United Kingdom, dated 21 January 1943 (the Casablanca directive). "Your primary Object," it directed, "will be the progressive destruction and dislocation of the German military, industrial and economic system. And the undermining of the morale of the German people to a point where their capacity for armed resistance is fatally weakened."<sup>3</sup> Sir Arthur Harris perceived this as meaning "the primary objective of Bomber Command will be the progressive destruction and dislocation of the German military, industrial and economic system aimed at undermining the morale of the German people to a point where their capacity for armed resistance is fatally weakened."<sup>4</sup> Thereby, he confirmed his intention to destroy the will of the German people directly through area bombing of German cities rather than accepting that his purpose must be to lower morale by attacking German industry. Although the Air Staff thought differently, they could not dissuade him, and Sir Charles Portal, Chief of the Air Staff, declined to interfere with Harris' desire to prosecute the campaign as he saw fit.



The draft POINTBLANK directive, a product of the Washington conference of May 1943, further modified the Casablanca directive. POINTBLANK envisaged a cooperative effort between the United States' 8th Air Force and Bomber Command, wherein the Americans would bomb key industrial targets by day while the British would bomb the surrounding industrial areas at night.<sup>5</sup> However, as German fighters posed an increasing threat to the USAAF bombers, the draft of POINTBLANK submitted to Sir Arthur Harris on 3 June 1943 gave the destruction of the German fighter force as an intermediate objective of the CBO. "There was not a single mention [in it] of the general area attack upon German morale," stated the Official History.<sup>6</sup> Harris could not abide any detours from his chosen path, and saw that the final draft of POINTBLANK, dated 10 June 1943, was changed accordingly, leaving the intermediate objective of the German fighter force to the USAAF 8th Air Force entirely, while the forces of Bomber Command were "to be employed in accordance with their main aim in the general disorganization of German industry..."<sup>7</sup> Nor was Harris discouraged in this by Sir Charles Portal. Indeed, Portal pressed Harris to attack Berlin, as did Sir Winston Churchill.<sup>8</sup> Thus, POINTBLANK, which, in the words of the British official history, was "a highly obscure document," actually gave Harris the leeway he desired to assault what he believed would be the decisive target of the war: Berlin.<sup>9</sup> Even though the Chiefs of Staff saw the reduction of the German fighter force as a necessary prerequisite to OVERLORD (the cross-channel invasion), Portal allowed Harris to attack targets as he saw fit, at least until 1 April 1944, when operational control of Bomber Command would pass to General Dwight D. Eisenhower, the Supreme Allied Commander in Europe (SACEUR).<sup>10</sup>

In 1943, Bomber Command developed into a formidable weapon for carrying the war into the heart of Germany and gained two major victories. It had a frontline strength of over 800 four-engine heavy bombers, with 8 (Pathfinder) Group being specifically employed to find and mark aiming points for the Main Force. Sir Arthur Harris had prosecuted two highly successful campaigns in 1943, the Battle of the Ruhr and the Battle of Hamburg. These victories were the result of significant technical advances in bomb-carrying capacity, navigation, and bombing accuracy, which had allowed Bomber Command to strike hard and accurately at German targets. The essential problem of the bombing campaigns of 1940 and 1941, that crews could neither find targets nor bomb them accurately, had been solved.<sup>11</sup> Bomber Command could "see" in the dark, and under the cloak of darkness it could deliver enough bombs accurately to make area bombing a worthwhile proposition. But Bomber Command's "sight" had technical limits, and the RAF would come up hard against them in the Battle of Berlin.

Bomber Command's sight was based upon three devices: Gee, Oboe, and H2S. The first two were ground-based navigational aids, the third an airborne ground-mapping radar. Gee was essentially a pulsed radio beam which emanated from two transmitters in England and could be directed over a target in Germany. As the beam widened with the distance traveled, the accuracy lessened, and its effective range was about 300 miles.<sup>12</sup> After some early successes with Gee in 1942, the Germans jammed the signal, and thereafter it was only usable near England (where it was nonetheless a valuable aid to aircraft returning to base at night and in bad weather). Oboe was more sophisticated. It consisted of a pair of transmitters in the aircraft which re-radiated a pulse received from two ground transmitters in England. These gave the aircraft guidance in both azimuth and distance along a given track, and could provide a signal for precise bomb release. As the ground stations could control only one aircraft at a time, Oboe was used only by special twin-engine Mosquito aircraft. These dropped pyrotechnic target indicators which marked the aiming points for the other bombers. Thus, a Mosquito flying at 28,000 feet (a height that no four-engine bomber could attain) could direct an attack on the Ruhr with great accuracy. Oboe was also limited to 300 miles.<sup>13</sup> The final aid, H2S, was airborne radar which mapped ground features and provided the navigator with a crude picture of the ground. However, the 10-centimetre wavelength of the initial H2S set did not give good returns from some types of terrain or built-up areas. The best radar picture came from coastlines or large lakes; the poorest came from large, unrelieved urban areas like Berlin.<sup>14</sup>

Neither Gee nor Oboe could guide aircraft 600 miles to Berlin. So, when Harris asserted that he could wreck Berlin, he gambled that H2S could get the aircraft there accurately enough to bomb the target effectively. More specifically, he was relying on H2S to provide the Pathfinders with the ability to find and mark the aiming point without any visual confirmation whatsoever, in any weather.

Without reliable identification of the aiming point, the potential accuracy of a raid on Berlin could be no greater than that of the unaided raids of 1940–41. Success depended upon the gadget working well.

Harris had available in Bomber Command a force of some 802 heavy bombers at the beginning of November 1943.<sup>15</sup> The three types of heavy bomber employed were the Stirling, the Halifax, and the Lancaster. The Stirling, as events would show, was no longer suitable for deep penetrations into Germany. The 250 available Halifax Mark Is and Vs were almost as troublesome.<sup>16</sup> They could carry only a 4,750-pound bomb load to Berlin, and they had trouble attaining the high altitudes necessary for self-preservation.<sup>17</sup> The star of Bomber Command was the Lancaster, Marks I, II, and III, capable of carrying a 9,000-pound bomb load to Berlin, and of attaining a height of 22,000 feet over the target.<sup>18</sup> The Operations Research Section (ORS) of Bomber Command rated the effectiveness of the Lancaster over the Halifax in a ratio of 2.6:1.<sup>19</sup> No wonder that Harris stated his disdain for the Halifax quite clearly. “Nothing we can do to rid ourselves of these obsolescents as soon as possible should... remain undone,” he wrote.<sup>20</sup>

The Pathfinder Force, 8 Group, had the same heavy bombers as the Main Force, as well as three squadrons of Mosquitoes. These light, twin-engine aircraft could carry a 4,000-pound bomb load to Berlin at 30,000 feet, well above the defences. Mosquitoes were used to assist in target marking and to carry out diversionary raids.<sup>21</sup>

As a distinctly Canadian part of Bomber Command, 6 Group had been created on 1 January 1943. Commanded by Air Vice-Marshal G. E. Brookes, in November 1943, it consisted of eight squadrons flying either the Halifax V or Lancaster. It would shortly be reinforced by the return of three squadrons that had been detached for service in the Middle East. The first Canadian-built Mark X Lancaster, The Ruhr Express, arrived at 405 Squadron, the lone Canadian pathfinder squadron in 8 Group, in late October 1943.<sup>22</sup> Further Lancaster Mark X's would follow in April 1944, but The Ruhr Express was the only Canadian-built Lancaster to take part in the Battle of Berlin.<sup>23</sup> Over the “Big City,” as Berlin was known to the crews, the Canadians flew British-built Halifaxes and Lancasters.

After the success of Bomber Command over the Ruhr and Hamburg in 1943, Churchill and the Chief of the Air Staff, Sir Charles Portal, were inclined to believe that Harris could, if not destroy Berlin, then inflict crippling damage upon the city; at the very least, Harris claimed that with 10-centimetre H2S, two out of four recent attacks (not on Berlin) had been partial successes, one a complete failure, and one an outstanding success. With the three-centimetre H2S Mark III, he predicted that two out of four attacks would be highly successful.<sup>24</sup> As events would show, however, Harris' faith in H2S was misplaced, and Bomber Command would fail.

Berlin was an extremely difficult target for Bomber Command, and as already stated, success depended upon the performance of H2S. But there were other factors to consider. Berlin was 600 miles from the 6 Group airfields in Yorkshire, which meant that with additional routing considerations, crews faced an average 1400-mile round trip for each mission, or roughly seven hours flying time. This fact had several consequences. First, the long trip increased the possibility for navigational error. Second, the increased fuel requirements meant smaller bomb loads, so that more trips were necessary to achieve a given result than if the target had been closer to England. Two corollaries to this were that group commanders stripped armour out of the aircraft and imposed overloads to boost the bomb tonnage. The effect of the former is arguable, but the effect of the latter was to decrease aircraft performance, which increased casualties. Third, the only practicable period in which to attack Berlin was during the long winter nights, precisely when weather would be at its worst. Crews would have to deal with icing, turbulence, cloud over the target, and foul weather for take-offs and landings. Last, going to Berlin meant a long exposure to the German defences, which meant high casualties.

Harris had expressed his desire that the USAAF join in the battle, but there was never any real prospect of USAAF participation. POINTBLANK had already established the separate thrust of the Americans, and, certainly, after the debacle of Schweinfurt on 14 October 1943, where 60 out of 291

aircraft dispatched were shot down, the Americans would not go so deep into Germany again without fighter escort.<sup>25</sup> Portal, responsible for the strategic direction of both Bomber Command and the 8th Air Force, did not share Harris' belief in the imminent triumph of the area offensive, and never seriously considered altering the 8th Air Force's instructions; yet, he still encouraged Harris to hit Berlin.<sup>26</sup> Without the Americans attacking by day it seems incredible that Harris believed that Bomber Command alone could destroy Berlin by night. Harris himself had warned Portal that "40,000 tons of bombs" would be required for a prolonged attack on Berlin, equating to 25 raids with the full strength of Bomber Command.<sup>27</sup> This might have warned Portal of the size of the offensive Harris was preparing to unleash, but he seems to have remained undisturbed until the effort began to fail.

The German air defence system lay between Bomber Command and its objective. Harris was doubtless optimistic that Bomber Command had found the right combination of tactics and radio countermeasures to keep the German defences in the disarray into which they had fallen during 1943.<sup>28</sup> At this point it is useful to review the development of both the German air defence and RAF bomber tactics during 1943. The German air defence had been based on the *Himmelbett* system, an integrated array of Freya coastal early warning radars and ground controlled interceptors. These fighters operated in a shallow line of "boxes" ranged along the frontiers of the Reich. As bombers transited to the target, the radar controller used two Wurzburg radars to vector a single fighter on to a single bomber as it passed through the box. The Germans improved this system in 1943 by the addition of "Y" guidance, which allowed two additional fighters to be controlled into the box, from which position they would make interceptions with their on-board Lichtenstein radars.<sup>29</sup> Even so, the maximum number of fighters in a box was three, and early in 1943, Bomber Command figured out that they could flood the boxes with far more bombers than the fighters could handle. The result was the "bomber stream," a highly concentrated group of bombers which passed quickly through the fighter boxes. Just as a lion might kill only one out of a herd of passing zebras, so, too, a controlled night fighter could only kill one or two bombers out of the 400 or 500 passing through the box. Interceptions as a percentage of aircraft flying through the box fell dramatically and more bombers got through to the target.

In June 1943, Luftwaffe Major Hajo Hermann suggested a new technique for engaging bombers. Hermann, a bomber pilot, had seen as many as 100 bombers caught in the searchlights over the Ruhr at one time, far more than the flak batteries could hit. He proposed that single engine fighters, flown by bomber and transport pilots skilled in night and instrument techniques, intercept the bombers over the target where they would be easily caught by the searchlights or silhouetted by fires from the target.<sup>30</sup> General Kamhuber, overall air defence commander, vetoed Hermann's idea, fearing the fighters might be hit by friendly flak. At this point, controlled night fighting was still effective, and much safer, but events were soon to overwhelm him.

On 9 May 1943, a Ju 88R-I night-fighter crew defected to the British with their aircraft. British technical investigators discovered that the aircraft's Lichtenstein radar worked on almost the same frequency as the ground-based Wurzburg interception radar.<sup>31</sup> This confirmed for the British that both radars were susceptible to jamming by the same means. The Germans had realized this possibility some time previously, but Reichsmarshal Goering had been so horrified by the prospect that he had forbidden mention of the idea at any level on the basis of security, and thus had prevented research into any adequate jamming defence.<sup>32</sup> The British were likewise afraid, and had worked for some time to ensure that their radars were proof against jamming. Once they had done this, they proceeded against the German radars.

The British jammed German radars by dropping millions of pieces of aluminum foil (codename Window), cut in strips 30 centimetres long and 1.5 centimetres wide, from attacking aircraft at one-minute intervals whilst over enemy territory.<sup>33</sup> Bomber Command first used Window on the night of 24–25 July 1943 when it attacked Hamburg. German Freya and Lichtenstein radars were instantly rendered useless. Radar screens showed thousands of echoes, and it was virtually impossible to distinguish between the echoes from the bombers and the echoes from the Window. German defences fell into mass confusion, and Bomber Command suffered light losses of only 1.5 per cent. The raid devastated Hamburg.<sup>34</sup> At one stroke, the German system of controlled radar interception was obsolete.

Hamburg was a rude shock to the German night fighting system. The Luftwaffe Chief of Staff, Generaloberst Hans Jeschonnek shot himself on 19 August 1943, depressed by the Luftwaffe's failures in the air.<sup>35</sup> General Kammhuber still clung to the Himmelbett system, but gave Hermann permission to prosecute *Wilde Sau* (Wild Boar) intercepts with single-engine fighters.

The Wild Boar fighters would be guided to the bombers by the “running commentary” method of control. The Germans invariably gained prior warning of a raid from the pattern of intercepted radio traffic from Bomber Command bases, as RAF ground crews always performed radio checks on their aircraft the morning prior to a raid. The fighter squadrons would be warned, and had ample time to man their aircraft, take off, and assemble at altitude over a radio or optical navigational beacon. The bomber stream would be tracked through a combination of radar reports and ground observation, and controllers passed this information to the fighters in the form of a running commentary. This gave the weather, position, course, and altitude of the bombers, the direction of their approach to the target, and notice of any sky markers or bomb drops.<sup>36</sup> Flak batteries fired barrages of illuminating rounds at fixed heights above the bomber stream, and banks of searchlights shone on the clouds, silhouetting the bombers. Over the target area, flak batteries only engaged targets below 4,000 metres altitude, leaving everything above to the fighters.<sup>37</sup>

These innovations led to a remarkable recovery for the German night-fighter defences. In August 1943, night fighters claimed a record 250 victims, 200 of which went to the Wild Boars, and 50 to the Himmelbett system.<sup>38</sup> Yet, General Kammhuber, despite increasing pressure, clung to his Himmelbett system. Rather than risk the slow and vulnerable twin-engine night fighters over the target area, a new method of operation, *Zahme Sau* (Tame Boar) was proposed. Under this system, the Kammhuber boxes would be abandoned. In their place, the twin-engine night fighters would loiter at a radio beacon, and then be guided into the bomber stream by Y guidance and a running commentary similar to that given the Wild Boar fighters. Once in the stream, the night fighters intercepted bombers with on-board radars, passive homers, or visually. A new jam-proof airborne intercept radar—the SN-2—started to enter the force at this time, but when Tame Boar operations were first tried on 28 August 1943, most fighters carried the old Lichtenstein sets. Success eluded them.<sup>39</sup>

The good weather and short nights of the summer gave way to the clouds and darkness of the German fall. The German night-fighter forces' fortunes fell badly in September as the bombers hid themselves in the cloud and continued to jam the radars with Window. On 15 September 1943, General Kammhuber was sacked and replaced by General Major “Beppo” Schmid. The Himmelbett system of closely controlled night fighting was abandoned, and the Germans entered the Battle of Berlin in November with a marginally effective night-fighter defence based on early warning, Wild Boar interceptions over the target, and Tame Boar interceptions in the bomber stream as it approached the target. Bomber Command faced a night-fighter force which it correctly believed had been in disarray since the Battle of Hamburg. The recovery of that force during the Battle of Berlin would be a truly remarkable—and for Bomber Command a truly terrible—turn of events.

Bomber Command reinforced Window by attacking the fighter control system with a series of radio countermeasures. To jam the Freya early warning radars they used an airborne jammer called Mandrel in December 1942. The Germans responded by widening the band of the Freya emissions, which forced Mandrel to jam over a wider spectrum, thus weakening it. Further, they developed a homer, *Freya-halbe*, which allowed fighters to track Mandrel emissions. By the time of the Battle of Berlin only 200 Main Force aircraft were equipped with Mandrel, and the device was only marginally effective.<sup>40</sup> More successful was Tinsel, the communications jamming of the high-frequency band used for controlling German fighters. Every bomber could jam these frequencies. The RAF listening service determined the frequencies being used and instructed the aircraft to jam accordingly.<sup>41</sup> In August 1943, when the Germans began using their running-commentary system, Special Tinsel was introduced. This divided the jamming effort so that two-thirds of it was against running-commentary and one-third was against ground controlled intercept traffic.<sup>42</sup>

The Germans responded by moving traffic into the very-high-frequency (VHF) spectrum. As early as spring 1943, the RAF listening service had detected fighter traffic on VHF, and had instituted Ground Cigar, or VHF jamming, from England in the summer of 1943. Ground Cigar reached only as far as the Dutch coast, so in October 1943, the RAF formed a special squadron to carry Airborne

Cigar VHF jammers in the bomber stream itself.<sup>43</sup> The German fighter pilots soon found it very difficult to either send or receive instructions.

Yet another assault occurred against the German command and control. This was Corona. Over high power transmitters in England, idiomatic German speakers transmitted confusing instructions to the German pilots on the high-frequency band. Due to the physics of high-frequency transmissions, the strength of the English radio was as good as or better than the German. Corona interfered with the running-commentary system, and when introduced on 22–23 October 1943, it threw the German night fighter force into confusion.<sup>44</sup> The Bomber Command loss rate for September and October dipped below 3.5 per cent as compared to 7 per cent in August.<sup>45</sup>

In the battle between the night fighters and the bombers, it seemed that the bombers were winning; thus, Harris could reasonably believe that his bombers could go anywhere in Germany with acceptable losses. The weakness, as already stated, was in finding and marking the aiming point. If the bombers could not bomb accurately, then all the effort would be wasted.

What was the situation for 6 Group on the eve of the Battle of Berlin? In general, the squadrons of 6 Group had experienced a rough ride during 1943. The strongest evidence of this comes from the ORS reports of Bomber Command. The scientists monitored various indicators of performance throughout the command, such as navigational accuracy, early return rates, and loss rates, which they correlated according to group, type of aircraft, and experience level. In the course of this analysis they noticed higher than average loss rates and early return rates in 6 Group. They therefore monitored the performance of 4 Group and 6 Group together to determine the cause of the discrepancies, as these two formations were both similarly equipped and based close together in western England.

The comparisons confirmed the impression of higher loss rates, higher early return rates, and generally lower efficiency in 6 Group than in 4 Group. For the period 1 January to 30 September 1943, 6 Group's casualty rate for Wellingtons was 10 per cent higher than 4 Group's, and for Halifaxes it was 25 per cent higher.<sup>46</sup> ORS attributed the difference to the newness of the group, its lack of experienced Canadian officers for the critical positions of flight and squadron commander, and the upheaval caused by the departure of three Wellington squadrons for the Middle East. They also noted that 45 per cent of the Wellington pilots who went missing fell in their first six missions; likewise, the missing rate for Halifax pilots was 6.8 per cent for the first twenty missions, after which it declined to 3.1 percent.<sup>47</sup> Further, 6 Group aircraft made contact with fighters more frequently than 4 Group, although loss rates were similar, and ORS postulated that 6 Group might be making more contacts as they joined the bomber stream nearer the enemy coast.<sup>48</sup> ORS laid the higher early return rate at the door of inexperienced ground crew and aircrew.

Bomber Command was not overly concerned with the results. They could be explained away in terms of the newness of the Group, and the turbulence associated with its formation. The Canadians on the 6 Group staff had additional paperwork pressed on them as a national formation, and were also absorbed with the problems of activating new squadrons and re-equipping with heavy Halifax and Lancaster bombers. Their tactical planning was good, and Bomber Command Headquarters asserted that in time 6 Group's problems would work themselves out.<sup>49</sup>

The Battle of Berlin is generally recognized as beginning on 18 November 1943, when Harris dispatched 440 Lancasters and four Mosquitoes to the Big City. The designation of that period as a "battle" is somewhat of a historical convenience, as Bomber Command flew against enemy targets continuously throughout the war, whenever the weather was good enough. From the crews' point of view it was just one long slog, whether against Berlin or any other target, until the requisite 30 missions were completed and they were released from operations for a six-month rest. But, Sir Arthur Harris had a particular objective in mind for this period of operations and so the term "battle" is apt.

From 18 November 1943 until 31 March 1944, Bomber Command dispatched 35 major raids against German targets, 16 of these against Berlin. Excluding minor actions, 20,224 sorties were flown, 19,914 by four-engine bombers,<sup>50</sup> and 11,113 sorties were directed against Berlin.<sup>51</sup> From the 35 major actions, 1,047 bombers failed to return and another 1,682 were damaged.<sup>52</sup> The loss rate



overall was 5.2 per cent.<sup>53</sup> A total of 157 aircraft were lost by 6 Group during this period.<sup>54</sup> For all this effort, not much was accomplished.

Bomber Command raided Berlin four times in November, dispatching 2,040 sorties with 84 aircraft failing to return.<sup>55</sup> Target marking was a problem right from the start; 8 Group Pathfinders had only one serviceable H2S Mark III set of the six available.<sup>56</sup> The other Pathfinders had regular H2S sets, and only 25 per cent of the Main Force was so equipped. These proved inadequate for the task.

The German night-fighter force remained in disarray. The bad weather restricted the operation of the Wild Boar fighters, and when they were ordered into the air regardless, many pilots had to bail out because they could not find an airfield, or the aircraft lost control due to icing.<sup>57</sup> British jamming made life hell for the Luftwaffe controllers. According to Gebhard Aders, “the running commentary could no longer be clearly understood on any wavelength or frequency, and everywhere one heard noisy roars, whistling, bells or quotations from Hitler’s speeches.”<sup>58</sup> The controllers were further confused by diversion raids and spoofs by high-flying Mosquitoes that dropped target-indicators and 4,000-pound bombs over cities hundreds of miles from the main attacks. Wild Boar interceptions were made difficult by packing the bombers so closely that they passed through the target at the rate of 30 to 40 per minute.<sup>59</sup> A raid, from the time the first markers were dropped until the last bomber passed, would last some 20 minutes. One false guess by the controller, and the Wild Boars would miss the raid.

Thus, in November, Bomber Command flew a large bomber force deep into Germany and struck at Berlin four times with minimum interference from the defences. Success, as the saying goes, has many fathers. Churchill sent Harris a message of congratulations for his “crushing attacks upon the Nazi citadel.”<sup>60</sup> However, the bombing results were disappointing, to say the least. Target photographs, which were taken automatically from each aircraft at the time of bomb release, showed almost nothing but cloud. Only 8.3 per cent showed fire tracks, that is, evidence that something had been hit. Of the five photographs on which ground features were identifiable, four showed that the bomber was more than three miles from the aiming point. ORS also noted that six Pathfinder Force squadrons and 12 Main Force squadrons were now equipped with H2S, but that only 62 per cent of the sets had been serviceable at the target.<sup>61</sup> However, the ORS concluded optimistically that “the very considerable damage said to be inflicted in Berlin may prove that a very large percentage of the bombs dropped blind on H2S were in fact on or near the aiming point.”<sup>62</sup> A remarkable conclusion! One effect of November’s raids was that the Stirling bombers were withdrawn from missions over Germany.

In fact, three attacks, on the nights of 22, 23, and 26 November 1943 had been, and remained, the most destructive of all RAF attacks on Berlin. German authorities reported a total of 8,701 buildings destroyed and 4,330 people killed. Over 400,000 people were bombed out and homeless, and an area roughly 70 square miles in size had been severely damaged.<sup>63</sup> Several important arms factories, including the Alkett tank factory, were also hit on the night of 27 November, when the Pathfinders missed the aiming point and dropped their target markers in the suburbs, where, by happy chance, some war industry was located.<sup>64</sup> Yet, for all this damage, the result was not decisive. The casualties and the destruction made no significant impact on Berlin, a city of four million, with a metropolitan area of 883 square miles.<sup>65</sup> Proportionately, Berlin had suffered far less damage than the Ruhr or Hamburg. In lieu of any direct evidence, Bomber Command made up its own claims. “The administrative machine of the Nazis,” proclaimed a December 1943 report, “their military and industrial organization, and above all, their morale, have by these attacks suffered a deadly wound from which they cannot recover.”<sup>66</sup>

It was not that the Germans were unaffected by the bombing. “Everyone should pay a visit to Berlin,” said the Luftwaffe’s Director-General of Equipment, Field-Marshal Milch, on 23 February 1944. “It would then be realised that experiences such as we have undergone in the last few months cannot be endured indefinitely.”<sup>67</sup> Propaganda Minister Josef Goebbels wrote, “the sky above Berlin is bloody, deep red, and of an awesome beauty. I just can’t stand looking at it.”<sup>68</sup> But, he issued no denials of the British damage claims, believing that the sooner the British thought that they had destroyed Berlin, the sooner they would leave it alone.<sup>69</sup>



The Germans reacted to November with furious efforts to reinforce their air defences. Although the bombers may have been cloaked in darkness, electronically speaking, they were lighting up the night sky like neon signs. The Germans used this to their advantage. A ground-based device, Korfu, picked up signals from the H2S at long range, and replaced the early warning lost from the jammed-out Freya radars. The Germans also triggered the identification friend or foe (IFF) sets in the bombers, which created a distinctive blip on the German radar screens.<sup>70</sup> Two new airborne homing devices, Naxos and Flensburg, began to enter the night-fighter force. Naxos allowed fighters to home in on signals emanating from a bomber's H2S radar, and Flensburg performed a similar function on the bomber's Monica tail-warning radar. The Germans used these devices efficiently by forming squadrons of observer aircraft, specifically to track the bomber stream and broadcast a running-commentary to the fighters. Controllers would then vector Tame Boar twin-engine night fighters into the bomber stream on the way to the target. These fighters would "swim" with the stream, making multiple interceptions until the target area, where Wild Boar fighters and flak took over. Other aircraft dropped flares over the bomber stream, trying to illuminate the bombers. In this they had competition from the RAF, which also dropped route markers to guide the stream. The Germans also reinforced success. High-scoring pilots laid claim to the newest aircraft equipped with the latest radar equipment and the deadly *schrage-musik*—twin 20-millimetre cannons mounted aft of the cockpit and pointing forward at 70 degrees from the horizontal. With these guns a fighter could sneak up under a bomber's blind spot and pour fire accurately into the starboard wing tanks between the fuselage and the inboard engine. A bomber on fire died quickly.<sup>71</sup>

German fortunes rebounded in December 1943. In spite of atrocious weather, Bomber Command raided Berlin four times that month, hitting Leipzig and Frankfurt as well. The Germans reinforced the fighter defences around Berlin, and Bomber Command lost 170 aircraft that month, including 28 from 6 Group.<sup>72</sup> Bomber Command stepped up its campaign of radio countermeasures, and each raid saw some new twist. When the Germans found that their normal communications channels were jammed, they broadcast instructions by varying the music on the "Anna-Marie" German Forces radio show, which could be received on a fighter's medium-frequency receiver. If waltz music played, the fighters flew to Berlin; if accordion music played, they headed for Leipzig, and so on. The RAF soon discovered the subterfuge and jammed it out, deriding the measure as "childish;" however, it worked while it lasted.<sup>73</sup> More serious for the British were the airborne running-commentary aircraft, and the German resort to Morse-code transmissions.<sup>74</sup> The RAP never successfully jammed these methods. As a result, German night fighters claimed 138 victories in December, for 30 losses. However, aircraft available fell to 247 from 258 in November, and the loss of experienced crews was keenly felt.<sup>75</sup>

Harris was still optimistic that he could batter Berlin into oblivion and the Germans into submission. In a 7 December 1943 letter to the Air Ministry, he documented the superiority of the Lancaster over other types, and added, "...it appears that the Lancaster force alone should be sufficient, but only just sufficient to produce in Germany by April 1st 1944, a state of devastation in which surrender is inevitable."<sup>76</sup> He urged further attention to the rapid delivery of more Lancasters and bombing aids (H2S sets), and expressed some concern that a rise in the ratio of losses to sorties would affect his scheme. Not for a moment, though, did he consider shifting the weight of Bomber Command's attack to the German aircraft industry, as POINTBLANK had directed and to which task the 8th Air Force was applying itself. Harris' determination to win the war through area bombing had not altered. As the Official Historian remarked, "Sir Arthur Harris thus made it abundantly clear that he was not concerned with an air offensive which would make OVERLORD possible, but one which would make it unnecessary."<sup>77</sup>

The Air Staff held a different opinion. In a 23 December 1943 letter the Deputy Chief of the Air Staff, Air Marshal N. H. Bottomley, directed Harris' attention to the fact that the claims made in his letter of December could only account for the de-housing of some 11 per cent of the German population, and that this result could not be decisive.<sup>78</sup> Moreover, Bottomley stated that Bomber Command operations were meant to be complementary to those of the 8th Air Force. "I am to emphasize the fact," Bottomley wrote, "that your night bomber forces would make the greatest contribution by completely destroying those vital centres which can be reached by day only at heavy cost; examples are Schweinfurt, Leipzig and centres of twin-engined fighter industry."<sup>79</sup>

Harris responded to this and earlier missives by deriding previous attempts at selective bombing and denying the critical importance of the Schweinfurt ball-bearing industry, or indeed, any single industry, to the German war effort.<sup>80</sup> The Air Ministry thought it wise at this point to request yet another study of the significance of Schweinfurt's ball-bearing plants from the Ministry of Economic Warfare. Harris continued to bomb Berlin.

On the first night of 1944, 421 bombers returned to Berlin, of which 28 were shot down.<sup>81</sup> That night, the German night-fighter ace, Major Heinrich Prinz zu Sayn-Wittgenstein shot down 6 bombers while swimming in the stream.<sup>82</sup> The bombing was relatively ineffective, killing only 79 people, and de-housing 1,270.<sup>83</sup> Pathfinders now used the "Berlin" method for marking the aiming point—they dropped both coloured target indicators for ground marking and flares for sky marking.<sup>84</sup> As total cloud cover prevailed, the target-indicators soon disappeared and the Main Force bombed on the sky markers, which, as they drifted with the prevailing wind, were never very accurate.

And so it continued for January. On the night of 2–3 January, 362 Lancasters, 12 Mosquitoes, and 9 Halifaxes took off for Berlin. Of those, 60 aircraft turned back early and 26 Lancasters were lost, for a total loss of 7 per cent of those dispatched.<sup>85</sup> Then, it was on to Brunswick, after the moon period on 14–15 January: Bomber Command lost 38 Lancasters out of 498 dispatched.<sup>86</sup> On 20–21 January, 769 aircraft struck at Berlin. They flew over the target in 20 minutes (38 per minute), and only 35 were lost, or 4.6 per cent.<sup>87</sup> The next night Magdeburg was chosen, with a small diversion force going to Berlin. Of those, 55 bombers were lost, 35 of which were Halifaxes.<sup>88</sup> Then, at the end of the month came three consecutive raids on Berlin: 27–28 January, 28–29 January, and 30–31 January. Bomber Command dispatched 1757 aircraft, of which 112 went missing;<sup>89</sup> 6 Group lost 48 bombers in January.<sup>90</sup>

For all that, the raids had been reasonably successful; the damage to Berlin was not insignificant. On the other hand, the Ministry of Economic Warfare's report confirmed the value of hitting Schweinfurt, and on 14 January, the Chief of the Air Staff issued a directive ordering Bomber Command "to attack Schweinfurt as [its] first priority until either the place was destroyed or until further instructions were received."<sup>91</sup> Harris protested, citing tactical difficulties, but Sir Charles Portal insisted, and on 28 January he again ordered Harris to make the attack.<sup>92</sup> Preferred targets, listed in priority, were: Schweinfurt, Leipzig, Brunswick, Regensburg, Augsburg, and Gotha. Berlin was only to be attacked when "conditions were not suitable" for the six priority targets.<sup>93</sup>

Harris was not ignoring the Air Staff totally, as both Leipzig and Brunswick had been raided previously. Yet, his overall emphasis in January had been Berlin. Clearly, Harris had no intention of departing from his main objective of victory through area bombing. In spite of high losses, the front line strength of his command grew as more Lancasters and new, more effective Halifax III's entered the inventory. In the two months that remained before operational control of Bomber Command passed to SACEUR on 1 April 1944, Harris continued the assault on Berlin.

Bomber Command flew no major operations for the first two weeks of February 1944, during the new moon period. New aircraft arrived, and many of the Halifax II's and V's were traded for the much improved Halifax III's. Although the RAF had no inkling yet of the Germans' deadly *schrage-musik*, some squadrons began receiving kits to install a single .50 calibre gun in the belly of the Halifax, and four Canadian squadrons were selected for this trial.<sup>94</sup> As the gun took the place of the H2S radar installation, it could only be installed on aircraft not yet equipped with the radar, and the modification was only popular in 6 Group, although they too preferred the radar to the gun.<sup>95</sup>

German night-fighter strength fell to 223 aircraft in February, but qualitative improvements continued in the form of additional SN-2 radar, Naxos, and Flensburg installations.<sup>96</sup> It is interesting to reflect now how much the inadequate planning of the Luftwaffe higher command had prevented the winter of 1943–44 from turning into a slaughter of Allied bombers. While the German pilots were still excellent at this stage of the war, they were denied a first-rate night fighter. As early as December 1941, General Kammhuber had proposed developing the He-219 solely as a specialized night fighter to deal with the RAF's fast four-engine heavy bombers. Field-Marshal Milch objected to specialized aircraft, and would only proceed with multiple-use variants.<sup>97</sup> As a result, in late 1943 and early 1944, the backbone of the twin-engine night-fighter force was still variants of the same

Bf-110 day fighters and Ju-88 bombers with which Germany had entered the war. The addition of radars, homers, guns, and armour caused sufficient aerodynamic and weight penalties to make the Ju-88C-6 actually 6.2 miles per hour slower than the Lancaster and Halifax at any altitude.<sup>98</sup> Only the overloads imposed on the bombers and their requirement to throttle back for maximum range gave the night fighters a relative speed advantage. Furthermore, the poor quality of German aero-engines reduced the performance of the few He-219s, which did enter service in the fall of 1943.<sup>99</sup> Not only that, but German aircraft deliveries were chronically behind schedule until February 1944 when Reichsmarshal Speer took responsibility for production.<sup>100</sup> Fabrication of new types was inefficient; the He-219 took 90,000 man-hours to produce compared to 10,000 hours or less for a Ju-88.<sup>101</sup> German industry produced a string of failures, such as the Me-410, the Ju-188, and the Ta-154.

Nor was the situation much brighter in the electronics industry. Goëring's prohibition of research into defence against Window, mentioned above, left the Germans scrambling for a counter-measure when it was introduced. Only 250 examples of the superb Flensburg homer were built, and these by small shops, as it was thought undesirable to burden larger companies with its production.<sup>102</sup> Then, in February 1944, Milch cut off all research and development in airborne radar entirely, choosing to concentrate on production of mature types.<sup>103</sup> Such policies ensured that the Germans were always reacting to RAF initiatives, instead of the reverse.

On the night of 15–16 February, the battle resumed, and 891 bombers bombed Berlin on sky markers through heavy cloud, and although the tonnage of bombs dropped was greater than that which had caused the Hamburg firestorm, it had little effect. Many bombs fell in already bombed areas, while many others went wide into the surrounding countryside.<sup>104</sup> Forty-three aircraft were reported missing.<sup>105</sup> On 19–20 February, Harris dispatched 832 bombers to Leipzig, one of the targets on Bottomley's list. A freak high wind at altitude threw the bomber stream into confusion, and many arrived at Leipzig before zero hour. Some dropped their bombs blindly, while others circled and waited for the pathfinders to drop the markers. When the markers did fall, there were several collisions as bombers rushed in from all directions toward the aiming point. Seventy-eight bombers were lost, 9.6 per cent of the force.<sup>106</sup> Proportionately, 6 Group suffered the most, losing 18 of 129 aircraft in the raid.<sup>107</sup>

The debacle of Leipzig prompted the removal of all Halifax I's and V's from raids on Germany, and, finally, a shift of emphasis to the targets listed in the directive of 28 January. Bomber Command instituted some minor tactical changes: the elimination of route marker flares, and the introduction of a movable zero hour, controlled by a master-bomber.<sup>108</sup> Bomber Command shifted to targets in the south, seeking to avoid the strong defences in the north. Only once more would the Main Force go to Berlin. "This situation, in view of the fact that Berlin was by no means destroyed," concluded the Official History, "meant that the Germans had already won the Battle of Berlin."<sup>109</sup>

Harris switched to targets in southern Germany, and casualties fell accordingly. Stuttgart was attacked on 16 February with a loss of only nine aircraft. Then, on 24–25 February, Harris complied with the Air Staff's order and attacked Schweinfurt after a daylight raid by the 8th Air Force. Three out of four ball-bearing plants were badly damaged.<sup>110</sup> From then through the first three weeks of March, Harris continued attacking targets in southern Germany and France as part of the OVERLORD preparations. Significantly, he did not re-attack any targets named on the 28 January directive. Losses remained low; 6 Group lost 37 aircraft in February 1944, and none in March before the 24th.<sup>111</sup>

On 24–25 March 1944, Harris launched Bomber Command against Berlin for the last time; 811 aircraft took off: 577 Lancasters, 216 Halifax III's, and 18 Mosquitoes.<sup>112</sup> Once again, unforecasted high winds scattered the bomber stream. Relatively few losses occurred on the outward journey, but when the struggling bombers turned into the wind for the homeward leg the slaughter began. At the time, Bomber Command attributed over 50 of the 75 losses to flak as the bombers drifted over the Ruhr and several other heavily defended areas.<sup>113</sup> But Martin Middlebrook's search of German records revealed that most of the losses were due to interceptions by night fighters employing schrage-musik. Schrage-musik was as yet unknown to Bomber Command, and flak was the only way to account for bombers which burst suddenly into flame and dropped out of the sky. An estimated 60 bombers fell to the night fighters.<sup>114</sup> Even as late as October 1944, after the secret of schrage-musik

had been discovered, Bomber Command was still grossly underestimating losses to this armament at 10 per cent of all losses.<sup>115</sup>

Bombing results were disappointing again. The master-bomber, Canadian Wing Commander R. G. Lane of 405 Squadron, attempted to control the milling crowd of bombers, but most of the bombs fell wide.<sup>116</sup> Lane reported that target marking was bad through 9/10ths cloud, and the sky markers released soon drifted off the aiming point.<sup>117</sup> There were 126 communities outside Berlin that reported bombs, mostly in field or woods, and no significant damage was done in the city.<sup>118</sup> 6 Group lost 13 aircraft, 11.5 per cent of those dispatched.<sup>119</sup>

It was a bitter experience for Bomber Command, this last raid on Berlin. The Main Force never raided Berlin again. Yet, there was one further trial to be endured before Harris closed the area assault on Germany. On the night of 30–31 March 1944, Bomber Command attacked Nuremburg with 795 bombers. Of those, 96, or 11.9 per cent of the attacking force, failed to return.<sup>120</sup>

The Nuremburg raid has never been satisfactorily explained. In the weeks previous, an ORS report on tactics had been circulated to the groups noting that the Germans could detect the bomber force before it left England, that Mosquitoes were ineffective for diversions, and that “no [planned] route should pass directly over a [fighter] beacon.”<sup>121</sup> The group commanders were divided on the practicality of this last suggestion, so Headquarters Bomber Command compromised by deciding on 22 March 1944 that “routeing [sic] over beacons is undesirable, but cannot always be avoided, and should not be allowed to interfere unduly with route planning.”<sup>122</sup> The route chosen to Nuremburg went from England directly to Charleroi, then straight for 250 miles to Fulda, passing directly over two known fighter beacons, Ida and Otto.<sup>123</sup> The weather forecast for the raid period had predicted broken cloud over the continent, but a weather reconnaissance Mosquito sent earlier in the day reported cloud over the target and clear weather along the route. Harris was told of the new weather, yet did not cancel the raid. The bombers flew on the long approach route in moonlight, condensation trails streaming from their wing tips. The night fighters shot down almost one bomber per minute on the leg from Charleroi to Fulda;<sup>124</sup> 6 Group lost 13 of 118 aircraft dispatched.<sup>125</sup> Few aircraft bombed the target. “None of the night photographs showed the target area,” stated the Official History, “though 34 of them were within three miles of the centre of Schweinfurt.”<sup>126</sup> It was an ignominious end to the campaign.

In the 35 main actions that comprised the Battle of Berlin, 1,047 bombers failed to return and 1,682 were damaged. Bomber Command had expended over 100 per cent of its front-line strength (974 aircraft in March 1944) during the five months of the battle.<sup>127</sup> Morale came close to cracking. Air Vice-Marshal D. C. T. Bennett, Commander of 8 (Pathfinder) Group, stated later that Berlin was the second occasion on which aircrews had “balked at the jump” (the first being at Essen in 1942).<sup>128</sup> Furthermore, Bennett concluded that many bombs were wasted en route in an effort to increase aircraft performance, and that, unfortunately, the Command suffered from many “fringe merchants.”<sup>129</sup> Great damage was undoubtedly done in Berlin, but the effect of each individual raid decreased as time went on.<sup>130</sup>

Although other writers question whether or not the morale of the crews suffered, there can be little doubt that the overall effect of the attacks was low. The Official History commented:

There were many factors other than morale which bore upon the question of efficiency. High morale, for example, does not cause men to see through cloud. The inaccuracy and scattered nature of nearly all the Pathfinder Force marking at Berlin, which itself was obviously due more to a lack of technique than to low morale, was probably a much more important cause of the “negligible” amount of bombing “on the markers” than low morale in the Main Force.<sup>131</sup>

The object of the campaign, as stated by Harris, was to cause Germany’s surrender by breaking the will of the German people by destroying Berlin. Bomber Command failed to achieve this objective, and the war continued for another 13 months after the end of the Battle of Berlin. Other, more controversial, claims have been made as to the value of the Battle of Berlin. The Official History concluded that not only did Sir Arthur Harris fail to achieve his objective, but also that Bomber Command had suffered a defeat at the hands of the German night fighter forces.<sup>132</sup> Max Hastings, in

his book *Bomber Command*, pilloried Harris for thinking that he could destroy Berlin, asserting that “calm analysis of the tactical and industrial realities should have disposed of this fantasy at birth.”<sup>133</sup> Air Commodore John Searby, a squadron commander in the Pathfinder Force during the battle, also concluded that Bomber Command had failed, and added (in retrospect) that “Berlin wasn’t worth it.”<sup>134</sup> Martin Middlebrook did extensive research into the damage caused in Berlin by the bombing, and concluded that 27 per cent of the city’s built-up area was destroyed by the bombing, and many industries were damaged.<sup>135</sup> Still, the damage inflicted was not decisive, and the losses to Bomber Command were heavy. “The Luftwaffe,” concluded Middlebrook, “hurt Bomber Command more than Bomber Command hurt the Luftwaffe.”<sup>136</sup>

For 6 Group, the Battle of Berlin had been as difficult for them as for the rest of Bomber Command. Yet, during that period 6 Group overcame its internal difficulties and became as competent and battle-hardened as any other group in Bomber Command. An ORS report that covered the period of December 1943 through January 1944 noted that “the previous tendency of 6 Group to have higher losses [than 4 Group] has been reversed and in the last two months 4 Group have shown a higher loss rate.”<sup>137</sup> The report also noted that 6 Group’s practice of flying their Halifaxes as high as possible was the most appropriate for the new German fighter tactics. The report generated a comment from Sir Arthur Harris to Air Marshal L. S. Breadner, Air Officer Commanding the RCAF (Overseas), that “the figures are certainly reassuring as far as 6 Group is concerned....”<sup>138</sup> Like the rest of Bomber Command, 6 Group, although defeated by the night fighters, was not beaten. A new commander, Air Vice-Marshal C. M. McEwen, took over the group on 29 February 1944, and led it to ultimate victory over Germany in 1945.

There was one effect of the Battle of Berlin in particular and of the Combined Bomber Offensive in general, largely unlooked for, that was decisive. The intensive bombing operations over the winter of 1943–44 turned the Luftwaffe irrevocably from an offensive force into a defensive one. The threat to Berlin was one that the Germans could not ignore, and as shown above, they made strenuous efforts to defeat it by introducing more fighter defences. 8th Air Force’s daylight attacks, particularly those of February 1944’s “Big Week,” damaged fighter production and caused even more emphasis on keeping fighters at home for defence of Germany. Losses were high: in March 1944, Germany lost 56.4 per cent of its fighter strength and 21.7 per cent of its fighter pilots.<sup>139</sup> The fruits of attrition were such that on D-Day, 6 June 1944, Luftflotte 3 could only launch 100 sorties against the invasion fleet.<sup>140</sup> Sir Arthur Harris credited the defensive orientation of the Luftwaffe as being one of the successes of Bomber Command’s assault on Berlin. “Defence,” he noted with disdain, “is a gesture, not of war, but of inferiority.”<sup>141</sup>

Sir Arthur Harris recognized that destroying Berlin would only be possible if the Pathfinders were successful in finding the aiming point with H2S and marking it well enough for the Main Force to bomb accurately.<sup>142</sup> But he also believed that Berlin was so big that even if the bombers missed the aiming point they would hit something, and that this could be enough.<sup>143</sup> He failed to recognize the necessity for concentration, which had made the attacks on the Ruhr and Hamburg so successful in 1943. In effect, he had set Bomber Command a task that could not be accomplished with the means available.

Logic suggests that Bomber Command would have been more successful over the winter of 1943–44 if they had concentrated on targets they could hit. This would have restricted them to the range of Oboe, or to targets that were more easily identifiable with H2S than was Berlin. Trials by Bomber Command ORS had suggested that “the average operator, over a series of runs, would be able to drop 50 per cent of his bombs within the mean radius of the main built-up area of the town selected as the target.”<sup>144</sup> Thus, smaller targets, chosen for their positive H2S characteristics, might have yielded better results for Bomber Command. Perhaps attacks on the smaller centres of the aircraft industry, in accordance with the wishes of the Air Staff, would have been successful after all.

The key to the battle, in the final analysis, lies in the character of Sir Arthur Harris. He firmly believed that strategic bombing could win the war, and that Berlin was a target without equal for achieving that end. In his opinion, he failed only because he was never given sufficient resources to do the job. “We were only prevented,” he wrote, “from having [sufficient] force by the fact that Allied war leaders did not have enough faith in strategic bombing.”<sup>145</sup> Indeed, on 12 January 1944,



Harris attempted to convince the Air Staff that diverting Bomber Command to direct support of OVERLORD would be a mistake:

It is thus clear that the best and indeed the only efficient support which Bomber Command can give to OVERLORD is the intensification of attacks on suitable industrial centres in Germany as and when the opportunity offers. If we attempt to substitute for this process attacks on gun emplacements... we shall commit the irremediable error of diverting our best weapons from the military function, for which it has been equipped and trained, to tasks which it cannot effectively carryout. Though this might give a specious appearance of “supporting” the Army, in reality it would be the greatest disservice we could do them.<sup>146</sup>

In the end Harris, fulfilled faithfully his instructions to support OVERLORD, and with great effect. The final irony is that when Bomber Command resumed the assault on Germany in the fall of 1944, bombing accuracy rose dramatically, reaching almost 90 per cent by December 1944.<sup>147</sup> The reason: the advance of the Allied armies into France and Holland had removed the early warning for the German night fighters and had allowed the establishment of Gee and Oboe stations on the continent, which could cover all of Germany.<sup>148</sup> The invasion, which Harris had thought to make unnecessary through his assault on Berlin, had made possible the bombing accuracy he had needed for victory in 1943. But, alas, it came too late.

.....  
**Notes**

1. Sir Charles Webster and Noble Frankland, *The Strategic Air Offensive Against Germany, 1939–1945*, vol. 2 (London: Her Majesty’s Stationary Office [HMSO], 1961), 190 (hereafter cited as *Official History*).
2. William S. Carter, *Anglo-Canadian Wartime Relations, 1939–1945: RAF Bomber Command and No.6 [Canadian] Group* (New York: Garland, 1991), 42.
3. *Official History*, 2: 14; and 4: 153–54.
4. *Ibid.*, 2: 14.
5. *Ibid.*, 24.
6. *Ibid.*, 28.
7. *Ibid.*, 29.
8. *Ibid.*, 31–51. The Casablanca directive also made reference to attacking Berlin specifically, “when conditions are suitable for the attainment of especially valuable results...” *Ibid.*, 4: 154.
9. *Ibid.*, 2: 30.
10. *Ibid.*, 4: 160.
11. *Ibid.*, 1: 178–80. This refers to the “Bull Report,” which determined that in 1941, Bomber Command’s accuracy claims had been wildly exaggerated.
12. Great Britain, Air Ministry, *The Origins and Development of Operational Research in the Royal Air Force* (London: HMSO, 1963), xiv (hereafter cited as *Operational Research*.)
13. *Ibid.*, xiv.
14. *Ibid.*, 51–53.
15. Charles Messenger, “*Bomber*” *Harris and the Strategic Bombing Offensive, 1939-1945*, (London: Arms and Armour, 1984), appendix 1.
16. Martin Middlebrook, *The Berlin Raids* (London: Viking, 1988), 99; see also, K. A. Merrick, *The Handley Page Halifax* (Bourne End: Aston, 1990). The reason why the Mark V came out before the Mark III is obscure.
17. Merrick, 229–30.
18. Bette Page, *Mynarski’s Lanc* (Erin: Boston Mills, 1989), 20.
19. DRS (BC) Report S124, “Note on the Relative Value of Halifax III and Lancaster II aircraft to Bomber Command, 20–21 December 1943 to 1–2 March 1944,” n.d., Directorate of History (DHist) file Air 1411895.
20. Letter from Sir Arthur Harris, AOC-in-C Bomber Command, to Air Chief Marshal Sir Wilfrid Freeman, Ministry of Aircraft Production, March 28, 1944, DHist file Air 1411795.
21. Mosquito bombers flew at 30,000 feet and were almost untouched by German defences. Bomber Command’s Operational Research Section looked into the question of whether an all-Mosquito force would be more effective than a heavy-bomber force, but came to the conclusion that all things considered, the Lancaster was equally efficient. See ORS (BC) note, “Relative Efficiencies of Bomber Aircraft,” October 3, 1943, DHist tile Air 1411875.
22. *Ibid.*, 25.
23. *Ibid.*, 35.



24. Letter from Sir Arthur Harris, AOC-in-C Bomber Command to Sir Charles Portal, Chief of the Air Staff, November 2, 1943, DHist file Air 1411083.
25. John Terraine, *The Right of the Line* (London: Hodder and Stoughton, 1985), 550.
26. Denis Richards, *Portal of Hungerford* (London: Heinemann, 1977), 313.
27. Middlebrook, 8.
28. "Radio countermeasures" are known today as "electronic warfare."
29. Gebhard Aders, *History of the German Night Fighter Force* (London: Janes, 1979), 77.
30. *Ibid.*, 62.
31. *Ibid.*, 80.
32. *Ibid.*, 81.
33. Alfred Price, *Luftwaffe Handbook, 1939–1945* (New York: Scribners, 1977), 27.
34. Aders, 95.
35. Price, 97.
36. Aders, 95.
37. *Ibid.*, 101.
38. *Ibid.*, 104.
39. *Ibid.*, 102.
40. Great Britain, Bomber Command Signals Branch, *War in the Ether: Europe 1939–1945*, (High Wycombe: Bomber Command, 1945), 11 (hereafter cited as *War in the Ether*).
41. *Ibid.*, 15.
42. *Ibid.*, 16.
43. *Ibid.*, 18–20.
44. *Ibid.*, 22–25.
45. Messenger, 139.
46. Carter, 67.
47. ORS(BC) BC/S.26628/ORS Report, "A Further Comment on 6 Group Losses," October 7, 1943, DHist file Air 14/180I.
48. ORS(BC) Report B147, "A Note On 6 Group Losses," n.d., DHist File Air 14/1794.
49. Carter, 66–67; Spencer Dunmore and William Carter, *Reap the Whirlwind* (Toronto: McClelland and Stewart, 1991), 107–09, 176–77.
50. *Official History*, 2: 192.
51. *Ibid.*, 191.
52. *Ibid.*, 197.
53. *Ibid.*, 194.
54. Dunmore and Carter, 381–82.
55. Messenger, 144.
56. Middlebrook, 106.
57. Aders, 147.
58. *Ibid.*, 148.
59. ORS (BC) Report S.206, "The Effect of Concentration on Losses," March 6, 1945, DHist file Air 14/1761. The report reviews losses since the introduction of concentrated bomber streams and covers the period of the Battle of Berlin. It also considers losses due to collisions and bombs falling on friendly aircraft.
60. John Searby, *The Bomber Battle For Berlin* (Shrewsbury: Airlife, 1991), 71.
61. ORS(BC) Note BC/S.26280/49/Radar, "H2S Performance in November," December 12, 1943, DHist file Air 1411558.
62. *Ibid.*
63. Middlebrook, 148–49.
64. Middlebrook, 147.
65. *Official History*, 2: 264.
66. *Ibid.*, 265.
67. *Ibid.*, 194.
68. Williamson Murray, *Strategy For Defeat: The Luftwaffe 1933–1945* (Maxwell: Air University Press, 1983), 215.
69. *Official History*, 2: 265.

70. *War in the Ether*, 4. Even when ordered to, many aircrew refused to turn off their IFF sets, in the firm belief that the IFF signals interfered with the enemy searchlights. Before IFF they accomplished the same function by dropping beer bottles over the searchlight belt. Harris eventually had to have the IFF selector sealed in the off position.

71. *Operational Research*, 70.

72. *Official History*, IV, 433; and, Dunmore and Carter, 382.

73. *War In the Ether*, 29.

74. Aders, 152.

75. *Ibid.*, 150.

76. *Official History*, 2: 56.

77. *Ibid.*, 57.

78. *Ibid.*, 60.

79. *Ibid.*

80. *Ibid.*, 65–67.

81. Middlebrook, 202.

82. *Ibid.*, 204.

83. *Ibid.*, 207.

84. Gordon Musgrove, *Pathfinder Force* (London: MacDonald and Janes, 1976), 256.

85. Middlebrook, 210.

86. *Ibid.*, 223–24.

87. *Ibid.*, 225.

88. *Ibid.*, 231.

89. *Ibid.*, 232, 239, 248.

90. Dunmore and Carter, 382.

91. *Official History*, 2: 69.

92. *Ibid.*, 70.

93. Messenger, 150; *Official History*, 4: 162–63.

94. Minute BC/30238/4 Armt, “.5 Inch Under-Defence Gun Mounting,” dated 11 December 1943, DHist file Air 14/1177.

95. Memorandum AOC 6 (RCAF) Group to Headquarters Bomber Command, 13 May 1944, DHist file Air 14/1647.

96. Aders, 154.

97. *Ibid.*, 70.

98. *Ibid.*, 69.

99. William Green, *Warplanes of The Third Reich* (London: MacDonald, 1970), 353; Aders, 69.

100. Aders, 128. Speer formed the Jaegerstab in February 1944 after heavy German fighter losses to the Americans during the 8th Air Force’s “BigWeek” offensive. See Williamson Murray, *Strategy for Defeat: The Luftwaffe, 1933–1945* (Maxwell: Air University Press, 1983), 243.

101. Aders, 136.

102. *Ibid.*, 126.

103. *Ibid.*, 121.

104. Middlebrook, 269.

105. *Ibid.*, 263.

106. *Ibid.*, 272.

107. *Ibid.*, 272; Spencer, 382.

108. Middlebrook, 272; *Official History*, 2: 206.

109. *Ibid.*

110. Messenger, 151.

111. Dunmore and Carter, 282–83.

112. Middlebrook, 276.

113. *Official History*, 2: 207.

114. Middlebrook, 303.

115. ORS (BC) Report B227, October 1, 1944, DHist file Air 1411801. SN-2, Flensburg, and Naxos were all discovered by the RAF on 13 July 1944 when a Ju 88G-I landed by mistake at the RAF Woodbridge airfield. The crew discovered their mistake when an RAF fuel truck pulled up alongside them in the dark.

116. Middlebrook, 286.

117. Searby, 147.
118. Middlebrook, 289–90.
119. Dunmore and Carter, 227.
120. Messenger, 152.
121. ORS (BC) Report B197, “Review of Bomber Losses In Relation to Enemy Defensive Tactics in Night Operations, for the Period 22 November 1943 to 21 January 1944,” February 7, 1944. DHist file Air 14/1801.
122. Note from Air Vice-Marshal Walmsley, HQ Bomber Command to AOC Groups, reference ORS(BC) Report B 197, March 22, 1944, DHist file Air 14/1801.
123. Musgrove, 114. The beacon locations are shown clearly on a chart appended to ORS (BC) Report B197 produced 7 February 1944, seven weeks before the raid.
124. Middlebrook, 305.
125. Dunmore and Carter, 231.
126. *Official History*, 2: 210.
127. *Ibid.*, 197.
128. *Ibid.*, 195.
129. A “fringe merchant” was an aircraft captain and crew that instead of flying to the centre of a heavily defended target chose instead to drop their bombs at the relatively safe fringe of the target area and then departed for home.
130. *Ibid.*, 196.
131. *Ibid.*
132. *Ibid.*, 193.
133. Max Hastings, *Bomber Command* (New York: Dial, 1979), 295.
134. Searby, 11.
135. Middlebrook, 320–21.
136. Middlebrook, 325.
137. ORS(BC) Report B.198, “A Note on Comparative Losses in No. 4 and No. 6 Groups,” n.d., DHist file Air 14/1794.
138. Letter from Sir Arthur Harris to Air Marshal L. S. Breadner, March 3, 1944, DHist file Air 14/1794.
139. Murray, 239–240.
140. Murray, 280.
141. Sir Arthur Harris, *Bomber Offensive* (London: Collins, 1947), 278.
142. Harris, 185–86.
143. *Ibid.*, 186.
144. *Operational Research*, 51.
145. Harris, 263.
146. Murray, 264–65.
147. *Operational Research*, 56. Note that the chart excludes attacks on Berlin when calculating overall accuracy.
148. *Ibid.*, 57.

### **Christopher R. Shelley**

*Christopher R. Shelley joined the Canadian Forces in 1973. He flew helicopters operationally with 424 Transport and Rescue Squadron, 408 Tactical Helicopter Squadron, and overseas with 89 Canadian Rotary Wing Aviation Unit, Central America, 1990, and the Bosnian Rotary Wing Aviation Unit in 2001. Command appointments included Commanding Officer of 408 Squadron, Edmonton, and Commander, 1 Wing, Kingston. Other significant appointments included Chief of Staff, Canadian Defence Academy, and the Director of Flight Safety for the Canadian Forces. Colonel Shelley has a BA and MA from the Royal Military College of Canada, Kingston, where he also had the pleasure of teaching in the Military Psychology and Leadership Department, 1994 to 1997. Colonel (retired) Christopher R. Shelley retired from the Canadian Forces in 2008 after a 35-year career.*

## Dining at Separate Tables: Heavy Tactical Air Support in Operation TOTALIZE, 7–10 August, 1944

*Jody Perrun*

During the historic summer of 1944, Allied soldiers (Canadian and British, at least) had a saying about the air forces: when the Luftwaffe comes over, the Allies duck; when the Royal Air Force (RAF) comes over, the Germans duck; but when the Americans come over, everyone ducks! I came to investigate the use of heavy bombers in support of the ground battle waged by First Canadian Army during Operation TOTALIZE because my grandfather was killed when B-17s from the American Eighth Air Force misidentified their targets and bombed Canadian positions south of the Norman city of Caen on 8 August 1944. It was easy enough to ascertain that two, perhaps three, tactical groups of 12 Flying Fortresses dropped their cargoes on the suburbs of Cormelles and Vaucelles, and that casualties numbered over 300, including 65 killed.<sup>1</sup> Trying to learn how and why the strategic air forces came to provide tactical support in this instance, and then to evaluate the results they achieved, was entirely another matter.

Essentially a combined operation, TOTALIZE has received insufficient attention from air historians, possibly because their mandates have not allowed for the necessarily detailed analysis of events on the ground. Army historians have done little better. Although air support was the cornerstone of the plan devised by Lieutenant-General Guy Simonds, whose 2nd Canadian Corps would carry out the ground operation, analyses of the supporting role played by Bomber Command and the Eighth Air Force have been superficial at best.<sup>2</sup> In attempting to fill the historiographical “gaps” left by these separate approaches, my examination of TOTALIZE has devoted equal attention to both army and air force perspectives. This methodology has led me to question arguments about the supposed unsuitability of aircraft designed to strike strategic targets when used to provide tactical (or battlefield) support. A greater barrier to a more effective application of Allied air power was the inter-service rivalry and politics between army and air force which precluded the maximum degree of cooperation between the two throughout the war. Rather than working together to develop and improve methods for providing close air support to ground troops, the two services each showed little sympathy or understanding for the peculiar problems of the other. Senior officers in the Royal Air Force (RAF), in particular, jealously guarded their jurisdiction and were extremely reluctant to divert resources from the strategic bombing offensive. The result was that no doctrine for the use of heavy bombers in the tactical role was formulated prior to the Normandy campaign. When heavy bombers were used for close support in 1944 and 1945, the technique was thus improvised and experimental.

Strategic air power, which was advocated during the interwar years by airmen like Sir Hugh Trenchard in Britain and the Italian General Giulio Douhet, stressed the use of bombers to strike targets deep within the enemy’s homeland, thus hindering his ability to continue to fight and demoralizing the citizenry. RAF officers who favoured the idea of strategic over tactical air power were in the ascendant immediately following the First World War. They argued that “based on the limited precedents of 1917 and 1918... future wars could be settled quickly, cheaply, and relatively painlessly through the ‘knock-out blow,’ an unstoppable and devastating bomber attack on an enemy’s commercial and industrial centres.”<sup>3</sup> Following the same principle of war—concentration of effort—that guided the Royal Artillery, adherents to the strategic bombing theory insisted that air resources should not be divided and squandered performing battlefield support duties for the army, which had its own weapons for that purpose.<sup>4</sup> To those who formulated official doctrine, the “tactical and operational integration” required by air and ground forces working in close cooperation was anathema. With stereotypical conservatism, British airmen insisted, and continued to insist even in 1945, that “strategic bombing was the war-winning weapon.”<sup>5</sup> American air doctrine, meanwhile, generally shared the orientation of the RAF, so that when it came to a choice between strategic or tactical targets the “[United States] U.S. Army Air Force [USAAF] bought the RAF’s priorities off the peg, as it were, much to the annoyance of the U.S. Army itself.”<sup>6</sup>

By the spring of 1944, however, nearly five years of war had proven the need for close air support if ground battles were to be won. The British Second Tactical Air Force (TAF) was created to cooperate with General Bernard Montgomery's 21st Army Group during Operation OVERLORD, the cross-Channel invasion of occupied Europe, although the Allied strategic bomber forces had been temporarily placed under the direction of General Dwight D. Eisenhower, Supreme Commander of the Allied Expeditionary Force, in order to provide additional support.

Ground commanders did not hesitate to call for the additional firepower. Following the D-Day landings on 6 June 1944, the strength of German resistance threatened to turn the Battle of Normandy into a stalemate. Montgomery came under increasing criticism by early July for his failure to take Caen, one of his D-Day objectives, and decided to use heavy bombers during Operation CHARNWOOD, 7-8 July 1944, in the hope that the great destructive power they could unleash might facilitate the capture of the city. After CHARNWOOD, heavy bombing would accompany every major Allied operation in Normandy.

Senior airmen, like RAF Bomber Command's Air Officer Commander-in-Chief Sir Arthur Harris, correctly argued that heavy bombers had been designed and their crews trained for strategic missions. Because British and American air doctrine, the body of knowledge underlying choices of weapons systems, suitable methods of employment and training, had focused on strategic bombing as the proper application of air power since the interwar years, a method had not been devised to hit more precise battlefield targets in close proximity to friendly troops. It is true that a command and control system had been worked out since 1942 that allowed tactical air forces to provide close support to ground troops, and indeed, impromptu support, but it was not applicable to the heavy bombers. Their targets were fixed before the aircraft left their bases, and no system of ground-to-air communications was developed, perhaps because such a system might have encouraged the latter's employment in a role which the RAF opposed. As a result, the employment of heavy bombers imposed rigidity on ground operations that did not allow for changes in the tactical situation, although this did not stop the Allied armies from using the "heavies" in their attempts to blast a hole through German defensive positions which continued to frustrate their advances.

By the first week of August, it was becoming more and more clear that the Germans did not have sufficient resources to win the battle of attrition that was the Normandy campaign. The success of Operation COBRA, the American break-out on the western flank of the bridgehead on 24–25 July, had forced them to bolster an unstable line with divisions drawn from the Caen sector. Montgomery had ordered First Canadian Army under Lieutenant-General Harry Crerar to prepare an attack along the Caen-Falaise road with the object of obliging the Germans to retain their armoured divisions on the eastern flank, where they could not interfere with the American advance. As the panzers rolled westwards in late July and the first days of August for the German counter-offensive at Mortain, however, the goal of the Canadian operation, code-named TOTALIZE, became a break-out toward the town of Falaise. The operation took on greater significance when the Germans were stopped at Mortain. The Americans continued to push east, and the Falaise Pocket formed.

Opposite the Canadian positions on the northern slope of Verrières Ridge, which had remained in German hands despite repeated attacks since Operation GOODWOOD, Simonds was confronted by two defensive lines covered by an array of machine guns, *Nebelwerfers*, along with the dreaded moaning Minnies, multi-barrelled rocket projectors, and numerous artillery pieces, including large numbers of the equally notorious 88-millimetre anti-tank guns. As of 1 August, the front-line defences were being held by 1st and 9th *Schutzstaffel* (SS) Panzer Divisions. Intelligence indicated that each division was keeping one of its two infantry regiments in the rear area to work on the secondary position, which was only partially completed, and to "form the nucleus of a defence in the event of a 'break in.'" Simonds assumed that in such an event, the Germans would "rely on being able to get tanks and [self-propelled guns] back" to improvise a defence on the rear position. Although they were under strength, the Germans were expected to "concentrate their infantry around tactically important localities, and... leave gaps in parts of the line which they would cover by fire from automatic weapons and anti-tank guns."<sup>7</sup> The notorious 12th SS Panzer Division *Hitlerjugend* (Hitler Youth) was believed to be in "close reserve opposite our front," so it could be expected to counter-attack on 2nd Corps' eastern flank.<sup>8</sup>

The British and Americans had neglected to seriously analyse the problems of armoured warfare during the 1930s, and this deficiency would be paid for during the Battle of Normandy. Not expecting to make a grand continental commitment in the next war, neither the British nor the Americans had overly concerned themselves with the development of progressive tank designs. When matched against superior German tanks and anti-tank guns, the Allies' Sherman tanks could not long survive on the battlefield. Tactical doctrine was therefore compromised as a result of substandard equipment. During Operation GOODWOOD on 18 July, Simonds had watched as 20 to 30 Shermans were "brewed up" within seconds of crossing their start line into open country. The fire-power and armoured counter-attacks which the Germans could bring to bear compelled Simonds to devise an innovative plan if he were to find an alternative to an armoured version of the Charge of the Light Brigade.

Simonds had set down an operational policy in February 1944 to guide training within his corps.<sup>9</sup> In addition to noting the characteristics of the German defence system and tactics that were to be expected, Simonds was concerned with determining the point at which artillery should be moved forward during the attack. The salient issue was whether attacking forces should continue beyond their objectives in order to exploit the temporary opportunity presented by the enemy's disorganization, thus incurring the risk of moving beyond the range of their fire support, or accept a pause and wait for the guns to move up. The question posed a dilemma, but as a rule, Simonds believed it necessary to wait. Given Allied air supremacy in Northwest Europe by the summer of 1944, however, he felt that it might be possible to alleviate the problem of the pause with an unorthodox solution. "This is the period," Simonds concluded, "at which the employment of all available air support is most useful to tide over the gap."<sup>10</sup>

Simonds' plan for TOTALIZE was novel. In order to break through the forward defences, the tanks of 2nd Canadian and 33rd British Armoured Brigades would lead the advance in Phase I, protected from German anti-tank guns by the cover of darkness. Infantry from 2nd Canadian and 51st Highland Infantry Divisions would follow in armoured personnel carriers (APCs) to mop up the bypassed areas and secure a base for the continuation of the assault the next day. The attack would be supported by heavy bomber strikes on the strongpoints that had previously prevented the infantry from cracking the forward defensive line, and through which Simonds expected German counter-attacks to be delivered. West of the Caen-Falaise road, that meant the towns of May-sur-Orne and Fontenay-le-Marmion, which had been denied him since mid-July; and, east of the road, the targets included La Hogue, Secqueville-la-Campagne, and a forest to the south, which he suspected to be a tank harbour.<sup>11</sup> The Lancasters of Bomber Command were to obliterate these areas beginning at 2300 hours on 7 August.

Between the two target areas, straddling the road, lay a narrow zone through which 2nd Corps' armoured columns would advance.<sup>12</sup> Three years after the fact, Simonds gave a lecture during which he explained that he had "wanted [air support] in Phase I, to seal off the flanks of the very narrow corridor through which the armoured columns were to pass, and, in particular, from enemy armour."<sup>13</sup> It therefore seems that Simonds was less concerned with actually destroying the enemy in the target areas than with preventing him from interfering with the advance.

As the assault troops would move out of the effective range of artillery near the second German defensive line, Simonds planned to test his notion about using air power to maintain the momentum of the attack. His initial appreciation, written on 1 August, stated that:

If all available air support is used for the first break in there will be nothing for the second except diminished gun support, unless a long pause is made with resultant loss of speed. If on the other hand the first break in is based upon limited air support (heavy night bombers) all available gun support and novelty of method, the heavy day bombers and medium bombers will be available for the second break in, at a time that gun support begins to decrease and it should be possible to maintain a high tempo to the operations.<sup>14</sup>

Bomber strikes on key positions would therefore also support 4th Canadian Armoured Division's assault in Phase II. Simonds' outline plan called for "[h]eavy day bombers (Fortresses) to drop high explosive on Bretteville, Gouvix, Hautmesnil, and Cauvicourt, and [a]ll available medium bombers



to lay [a] ‘fragmentation carpet’ along the Falaise road near the second line.”<sup>15</sup> Another attack with fragmentation bombs was proposed over a wider area stretching further south, to neutralize German gun positions.<sup>16</sup> The change in bomb type for the targets astride the road was due to two factors. Cratering, caused by high explosive (HE) bombs, was unacceptable because it would impede the advance, and as most of the German armour was expected to be in the forward line, HE was thought to be unnecessary. Secondly, the purpose of the attack was the neutralization of enemy weapons and infantry expected to garrison the second defensive position. Fragmentation bombs would not knock out tanks, but they could be quite effective against infantry and artillery given the right circumstances. Simonds made air support a key element in his plan for TOTALIZE, first and foremost because the tools with which he otherwise had to work were not adequate to overcome the German defences at a sustainable loss rate. In doing so, he incorporated the lessons from the bombing attack in Operation Goodwood, which had died out partly due to a lack of fire support in the latter stage of the operation. Bombing in TOTALIZE would accompany both ground assaults, and was arranged in progressive waves timed to move with the troops, not altogether unlike the creeping barrages of the Great War. By using air support as a substitute for artillery, however, Simonds would be presented with the additional problem of coordinating air strikes with the ground assault. The degree of cooperation required by such tactics would prove elusive.

When Simonds wrote the appreciation and outline plan, he assumed that getting past 1st and 9th SS divisions in Phase I would be the most difficult part of the operation. When 9th SS, and later 1st SS, subsequently withdrew and moved west for the Mortain counter-offensive, Canadian intelligence was slow to appreciate the move of the latter. It assumed that 1st SS, replaced on the front line by the newly-arrived 89th Infantry Division, had merely stepped back to the second line about Bretteville-sur-Laize to form a reserve together with the 12th SS. This meant that greater opposition was instead expected to come in the assault on the second line. Simonds thus changed his plan to increase the weight of the second phase attack by using the Polish Armoured Division together with 4th Canadian Armoured Division, but no change in the air plan was deemed necessary.

That plan was written jointly by the army and the air force. British doctrine by this point in the war called for Second TAF to work with 21st Army Group, constituting together a combined force, albeit under two separate commanders, supporting one combined plan. This type of relationship was extended to subordinate formations, so Second British Army’s air support was provided by 83 Group, and First Canadian Army was to work with 84 Group. The final decision to commit air forces or put air plans into effect rested with the RAF, and requests by the army for support therefore went to its associated group, and those that were beyond the latter’s resources, such as heavy bomber strikes, were submitted through parallel channels: First Canadian Army to 21st Army Group, and 84 Group to Second TAF. Requests were then passed up from Army Group-TAF level to the commander of the Allied Expeditionary Air Forces (AEAF), Sir Trafford Leigh-Mallory, who finally coordinated with Bomber Command or Eighth Air Force.<sup>17</sup> The rather involved chain of command had the practical effect of denying the armies a direct communications link to the strategic bombers providing support on any given occasion.<sup>18</sup> The potential negative consequences of this fact had been revealed in Operation COBRA, when Eighth Air Force struck American positions twice in successive days. If the tactical situation changed after the planes left the ground, or if there were any bombing errors, a flexible response while the planes were in the air would not be possible.

Because 84 Group had not yet become operational, air planning for TOTALIZE was done through 83 Group. A conference was held at First Canadian Army headquarters on August 4th in order to settle the preliminary details. It was attended by representatives from First Canadian Army, 21st Army Group, AEAF, Second TAF, and 83 and 84 Groups.<sup>19</sup> Absent were any representatives from Bomber Command or Eighth Air Force, which would not become involved until after plans were considered at the TAF level. Procedural matters for the bombing were explained to the army officers, noting that the heavy bombers belonging to Bomber Command could provide more accurate attacks on targets to be hit with high explosives. Simonds’ outline plan had called for Fortresses, but this specification may simply have been due to a habit of thought because Eighth Air Force was considered the day-bombing specialist.

The decisions taken at the conference concerning the timing of the attacks forced Simonds to adhere to a strict timetable. If it became necessary to alter the time of the air strikes, the army was

told that “the RAF require 5 hours prior to H-hour,” which Simonds had set for 2300, “if a 24 hours postponement is required.” Five hours notice was also required for a postponement of the bombing in Phase II, slated for 1400 hours on the day following the start of the operation. “NO change” was possible, therefore, “after 0900 hours.” This requirement would mean, in effect, that regardless of any changes in the tactical situation on the ground after 0900 on August 8th, the second-phase bombing could not be aborted. Simonds would have to decide by that time whether or not to proceed with the air strike. The time constraints would considerably restrict Simonds’ flexibility in launching Phase II.<sup>20</sup>

The imposition of a rigid schedule has often been seized upon as the key flaw in Simonds’ plan. Such judgements are themselves flawed. Simonds’ corps had just been mauled at Verrières Ridge during Operation SPRING on July 25th, and every other attempt to break through on the Caen front had also been defeated. The defensive fire-power 2nd Corps faced could only be overcome with heavy offensive firepower. Because there was no way to move artillery forward quickly enough to keep pace with the advance, Simonds judged it better to accept the resulting inflexibility than to impose a lengthy pause or proceed without covering fire.

Convincing the commanders of the strategic bomber forces of the need for their participation in TOTALIZE was the task of First Canadian Army’s Chief of Staff, Brigadier Churchill Mann, who made his pitch for air support to the “Bomber Barons” of the RAF and USAAF during a major conference at AEF headquarters in England on 5 August. Mann outlined the general plan and noted that “the area was heavily defended, and they had been trying for nearly two months unsuccessfully to break through. Their own artillery could cover part of the area, but they had only 400 guns against 400–500 enemy guns.”<sup>21</sup> Bomber Command was requested to neutralize the first-phase flank targets, which would be illuminated by coloured flare shells fired from 2nd Canadian Infantry Division’s 25-pounder field guns. He made certain to mention that the ground attack would begin while the bombing was in progress, in order to take full advantage of the effort. The second phase would be more complicated. The air strikes would not proceed unless the night attack was successful, so the air force would be notified by 0900 hours, as had previously been agreed, whether the bombing on D plus 1 was required.

Mann explained that cratering was acceptable on the flank targets (six, seven, and nine) in the second phase, but that “fragmentation and a blast effect” was needed “over a wide area on the axis of advance.” Because Bomber Command normally used high explosive rather than fragmentation bombs, the second phase attacks were to be conducted simultaneously and jointly by the two air forces, with the Eighth taking on the centre targets. Lieutenant-General Carl Spaatz, the commander of the American strategic air forces, objected that his aiming points would be obscured by smoke created by the RAF’s bombs. After some further discussion, and perhaps with the intention of simplifying the planning process, Air Chief Marshal Sir Arthur Tedder, Eisenhower’s deputy, “suggested that... in view of the doubt whether cloud conditions would be suitable for high level bombing by 8th Air Force, it would be better for Bomber Command to take on all the bombing in the phase 2 area.” To avoid obscuring the central targets, the flanks would be bombed one hour before the army advanced. The centre would then be hit at H-hour, with Bomber Command “ensuring the minimum of cratering effect.”<sup>21</sup>

Mann proceeded to request the bombing of additional targets (10 through 12), “which intelligence reported to be mostly unoccupied” following the Phase II assault. Bombing empty space was not likely to be smiled upon by that particular audience, considering the reluctance of men like Harris and Spaatz to divert their forces from targets in Germany to assume ground support duties. Nevertheless, First Canadian Army had earlier predicted that the likely German reaction to a breakthrough would be to move their guns and tanks into prepared positions in the rearward lines. Mann explained that the “choice of these areas was not always based on what there was there at the moment, but on what could be moved there during the battle.”<sup>23</sup> Tedder said that the southernmost target areas (10–12) were too large to allow more than a “very thin effect,” at which point Leigh-Mallory advised the employment of fighter-bombers to watch for the movement of guns into those areas. The conference thus wound up with decisions that the heavy bombing in both phases would be done by the RAF, with further air support over the southernmost targets provided by Second TAF, Ninth U.S. Tactical Air Force, and fighter-bombers of Eighth Air Force.<sup>24</sup>

The plan was, for the most part, then finalized in two documents issued by AEF on 6 August and 2nd Corps in the early morning of the 7th. Both documents reflect the decisions taken at the conference of 5 August, though there are some interesting discrepancies in the way the army and the air force each articulated the purpose of and the procedures for the air strikes. The AEF plan made no distinction between the purposes of the bombing in Phase I and II. In both, it was to “[d]estroy enemy installations and forces” in the target areas. Cratering was “acceptable” in all first phase areas, and “desired” in all second phase areas except target eight. H-hour for Phase II would “not be earlier than 1400 hours 8 August.”<sup>25</sup> Simonds’ headquarters, meanwhile, specified that “[c]ratering has been accepted” in the initial attack on 7 August, “with a view to isolating the corridor through which the armour and infantry are to advance.” Contrary to what the AEF planned for targets six through nine, “[c]ratering has NOT been accepted in these areas.”<sup>26</sup> The latter attack, furthermore, was to be made at 1300 hours. The cause of confusion over the timing of H-hour was revealed in First Canadian Army’s Operation Instruction for the TOTALIZE air plan. The problem was that the term H-hour was being used both to indicate the time at which leading troops would cross the start line for the attack, as well as the time the first bomb was to be dropped.<sup>27</sup> These inconsistencies indicate the continuing confusion in communications between the army and air force. In spite of all the meetings and memos, the two still did not think of the tactical support problem in the same terms.

As it turned out, Bomber Command would not be responsible if cratering occurred in the wrong target areas. At 1535 hours on August 7th, First Canadian Army received word from 21st Army Group that Eighth Air Force would make all of the Phase II attacks after all. H-hour on the following day was confirmed as 1300, but the bombing of the flank targets (six and seven) would “PROBABLY COMMENCE BEFORE H-HOUR.” The remaining targets would be hit at H-hour. The reason for bombing earlier on 8 August was a meteorological forecast predicting that after 1300 hours, the weather would be unsuitable.<sup>28</sup> Major changes to the air plan were thus being made at virtually the last minute.

Most histories ignore these changes, but the unfortunate results of Eighth Air Force’s attack on 8 August make it worth noting why they came to replace Bomber Command at the last minute. The existing literature is unusually ambiguous, where the decision is discussed at all, although it seems that persistent morning fogs at RAF bases made it “impossible to guarantee a sufficiently strong force for the second phase of the bombing operations on the following day.”<sup>29</sup> Simonds alluded to the significance of the change from RAF to USAAF in his 1947 lecture, when he said that the latter “was not equipped with the same aids for precision bombing and would have to depend largely on visual identification of targets.”<sup>30</sup> In fact, both air forces insisted on visual identification of targets by air crews, but the measures developed by Bomber Command to guide their aircraft to targets at night, in Charles Carrington’s words, supposedly rendered “the so-called ‘area-bombing’ of ‘Bert’ Harris... more accurate and concentrated than American ‘precision’ bombing.”<sup>31</sup>

At 2300 hours on 7 August, Bomber Command kicked off the attack by hitting the five targets on the flanks of 2nd Corps’ line of advance. Despite some claims exaggerating the positive effects of the air strike, 21st Army Group’s No. 2 Operational Research Section (OSR) later reported that the bombing was inaccurate, possibly as a result of the premature firing of the artillery’s marker shells, and that relatively little of importance was hit. The armoured columns of tanks and APCs nonetheless broke through the 89th Infantry Division’s front line and moved to their objective areas about three miles in the rear, from which the second-phase assault would be launched. At this point, some historians have argued, Simonds should have aborted the second-phase bombing attack in order to allow his armoured divisions to charge down the highway to Falaise, which had supposedly been left undefended following the alleged annihilation of the 89th Division. Because he did not, 12th SS, the only reserve in the area, was given time to deploy and stop 2nd Corps dead in its tracks, as it were. Waiting for the Phase II air strike supposedly caused a loss of momentum.<sup>32</sup> These arguments are predicated on the mistaken belief that the armoured divisions were in place and waiting to advance early on the morning of August 8th. In fact, the 89th Division continued to put up strong resistance until late in the afternoon, and the ongoing battle in the bypassed areas, plus heavy traffic congestion as three divisions and their supporting artillery and services moved forward through the battle area, meant that there was no momentum. The operations log of 4th Canadian Armoured Brigade, meanwhile, shows that the spearhead of the division did not even move forward to its start line until after 1224 hours.

As the tanks struggled forward, the rumble of four-engine bombers again filled the air south of Caen. The Flying Fortresses made their runs between 1226 and 1355 hours. Targets were marked for the 681 B-17s sent by Eighth Air Force the same way they had been the night before, using 25-pound flare shells. Flak disrupted the bomber formations on the run-in to the targets, and the “Mighty Eighth” claimed that neither the marker shells nor the flares dropped by pathfinders were visible from the air. As a result, accuracy was poor and the lack of wind allowed smoke and dust to obscure the targets, making the problem worse. Only 497 Fortresses bombed, and of the 55 tactical groups that made the attack, “no more than 16... bombed in or adjacent to the target areas.”<sup>33</sup>

Two or three of the 12-plane groups bombed First Canadian Army rear positions just south of Caen, however.<sup>34</sup> A 2nd Corps situation report from the afternoon of 8 August described the event vividly:

The great excitement today was the “precision” bombing of the Yanks as opposed... to the Lancaster bombing last night. We heard the bombers going towards [the] enemy just as we started lunch. A few minutes later they came back lower, and we crowded out to watch them. The sun glinted on their wings and they were a fine sight heading back to England, with their job well done (as we thought). Suddenly they opened bomb doors (there were 12 of them) and down came the bombs, and the rolling thunderclaps were all round us and lasted for about four minutes, and it felt like hours. Their job well done they sailed on for England. Just as we were about to start lunch again we saw another 12 stream into sight. They were heading N[orth]E[ast] of us, but on seeing the billowing clouds of smoke and dust their pals had created they turned and made straight for Cormelles, letting us have it again. This we felt was anything but funny. We had visions of two and three thousand Forts unloading on us in lots of 12 all afternoon. Fortunately only one more lot dropped anything, and some poor sods up East of Caen got the last dose... Altogether not a nice business though thank goodness it did not hit the [forward troops]. How any pilot in his senses could mistake Caen I cannot imagine. He did however.<sup>35</sup>

Marcel Fortier of the Governor General’s Foot Guards was on top of Verrières Ridge admiring the view of Caen when, in his words, “the Pathfinders came, and we wondered what the hell were they doing down there.” He had not been told there would be another bombing attack, and the next thing he knew “they were dropping bombs... On the ground, about 200 tank guns turned and went up... they were gonna let loose... and I said we got no orders to fire, and then it came over the blower, the radio, ‘No firing, no firing, no firing.’” The tank men on the ridge waited and watched, “ready to blow those planes out of the sky... it was either them or us.”<sup>36</sup>

The attack seems to have accomplished little. “Gouvix was not bombed at all,” and Major-General George Kitching, commanding 4th Armoured Division, judged that it “had not been as effective as we had hoped, causing very few casualties amongst the Germans.”<sup>37</sup> The effect on the soldiers in the rear areas, however, was disastrous. The 7th Medium Regiment, Royal Canadian Artillery, was firing on the Germans when it was bombed near Cormelles. The gunners lost 11 killed and 18 wounded when three of their guns suffered direct hits, and the adjacent ammunition dump exploded. J. E. Anderson of the North Shore (New Brunswick) Regiment recalled that the “damage and casualties to the medium regiment were unbelievable. One minute the gunners, most of them stripped to the waist, were working their guns on a beautiful summer day, the next the valley was filled with blazing vehicles, dead and wounded men.”<sup>38</sup> Also hit nearby was the 4th Medium Regiment, which had moved to an assembly area in Vaucelles preparatory to taking up new gun positions at Hubert Folie in support of the Polish Armoured Division. Aside from devastating the supporting medium artillery regiments, the bombing inflicted casualties on the Régiment de la Chaudière, 1st Hussars, the Polish Armoured Division, the headquarters of both 3rd Division and 2nd Armoured Brigade, and the 9th British Army Group Royal Artillery.<sup>39</sup> Eight men from the Fort Garry Horse were killed, one of whom was my grandfather, and 50 were wounded at the regiment’s “B” Echelon, “while loading ammunition and petrol in kangaroos prior to going forward.”<sup>40</sup>

By 1330 hours, reports of the bombing were coming in to 2nd Corps Headquarters. A message had to be passed through the First Canadian Army-83 Group control centre before Eighth Air Force could be contacted to stop the bombing. Without a direct link to the planes in the air, nothing could be done in time. The fragmentation bombs had devastating effects because, as Kitching later

explained, “several thousand vehicles, guns and tanks and some 50,000 soldiers” had moved “into an area approx. 2 miles by 4 miles.” The troops, caught in the open, presented extremely vulnerable targets to the errant bombs.<sup>41</sup> At 1700 hours, Simonds spoke to Mann from his command post and delivered an optimistic and undoubtedly erroneous evaluation of the bombing errors. He said that his corps’ “fighting efficiency has NOT been affected by inaccurate bombing by 8 USAAF... One [ammunition] dump destroyed but is being replaced... everything is in hand.”<sup>42</sup>

The Phase II bombing attack failed to blast a path through the Germans’ secondary line. TOTALIZE ground to a halt on 10 August following a failed, last-ditch assault on Quesnay Wood by the Queen’s Own Rifles and the North Shore Regiment, which had effectively been reduced to three companies instead of four as a result of the bombing mishap.<sup>43</sup> Added to the tragedy of bombing Canadian, British, and Polish troops in the rear areas was the missed opportunity to encircle the Germans in the developing Falaise Pocket, which would not be completed until August 21st.

What judgements can we make concerning the improvised use of heavy bombers in a role for which they had not been designed and no doctrine existed to guide training or technique? The 21st Army Group’s Operational Research Section concluded after the Battle of Normandy that the wide bomb dispersal pattern on the ground made heavy bombers an “uneconomical” method of destroying “widely dispersed targets” or “point targets” such as artillery, because of the extremely high number of aircraft and bombs that would be required to ensure destruction of even a few such targets.<sup>44</sup> German doctrine dictated that defenders would be dispersed behind a thinly-held front line controlled by fire. The ORS thus found that enemy personnel and equipment casualties lost through heavy bombing in Phase I were small, although it admitted that this could have been due to a lack of enemy concentrations within the target areas.<sup>45</sup> With these conclusions in mind, it seems that the bombing attack in Phase II could not have been of great help to the men on the ground, either, because of the difficulty in destroying the anti-tank guns and tanks that were the main barrier between First Canadian Army and Falaise. Simonds, of course, would not have realized the low probability of hitting anything at the time. When the Americans bombed the Canadians and Poles in the rear areas, the results were just the opposite.

Historians have insisted that Simonds’ plan to capitalize on this historic opportunity was fundamentally flawed because it was too complicated and sought to impose a rigid schedule upon a fluid tactical situation. The strict timetable required by the air force did not, however, prove to be a determining factor in the operation’s outcome. If there was an evident flaw, it was that Simonds had planned the air strikes to deal with a specific tactical situation, one which had changed fundamentally before the operation began. This fact was clear to Simonds by the early afternoon of 7 August, and he may have been guilty of allowing an element of inertia to guide his decisions. There is, however, a military principle that allows no more than one change to an established plan, as expressed in the dictum “order—counter-order—disorder.” Simonds apparently decided that an abundance of support was better than a paucity. Regardless of timetables, targets, and best-laid plans, the bombing in TOTALIZE was destined to be of secondary importance.

The improvised doctrine that shaped Operation TOTALIZE and other battles in Normandy emerged largely in response to the stronger anti-tank defences that had made Blitzkrieg-style tank warfare obsolete.<sup>46</sup> Lacking the conventional means to break through prepared positions without suffering prohibitively costly casualty rates, the army turned to the strategic air forces to solve the problems it faced on the ground with brute force. Heavy tactical air support was, however, “only grudgingly provided by the airmen, and its inherent characteristics [were] never... fully understood by the soldiers.”<sup>47</sup> Had there existed a history of close cooperation between the two services, Operation TOTALIZE might have achieved more positive results. Instead, the planning process was marked by miscommunication, unclear bombing objectives, and improvisation, rather than careful deliberation on the best way to get the job done. In this sense, the two services continued to exhibit a tendency attributed by Shelford Bidwell and Dominick Graham to the British Army of 1914: officers “were unaware of the principle of cooperation, and did not grasp how to coordinate the different arms, cavalry, infantry, and artillery, which, as it were, ‘dined at separate tables.’”<sup>48</sup> The army and air force were still dining at separate tables 30 years and another war later.



## Notes

1. C. P. Stacey, *The Victory Campaign: The Operations in North-West Europe 1944–1945*, vol. 3, *Official History of the Canadian Army in the Second World War* (Ottawa, Department of National Defence [DND], 1960), 223.
2. Ibid.; John A. English, *The Canadian Army and the Normandy Campaign: A Study of Failure in High Command* (New York: Praeger Publishers, 1991).
3. Brereton Greenhous et al., *The Crucible of War, 1939–1945*, vol. 3, *The Official History of the Royal Canadian Air Force* (Toronto: University of Toronto Press, 1994), 166.
4. Shelford Bidwell and Dominick Graham, *Fire-Power: British Army Weapons and Theories of War 1904–1945* (London: George Allen & Unwin, 1982), 185–86.
5. Greenhous et al., 172.
6. Dominick Graham, “Observations on the Dialectics of British Tactics, 1904–1945,” in *Men, Machines, and War*, eds. Ronald Haycock and Keith Neilson (Waterloo, ON: Wilfred Laurier University Press, 1988), 70.
7. Department of National Defence, Current Reports From Overseas #57, September 30, 1944, Directorate of History and Heritage (DHH), File 87/243.
8. Crerar Papers (CP), “Appreciation for Operation TOTALIZE, August 1, 1944,” vol. 2 (Ottawa: National Archives of Canada (NAC), MG 30 E1570).
9. Reproduced in Terry Copp and Robert Vogel, *Maple Leaf Route: Falaise* (Alma, ON: Maple Leaf Route, 1983), 46.
10. David R. O’Keefe, personal correspondence based on “Bitter Harvest: A Case Study of Allied Operational Intelligence for Operation Spring, Normandy, July 25, 1944” (MA thesis, University of Ottawa, 1996).
11. Ibid.
12. CP, vol. 2.
13. DHH 693.013 (D2), British Army of the Rhine (BAOR) Battlefield Tour Operation TOTALIZE: 2 Canadian Corps Operations Astride the Road Caen-Falaise 7–8 August 1944 (September 1947), 33.
14. Stacey, 208–09.
15. CP, vol. 2.
16. Ibid.
17. CP, vol. 24; C. C. Mann, untitled (lecture to the Canadian Staff Course, Royal Military College, Kingston, ON, July 25, 1946).
18. Dominick Graham, *The Price of Command: A Biography of General Guy Simonds* (Toronto: Stoddart, 1993).
19. CP, vol. 2, Memorandum of Points Arising at Conference Held At HHQ First Canadian (Cdn) Army at 1700 B hrs 4 August 1944, August 5, 1944.
20. Public Record Office (PRO), Kew, United Kingdom, AIR 37/763, Notes of a Conference Held in the War Room, HQ AEF at 1800 Hours on Saturday August 5th 1944, to Discuss Air Support for Operation TOTALIZE, an Operation Planned by 1st Canadian Army in the Caen Sector.
21. Ibid.; English, 273, claims that 720 guns were available to support TOTALIZE; G. W. L. Nicholson clarifies: 360 field and medium pieces could support the first phase, while 720 guns in total were available for the entire operation; see *The Gunners of Canada*, vol. 2, *The History of the Royal Regiment of Canadian Artillery, 1919–1967* (Toronto, McClelland and Stewart, 1972), 313.
22. Public Record Office (PRO), Kew, United Kingdom, AIR 37/763, Notes of a Conference Held in the War Room, HQ AEF at 1800 Hours on Saturday, August 5<sup>th</sup>, 1944, to Discuss Air Support for Operation TOTALIZE, an Operation Planned by 1st Canadian Army in the Caen Sector.
23. Ibid.
24. Ibid.
25. CP, vol. 2, AEF/TS.13165/Air, August 6, 1944.
26. NAC RG 24 vol. 10820, Op TOTALIZE Air Programme, August 7, 1944.
27. CP, vol. 2, First Cdn Army Op Instr Number 12, Major Air Plan Op TOTALIZE, August 7, 1944.
28. CP, vol. 2, AEF to First Cdn Army, 1535 hrs, August 7, 1944.
29. Air Ministry Historical Branch, RAF draft narrative, “The Break-Out and the Advance to the Lower Rhine, 12 June to 30 September 1944,” vol. 4, *The Liberation of North-West Europe*, DHH 86/285, 92.
30. BAOR, 33.
31. Charles Carrington, *Soldier at Bomber Command* (London: Leo Cooper, 1987), 87.
32. English, 291.



33. U.S. Air Force Historical Study No. 88, “The Employment of Strategic Bombers in a Tactical Role, 1941–1951” (Air University, 1953), DHH 81/881, mfm, 81.
34. Secondary sources are uncertain as to the exact number of aircraft.
35. NAC RG 24, vol. 10818, file 225C2.093 (D2), Situation Report 8 August 1944.
36. Marcel Fortier, personal interview, Ottawa, December 11, 1998.
37. George Kitching, *Mud and Green Fields: The Memoirs of Major-General George Kitching* (Langley, BC: Battleline Books, 1986), 212.
38. Will R. Bird, *North Shore (New Brunswick) Regiment* (n.p., 1963), 359.
39. English, 278; NAC RG 24, vol. 10818, message log.
40. W. A. Johnston, “A’ Echelon From the Beaches to Breda,” appendix to *Vanguard: The Fort Garry Horse in the Second World War* (Winnipeg, 1995 reprint), 144.
41. DHH 81/150, George Kitching Memoir.
42. NAC RG 24, vol. 13624, First Cdn Army MAIN Ops Log, 8 August 1944.
43. Stacey, 231.
44. 21 Army Group No. 2 Operational Research Section (ORS) Report No.14, Heavy Bombing in Support of the Army. Taken from a forthcoming compilation of ORS reports to be published by Wilfrid Laurier University’s Centre for Military Strategic and Disarmament Studies in Waterloo, Ontario.
45. Ibid.
46. English, 311.
47. Ian Gooderson, “Heavy and Medium Bombers: How Successful Were They in the Tactical Close Air Support Role During World War II?” *Journal of Strategic Studies* 15, no.3 (1992): 390–91.
48. Bidwell and Graham, 2–3.

### *Jody Perrun*

*Jody Perrun holds a PhD in History from the University of Manitoba. His current specialization is the history of the Second World War, and his doctoral dissertation (University of Manitoba, 2009) was a study of Winnipeg’s home front from 1939 to 1945. His MA thesis (Carleton, 1999) focused on First Canadian Army’s operations during the Battle of Normandy. He has worked as a historical consultant and researcher for the Department of National Defence, the Juno Beach Centre in Courseulles, Normandy, and for local documentary film producers in Winnipeg. He currently teaches for the Division of Continuing Studies, Royal Military College of Canada, and at the University of Winnipeg.*

## Secret Device: Eastern Air Command's Operational Experience with the Mark 24 Mine, 1943–1945

*Jeff Noakes*

If the anti-submarine aircraft was one of the primary weapons in the Allies' fight against the U-boat, the first years of the Second World War (WWII) gave little indication that this would be the case. Prior to September 1941, Coastal Command's aircraft made 245 attacks on U-boats, but recorded only three sinkings, all shared with surface ships, one U-boat that surrendered to aircraft, and several that were damaged.<sup>1</sup> Through the remainder of 1941 and all of 1942, aircraft achieved increasing success with airdropped depth charges, but this depended entirely on catching the submarine on the surface or in the early stages of a dive. Once the sub was down and the swirl of its dive dissipated, there was no way to track and attack it from the air. The situation remained the same until mid-1943, when a new anti-submarine weapon entered service with Allied maritime and naval air units, and aircraft were finally given a weapon that could attack submerged U-boats.

This weapon was the Mark 24 Mine, an air-dropped passive acoustic homing torpedo. Relying solely on the noise created by its target, the weapon was designed to home in on and destroy submerged U-boats. Anticipating America's entry into WWII, the United States Navy's (USN) Bureau of Ordnance had commissioned studies of underwater sound propagation and improved methods of detection at Harvard in 1940. Inspired by these studies, scientists had proposed an acoustic homing torpedo.<sup>2</sup> After extensive development work and field trials, production of the weapon began in early 1943, and was first used in combat successfully in mid-May 1943.<sup>3</sup>

In addition to the Americans, the British and the Canadians were the other two countries that made use of the mine. During the war, all Allied forces dropped a total of 340 mines in 264 attacks, sinking some 37 submarines and seriously damaging 18, giving the weapon an effectiveness rate of 16 per cent. In comparison, the average effectiveness of depth charges throughout the war was 9.5 per cent. Of the mines used, American forces dropped 142, sinking some 31 submarines and damaging 14, for an effectiveness rate of 32 per cent.<sup>4</sup> The Royal Canadian Air Force's (RCAF) Eastern Air Command (EAC), responsible for air operations in Eastern Canada and hence the Western Atlantic, appears to have been the only element of the RCAF to make use of this weapon. The Mark 24 Mine became available to the EAC beginning in June of 1943, and its first "drop" on a suspected target was made in early September of the same year. The EAC's aircraft are known to have made 20 attacks with the mine, but in these attacks the weapons sank no U-boats and do not even seem to have inflicted any damage on their targets—a disappointing record. The EAC's operational use of the mine was hampered by problems with aircrew training and target identification. Also, technical problems with and limitations of the weapon itself contributed to its limited effectiveness in Canadian service.

Because so little is generally known about the Mark 24 Mine, some background and description of the weapon is important for any discussion of its operational history. The weapon was known by several codenames. In fact, the term "Mark 24 Mine" was something of a misnomer, and was apparently bestowed either as a security measure or because much of the development work had been carried out by the USN's mine, not torpedo, section. Its initial codename was "Project Z," which was changed on April 25, 1944, to "Proctor." For reasons of secrecy, the weapon was referred to in after-action reports as a 600-pound depth charge. Various unofficial nicknames were also affixed to the weapon, including "Fido" and "Oscar." The weapon was surrounded by extensive security because of its susceptibility to simple countermeasures. Some in the USN believed that a countermeasure to the weapon could be developed within three weeks were the Germans to learn of its existence.<sup>5</sup> The concern that motivated these security precautions was caused by the weapon's homing system. The Mark 24 Mine was a passive homing weapon, whose guidance system relied on the noise made by a submarine. The range at which the mine would home in on a target depended on the speed and depth at which the U-boat was traveling, as well as on the temperature and density of the water, the sea state, and the sound-reflecting characteristics of the ocean bottom in shallower water. Considerable

uncertainty existed during the war about the actual ranges at which a mine could home in on a U-boat, but depending on the target's depth and speed, the effective range varied from a few dozen yards to almost a mile.<sup>6</sup>

The mine was at its most effective when the target submarine was crash diving or proceeding at full speed near the surface; thus, at the time of the weapon's entry into service, U-boat doctrine unwittingly contributed to the weapon's success. A U-boat operating on the surface would dive quickly to escape air attack, with its electric motors operating at full speed and its propellers generating large amounts of noise, generally through cavitation. As a result of these characteristics, operational doctrine called for the mine to be used within 90 seconds of a U-boat's submergence.<sup>7</sup> An extremely useful adjunct to the mine, and one that facilitated attacks on U-boats submerged for longer periods of time, was the radio sonobuoy or RSB.

Developed at much the same time as the Mark 24 Mine, the sonobuoy was an air launched sensor that allowed aircraft to track submerged contacts. The concept of the sonobuoy originated in Britain in May 1941 as a means for convoys to detect submarines that might be trailing them. These convoys were to be released by escort vessels and would pick up noises made by U-boats trailing the convoys and radio these noises to the convoy. Since the British did not have the resources to develop the idea, it was brought to the attention of the American government, and a working model was developed but did not see service. The idea was later revived, but this time for use by aircraft, and entered service in August of 1942.<sup>8</sup>

The AN/CRT-1 sonobuoy contained a short-range, ultra-high frequency radio transmitter which transmitted the sounds picked up by a hydrophone suspended 20 feet (6 metres) below the surface of the water. Aircraft or surface vessels equipped with the appropriate receiver could pick up these transmissions and an operator could listen to the sounds and attempt to analyse them. The buoys were non-directional, but operated on six different frequencies, which allowed the signals from a pattern of buoys to be compared, which could then give some indication of the submarine's location and course. However, such indications were uncertain at best. Furthermore, even moderate seas created enough noise to overwhelm the sounds being made by the submarine and thus made the sonobuoys useless. The sonobuoys had an effective range of one to two miles (1.6–3.2 km) against submarines, with a maximum range of four to five miles (6.4–8.1 km) on occasion. The buoys could determine whether the submarine's propellers were in use and would also allow an operator to make an estimate of the submarine's speed by counting the revolutions made by the propellers. The sonobuoy made it possible to localize a submerged U-boat with enough accuracy for an aircraft to drop a Mark 24 Mine. The impact of a Mark 24 Mine hitting the water, and the detonation of the weapon could also be heard,<sup>9</sup> and the use of any decoys or unusual tactics by the submarine could be detected. If the attack failed, contact could be maintained with the submarine, and other anti-submarine forces could be called in to make further attacks.<sup>10</sup>

As mentioned above, heavy security surrounded the Mark 24 Mine. "This weapon," a list of RCAF security regulations began, "is in the MOST SECRET category, and is one of the most secret weapons in use by the allied powers today."<sup>11</sup> In addition to extensive security precautions being implemented at airfields, aircrew were given unambiguous orders about the actions to be taken to protect the secrecy of the weapon should it be used against the enemy. In September of 1943, the EAC instructions concerning the mine included a statement that:

While many hits made... have been lethal, some may merely damage the submarine forcing it to the surface. In this case, or if the weapon has run its course without a hit, it is of the utmost importance to ensure that the submarine crew do not transmit any intelligence regarding the means of attack employed. Unless capture by a supporting naval surface vessel is possible, every effort must be made to destroy the submarine and its entire crew to protect the security of the weapon.<sup>12</sup>

Post-war, the RCAF continued to regard Proctor as Top Secret, and even in the 1960s, researchers at the RCAF Historical Branch in Ottawa were unaware of the full details of the weapon.<sup>13</sup> This secrecy is one of the problems facing historians working in this area; for security reasons, many wartime documents omitted any reference to the mine, and at best only passing references were made

to it in the post-war official histories. Only since the mid-1980s have the Canadian documents that permit a more detailed examination of the weapon's official history been made available to the public.

For the EAC, one of the initial consequences of the heavy security surrounding the Mark 24 Mine was the surprising development that the aircrew using it were not always briefed on its principles of operation. Following its introduction to Canadian service, the EAC and security instructions prohibited the briefing of crews on the mechanical details and basic principles of the weapon; and, furthermore, the aircrew were intentionally misled on its principles of operation. By October of 1943, these restrictions were beginning to cause difficulties and confusion. The RCAF delegation in Washington, which handled much liaison work, including matters pertaining to the mine, was

astounded and baffled how pilots could employ [the] weapon at maximum efficiency without knowledge of [its] method of operation... giving them misleading data is beyond our perception. The EAC instructions re Project Z gave no indication that such conditions existed or otherwise would have commented before. Do not understand here why knowledge [of] this project [is] limited to so few that it has affected employment of weapon and equipment administration.<sup>14</sup>

Such a decision on the part of the EAC was unusual; the USN apparently briefed all of its aircraft captains and second pilots on the mine's principles of operation.<sup>15</sup> In any case, this extraordinary refusal by EAC to discuss the operating principles of a weapon with the crews who were supposed to use it cannot have done much for the operational efficiency of those crews and their use of the weapon.

The effect of these problems with training manifested themselves both before and after the message mentioned above, as was demonstrated by a number of attacks involving Liberators from Number 10 Bomber Reconnaissance (BR) Squadron (Sqdn). During the battle surrounding convoys ONS 18 and ON 202, Liberator P/10 made an attack on U-422 on 23 September 1943, dropping two homing torpedoes one and a half to two minutes after the U-boat submerged. This placed the drops at or outside of the recommended ninety-second limit prescribed by tactical instructions, and thus probably placed the submarine outside of the effective homing range.<sup>16</sup> Although other attacks made by 10 BR Sqdn's Liberators, discussed below, suggest that the Squadron was also experiencing some technical problems with the mine in general, the second volume of the RCAF's official history notes that during this attack, as well as the others that took place during the battle around this convoy, the EAC aircraft demonstrated that they needed to work on "perfecting the employment of homing torpedoes."<sup>17</sup>

Several months later, the Sqdn's attack on U-845 also revealed some problems with training. In early 1944, U-845 was one of two U-boats dispatched to patrol close to the southeastern coast of Newfoundland. Signals decrypted by Bletchley Park meant that the "surprise" arrival of the two submarines was anticipated by the EAC. Extensive air searches prompted by this signals intelligence produced no results. Even a transmission from the U-boat on February 6 that disclosed the submarine's location near Flemish Cap did not help the searchers. On 9 February, U-845 again disclosed its location when it torpedoed but failed to sink the British freighter *Kelmscott*, but the heavy air and sea search centered on the attack produced no results before weather brought an end to flying.<sup>18</sup>

Growing uncertainty about the location of U-845, as well as the location of the inbound U-539, meant that the EAC now had to broaden its search areas, and on 14 February, Liberator Q of 10 BR Sqdn (Q/10) was flying through the dusk seven hours into its patrol of one of these areas. After the wireless operator noted interference with his equipment that seemed to be the result of jamming, the pilot sighted a wake some four miles ahead and to port. As the Liberator altered course to investigate, the vessel's identity was confirmed as a U-boat when flashes from flak were seen. In the face of heavy flak, the Liberator pressed home its attack, but smoke from the nose gun apparently blinded the bomb aimer and the first stick of six depth charges fell off target. A second run was made, but no depth charges were dropped due to the aircraft's course; then, a third run placed the two remaining depth charges close enough to the U-boat that it was lifted in the water. The U-boat, almost dead in the water, disappeared from the surface at this point, and the Liberator made another pass to drop a Mark 24 Mine ahead of the oil slick left by the disappearing submarine some ninety seconds after it submerged.<sup>19</sup>

Interrogation of survivors from U-845 following its sinking on March 10 revealed that although machine gun fire had killed one crew member and wounded two others, the depth charges had inflicted relatively little damage. Following the second depth charge attack, however, the U-boat had crash dived out of control to a great depth, and this, coupled with its apparent lack of forward speed, may well have placed it beyond the effective range of the Mark 24 Mine that was dropped some ninety seconds after the sub's submergence. The crew of the U-845 also displayed no knowledge that an acoustic homing torpedo had been dropped on them. Worth noting is that an intelligence report on U-845's activities based on interrogation of its crew members that was forwarded to Flag Officer Newfoundland (FONF) made no mention of the mine, since the report had a secret classification, while the mine itself was classified Most Secret.<sup>20</sup>

Almost six weeks later, another Liberator from 10 BR Sqn was the subject of direct criticism from Chief of the Air Staff Air Marshal Robert Leckie when the aircraft failed to attack or make any subsequent sightings after a periscope had apparently been detected and a contact detected by sonobuoys. These incidents point to problems with training of the EAC crews in the effective use of the Mark 24 Mine and the sonobuoy. The problems were acknowledged by Group Captain C. L. Annis, an experienced anti-submarine pilot and station commander at Gander, who admitted that the crew of Q/10 had not received adequate briefings about sonobuoys prior to their attack on U-845. Another analysis of Q/10's actions concluded that a mine had not been dropped on the contact because the crew had insufficient experience with the equipment.<sup>21</sup> The situation did improve over time; however, attack summaries for 1945 show that RSBs were used in all four Proctor attacks made by the EAC aircraft based in Canada and Newfoundland during that year, as well as in at least one attack made using only conventional depth charges.<sup>22</sup>

This discussion may seem to focus unduly on 10 BR Sqn and its problems, but it was the only EAC squadron based in North America to make Proctor attacks between mid-September 1943 and March 1945. There were also some problems with the weapon's use experienced by 162 BR Sqn based in Iceland. In one of two homing torpedo attacks made on U-300 by the squadron's Cansos on August 4, 1944, a mine was dropped on a moving oil slick being trailed by the U-boat, but the weapon was almost certainly dropped too far away to home in on its very slowly moving target.<sup>23</sup> The use of sonobuoys was not an issue in these August attacks since 162 BR Sqn's Cansos did not even begin to receive sonobuoy equipment until mid- to late-July 1944.<sup>24</sup>

While aircrew training undoubtedly affected the operational effectiveness of the Mark 24 Mine, the problem of target identification—separating genuine U-boats from numerous spurious contacts—presented yet another problem that degraded the operational effectiveness of the mine, at least in a statistical sense. The EAC, like other anti-submarine air forces, had always experienced some problems with the false identification of targets. A number of the EAC's early mine attacks were carried out on contacts that were not very likely to have been submarines. One of the difficulties in examining this issue lies with attempting to determine the true identity of the contacts that were attacked. The records suggest that several attacks were made on non-submarine targets, including what may have been an aluminum sea marker.<sup>25</sup>

Following the final collapse of surfaced U-boat operations in the mid-Atlantic in late 1943, and the gradual operational introduction of the *schorkel* from May 1944 onwards, surfaced submarines were seen far less frequently, if at all, but the mine remained a useful weapon.<sup>26</sup> By January 1945, Coastal Command had decided that since it offered such good chances against *schorkelling* and recently submerged U-boats, the Mark 24 Mine used in conjunction with the sonobuoy should become the primary weapon used to attack such targets, as well as the smoke puffs and wakes that many aircraft were sighting. This opinion was soon reflected in Coastal Command tactical doctrine, which was changed to state that: "The Mark 24 Mine is to be regarded as the primary means of attack against *schorkels* or against wakes, swirls, or smoke puffs emanating from *schorkelling* U-Boats."<sup>27</sup>

One of the consequences of the introduction of the *schorkel* was the virtual disappearance of surfaced submarines, and the changes in efforts to locate the now-submerged targets as they traveled just under the surface. Attention soon focused on contacts, including moving disturbances on the water, puffs of smoke, and trails and plumes of vapour. Unfortunately for the Allied anti-submarine crews, these did not guarantee the presence of a *schorkelling* U-boat. In reality, many of these sightings were



natural phenomena. Williwaws, a variety of waterspout, and whales are cited by Peyton-Ward in *The RAF and Maritime War*, the Air Historical Branch's useful narrative history, as the two major sources of spurious contacts and targets for aircraft attacks following the introduction of the schnorkel. Both phenomena could generate the sorts of contacts described by aircrews in sighting and attack reports, and were not often recognized or understood by the crews or those on the ground who assessed attacks and formulated doctrine. Faced with a dearth of real targets, the aircrew and others responsible for the conduct of the campaign against the U-boat seized on these natural phenomena as schnorkelling U-boats and acted accordingly.<sup>28</sup>

The record of 162 attacks with the Mark 24 Mine, for example, all made after the widespread introduction of the schnorkel and analysed post-war by Peyton-Ward, show that of the five attacks the Sqn made with the mine, two were the unsuccessful attacks on U-300 mentioned above, while three were made on contacts that were not U-boats. Of these three attacks, post-war examination concluded that one was made on a williwaw, while the other two were made on what were probably schools of whales or porpoises. This post-war examination of records showed that no U-boats were in the area at the time of these three attacks, and that the nature of the contacts closely matched the characteristics of these natural phenomena.<sup>29</sup> The EAC aircraft based in North America also made attacks on similar contacts. On March 25, 1945, Canso 21161 dropped a sonobuoy pattern on a contact that was subsequently attacked both by surface ships and by the aircraft itself. The contact was almost certainly not a submarine, and based on RAF analysis of similar attacks, it may well have been a whale or porpoise.<sup>30</sup> Another attack by a Canso, in this case N/5 on May 3, 1945, is described by the RCAF's official history as possibly having been made on a whale; the description of the attack seems to be in agreement with this conclusion.<sup>31</sup>

Finally, the operational effectiveness of the Mark 24 Mine was also affected by problems with and limitations of the weapon. In at least one case, the weapon failed to drop during an attack. On April 17, 1944, Canso S/162 attacked U-342 southwest of Iceland, destroying the submarine with three depth charges, but three attempts made to drop Proctor after the U-boat disappeared from the surface were unsuccessful. This could have been the result of a problem with the weapon itself, or a problem with the way it was loaded on the aircraft; unfortunately, no record of any enquiry into this problem seems to have survived. In this case, the failure of the mine to drop was of little consequence to the outcome of the attack, since the three depth charges had sufficed to destroy U-342.<sup>32</sup>

On a number of occasions, there may well have been problems with the mine itself. In an attack on U-377 on 22 September 1943, both depth charges and Mark 24 Mines failed to inflict damage, but the boat was forced to withdraw to seek medical attention for its commander, who had been wounded by gunfire from the attacking Liberator. In this case, the mines seem to have malfunctioned after being dropped, since post-attack reports place them close enough to the submarine to have been able to home in.<sup>33</sup> An attack on U-422 on the following day, in this case made by Liberator Y/10, may have been a case of the mine either not working or possibly dropped outside of effective homing range. After an attack run by the aircraft in which the depth charges apparently failed to detonate, a second run was made and a homing torpedo dropped using the swirl left by the U-boat's disappearing conning tower as an aiming point.<sup>34</sup> In this case, the mine seems to have malfunctioned, although there is also the possibility that it was dropped outside of effective homing range.

Another attack by a 10 BR Sqn Liberator just over a month later seems to be a much more clear-cut case of a malfunctioning weapon: on October 26, Liberator N/10 attacked a U-boat with depth charges, and then circled for over an hour before the boat submerged. The Mark 24 Mine that followed the submerging U-boat two minutes later seemed to have exploded and forced the U-boat to periscope depth, and a third run that dropped two depth charges near the U-boat's periscope produced a more spectacular explosion. Until recently, this attack was believed to have sunk U-420, but more recent reassessments now state that the target was U-91, which was not seriously damaged.<sup>35</sup> This reassessment opens the question as to whether or not the mine really worked—if U-91 survived without serious damage, it is highly unlikely that the weapon worked. Furthermore, the two minutes between submergence and the attack with the mine suggests that it may not have been dropped within effective homing range.



In many cases, of course, the limitations of the mine itself, particularly its passive acoustic homing capabilities, meant that even a drop under favourable conditions with a fully functioning mine made well within the parameters laid out by various tactical instructions would not necessarily produce results. Often, it is difficult to determine if this was a problem associated with the mine itself or with doctrine and training, but in some of these cases the U-boat was not acting in accordance with what Allied and U-boat tactics and prior experience suggested. One of the attacks made by 162 BR Sqn on U-300 provides an example of such an occurrence. Following the first attack on the surfaced submarine with conventional depth charges, Canso F/162 followed up with a homing torpedo, but at this point the boat was probably down to 295 feet (89 metres) or heading uncontrollably towards that depth, which may well have placed it outside of the effective homing range for the mine.<sup>36</sup>

The limited operational effectiveness of the Mark 24 Mine in the hands of Eastern Air Command was the result of several factors, including problems with aircrew training, difficulty with target identification, and technical problems with and limitations of the weapon itself. The legitimate wartime secrecy surrounding the Mark 24 Mine that persisted after the end of the war has undoubtedly contributed to misconceptions and rumours about the weapon and its use, and until recently, adequate documentation related to this weapon was not publicly available. While its development has recently received some attention from historians, a historical study of the mine's operational history, including the development of tactical doctrines for its use, is needed, and would be a worthwhile undertaking.<sup>37</sup> Further studies of Eastern Air Command operational training and use of the mine and the radio sonobuoy present other interesting possibilities. This research should not be limited to Canadian experiences; studies of American and British experiences with the mine along the lines of this paper would be worthwhile undertakings. As an important part of the beginnings of modern anti-submarine warfare, the history of the Mark 24 Mine is deserving of further examination.

.....

#### Notes

1. W. A. B. Douglas, *The Creation of a National Air Force*, vol. 2, *The Official History of the Royal Canadian Air Force* (Toronto: University of Toronto Press, 1986), 473–74.

2. Montgomery Meigs, *Slide Rules and Submarines: American Scientists and Subsurface Warfare in World War II* (Washington, DC: National Defense University Press, 1990), 32–33. Proposals for an acoustic homing torpedo had apparently been made during the 1930s but were rejected as impractical. Robert Gannon, *Hellions of the Deep: The Development of American Torpedoes in World War II* (University Park, PA: Pennsylvania State University Press, 1996), 102.

3. Its first successful use in combat was on May 12, 1943, when a Liberator of 86 Squadron RAF damaged U-456, which sank when attempting to dive and escape from surface ships called in by the aircraft. It was previously believed that U-456 was sunk by convoy escorts the following day, but it is now believed that this was U-753, damaged by a Sunderland from 423 Squadron RCAF and finished off by escorts from HX 237. The first sinking using the weapon occurred two days later on May 14 when U-640 was sunk by an American PBYSAs. Meigs, 106, 123, 130–31; Alfred Price, *Aircraft versus Submarine: The Evolution of the Anti-Submarine Aircraft, 1912–1945* (Annapolis, MD: Naval Institute Press, 2004), 137–38; Norman L. R. Franks, *Search, Find and Kill: Coastal Command's U-boat Successes*, 2nd ed. (London: Grub Street, 1995), 15–16, 191–92. It was originally believed that the attack on May 14 had sunk U-657, but it was sunk by His Majesty's Ship (HMS) *Swale* on 17 May. Meigs incorrectly identifies the submarine sunk in the attack on the 14th as U-657, despite its correct identity being known since at least 1977.

4. Gannon, 99, 199. The figures probably do not accurately reflect the effectiveness of the mine against submarines, since many of the late-war attacks made with the weapon were not made against submarines but against bogus schnorkel sightings. The effectiveness of aircraft depth charges varied throughout the war.

5. Coastal Command, "General Instructions for the Operation of the Mark 24 Mine," 29 June 1944, Public Record Office (PRO) AIR 15/564; EAC, "Command Instructions for the Use of Proctor," 20 June 1944, Directorate of History and Heritage (DHH) 181.009 (D3494), 4; Air Force Headquarters (AFHQ) to Headquarters (HQ) EAC, signal A.1277, 25 April 1944, NAC RG 24, vol. 6173, file HQ.19-6-30, vol. 3, "Proctor-EAC"; Samuel Eliot Morison, *The Atlantic Battle Won, May 1943–May 1945*, vol. 10, *History of United States Naval Operations in World War II* (Boston: Little, Brown, 1968), 52; 162 Bomber Reconnaissance Squadron Order of Battle (BR ORB), March 15, 1944; Gunter Hessler, *The U-Boat War in the Atlantic: June 1943–May 1945*, vol. 3 (London: Her Majesty's Stationary Office [HMSO], 1989), 53. Hessler's discussion of Allied anti-submarine weapons in *Ibid.*, 51–53, is based on "Submarine Situation 1.6.1944," Befeshishaber der Unterseebotte (BdU) war diary, IX, Directorate of History (DHist) 79/446, 351–59, and "State of enemy submarine defence May 1944," BdU war diary, IX, 363–68. The latter report concluded that although the Allies had information about

German homing torpedoes and were working in the field, they apparently had no such weapons for their own use. *Ibid.*, 368; Norman Friedman, *U.S. Naval Weapons Systems: Every gun, missile, mine and torpedo used by the U.S. Navy from 1883 to the present day* (London: Conway Maritime Press, 1983), 118; Gannon, 106–07, 199–200; “Tactical Employment of Mark 24 Mine,” August 4, 1943, I, DHH 181.009 (D4897), vol. 2.

6. Coastal Command, “General Instructions for the Operation of the Mark 24 Mine,” 29 June 1944, PRO AIR 15/564, 2; “Precis of Recent Conference & Minutes in Connection with the Mk 24 Mine,” September 4, 1944, PRO AIR 15/564, 4.

7. Coastal Command, “Tactical Procedure - Mark 24 Mine,” 10 April 1943, PRO AIR 15/450, 2–3; “Command Instructions for the Use of Proctor,” June 20, 1944, DHH 181.009 (D3494). Cavitation is the production and collapse of partial vacuum cavities in the water. It reduces the effectiveness of propellers, and also generates tremendous amounts of noise. Gannon, 118–120.

8. Friedman, 106.

9. In late 1944, the USN discovered that when the Mark 24 Mine’s battery was depleted and it began to sink, detonations would often occur when the mine reached a depth of 560 feet. The battery compartment would collapse at this depth and result in detonation of the warhead. They concluded that “this [probably] explains most of the detonations recorded as having occurred more than seven minutes after the drop and which were not believed to have resulted in kills or damage.” Memorandum, DofS/ST.6 to D/Ops, “Status of Proctor & Related Equipment in U.S.A.,” February 20, 1945, DHH 181.009 (D4897), 4.

10. “Technical Appendix to Report of FIO C. I. Soucy’s Visit, June 13 to June 17 to U.S. Navy, Washington, D.C.,” June 22, 1943, National Archives of Canada Record Group (NAC RG) 24, vol. 6173, file HQ.19-6-30, 4–5, vol. I, “Proctor-EAC;” Douglas, 560–561. A task force consisting of three destroyer escorts and one escort carrier was picked up at a range of 50 miles (80.5 km) by sonobuoy, but this was obviously an unusual incident. Exercises by 162 BR Cansos picked up what appeared to be a freighter at a range of 5 to 6 miles (8.1 to 9.7 km) and gunfire and the explosion of practice bombs from an aircraft carrying out bombing and gunnery practice some 10 to 12 miles (16 to 19.3 km) away. DofS/ST.6 TO D/Ops, “Status of Proctor & Related Equipment in U.S.A.,” February 20, 1945, DHH 181.009 (D4897), vol. 1, 4; “Report of Trip to 162 Squadron, Reykjavik, Iceland, Section B - Radio Sonic Buoys,” August 30, 1944, “Tracking Experiment - S. B. Investigation, Reykjavik Iceland,” August 17, 1944, DHH 181.002 (D481).

11. “Security Regulations for Project Z,” DHH 181.002 (D480). For more complete information on security measures, see Eastern Air Command, “Command Instructions for the Use of Proctor, D-Security Measures for Proctor,” June 20, 1944, DHH 181.009 (D3494).

12. “Command Instruction Regarding Project Z, including Tactical Safety, Security and Loading Instructions on the Use of the Mark 24 Mine,” DHH 181.002 (D479), quoted in J. D. F. Kealy, “Coastal Command Narrative No. 2: Eastern and Western Air Commands, 1942–43,” July 1975, DHH 89197, box 02, file 03.

13. Chief of the Air Staff (CAS) to Air Officer Commanding (AOC), RCAF Maintenance Command, “Type Z Aircraft Identification Equipment - Lancaster X Aircraft,” June 20, 1946, NAC RG 24, vol. 6174, file HQ.19-6-30, vol. 6, “Proctor-EAC;” letter from SO(1) H. A. Halliday to AVM C. L. Annis, “History - Eastern Air Command,” August 24, 1964, in DHH Biographical File, “Annis, Clare Levi.” The “Type Z Aircraft Identification Equipment” referred to in the first letter was an infrared signalling device for use by bombers, which Maintenance Command had confused with Project Z when requesting equipment for a demonstration at the Air Armament School at Mountain View, Ontario. See Memorandum AOC RCAF Maintenance Command to AFHQ, “Z Project-Supply,” June 8, 1946, NAC RG 24, vol. 6174, file HQ.19-6-30, vol. 6, “Proctor-EAC.”

14. AFHQ to AFCS Washington, signal A.2288, October 18, 1943, AFCS Washington to AFHQ, signal A.383, October 19, 1943, NAC RG 24, vol.6173, file HQ.19-6-30, vol. 2, “Proctor-EAC.”

15. AFHQ to AFCS Washington, signal A.2288, October 18, 1943, NAC RG 24, vol.6173, file HQ.19-6-30, vol. 2, “Proctor-EAC;” Gannon, 200; M. D. Fagen, ed., *A History of Engineering and Science in the Bell System*, vol. 2 (Bell Telephone Laboratories, 1978), 195–96. Prior to October 1943, the USN might not have briefed its pilots on the operation of the weapon, but the very limited information available seems to suggest that this was not the case.

16. Douglas, 565; “Sixty-Ninth Attack on Submarine by R.C.A.F. Aircraft (E.A.C.), September 23, 1943,” DHH 76/278 LG.

17. Douglas, 565.

18. *Ibid.*, 574–75.

19. *Ibid.*, 575; “Seventy-Seventh Attack on an Enemy U-Boat by Aircraft February 14, 1944,” DHH 76/278 LG.

20. Douglas, 575; SO(I) to FONE, July 12, 1944, “Interrogation of Prisoners ex U-845 which torpedoed S.S. Kelmscott off St. John’s,” DHH Permanent Reference File R V, U-845, 2–3.

21. Douglas, 575, 578.

22. DHH 76/278 LG.

23. "U/boat Attack Assessment Form," Serial 1185, PRO AIR 15/138; Franks, 206.
24. "Report of Trip to 162 Squadron," DHH 181.002 (D481), 1–2.
25. See attack summaries in DHH 76/278 LG, especially "Sixty-sixth Attack of Submarine by RCAF Aircraft (EAC), September 12, 1943."
26. United Kingdom (UK), Air Ministry, Air Historical Branch, *The Offensive Phase*, February 1943 to May 1944, vol. 4, *The RAF in Maritime War, The Atlantic and Home Waters*, 240–41, 476 (hereafter cited as UK Air Ministry).
27. *Ibid.*, *The Victorious Phase*, June 1944 to May 1945, vol. 5, *The RAF in Maritime War, The Atlantic and Home Waters*, 200–01; Coastal Command, "General Instructions for the Operational Use of the Mark 24 Mine," February 27, 1945. DHH 181.009 (D4897), vol. 2.
28. UK Air Ministry 5: 97–100, Appendix V.
29. *Ibid.*, Appendix VI, 4, 24, 28.
30. "Eighty-Fifth Attack on an Enemy U-Boat by RCAF Aircraft (EAC), March 25, 1945," DHH 76/278 LG.
31. Douglas, 608; "Eighty-Sixth Attack on an Enemy U-Boat by RCAF Aircraft (EAC), May 3, 1945," DHH 76/278 LG.
32. Douglas, 592; "First Attack on an Enemy U-Boat by 162 Squadron, Iceland, April 17, 1944," DHH 76/278 LG.
33. Douglas, 564; "Sixty-Seventh Attack on Submarine by RCAF Aircraft (EAC), September 22, 1943," DHH 76/278 LG.
34. Douglas, 565; "Seventieth Attack on Submarine by RCAF Aircraft (EAC), September 23, 1943," DHH 76/278 LG.
35. Douglas, 566; "Seventy-First Attack on Submarine by RCAF Aircraft (EAC), October 26, 1943," DHH 76/278 LG; Clay Blair, *Hitler's U-boat War: The Hunted, 1942–1945* (New York: Random House, 1998), 437; Fraser McKee and Robert Darlington, *The Canadian Naval Chronicle, 1939–1945: The Successes and Losses of the Canadian Navy in World War II*, rev. ed., (St. Catharines, ON: Vanwell Press, 1998), 254.
36. "U-425, U-300 and U-1018 (including Schnorkel Details Given by Survivors from U-877) - Interrogation of Survivors," N.I.D. 1/PW/REP/21/45, May 1945, DHH 181.009, vol. 2, 15; "U-boat Attack Assessment Form," Serial 1185, PRO AIR 15/138; Franks, 206.
37. Gannon. The differences between American, British, and Canadian forces in tactical doctrine for use of the mine, and their responses to the use of the schnorkel by U-boats, would be worth studying.

### **Jeff Noakes**

*Jeff Noakes has been the Second World War historian at the Canadian War Museum since mid-2006. Educated at the University of Western Ontario, the University of New Brunswick, and Carleton University, he has previously worked as a researcher on a variety of subjects related to Canada's military and diplomatic history during the twentieth century. He has presented numerous conference papers, and is also the author or joint author of articles and conference proceedings on subjects related to the Second World War, the cold war, and the Canadian Arctic. With Janice Cavell, he is joint author of Acts of Occupation: Canada and Arctic Sovereignty, 1918–25, published by University of British Columbia Press in 2010.*

## Tactical Air Power and Canadian Naval Aviation, 1946–1962<sup>1</sup>

*Leo Pettipas*

Key aspects of Canadian naval operations following the Second World War (WWII) were carrier-borne and land-based aviation. In the early post-war scheme of things, offensive military aviation writ large was of two kinds—strategic and tactical—and both can be best defined and understood by the targets toward which they were directed.

Strategic airpower targeted sources of an enemy's national strength and were essentially civilian in nature. These included industrial sites, population centres (cities), sources of raw materials, and hydro-electric installations—all the sorts of things that sustain a country's war effort. It can be truthfully said that Canadian naval aviation was not specifically tasked with the prosecution of strategic aerial warfare, and no more will be said of it here.

Tactical airpower, on the other hand, did indeed fall within the purview of Canadian naval aviation. Tactical operations focused on military targets—troops, equipment, and military infrastructure—and the principal weapons of tactical airpower were fighters, fighter-bombers, light bombers, and strike aircraft. The target priorities of tactical airpower were threefold: the enemy's air force, enemy reinforcements and supply lines, and battlefield targets.

It has been argued that the first objective of tactical air forces should be the destruction of enemy weapons that fire from the air to the ground. This view has a great deal to recommend it, considering the havoc that enemy airpower can wreak on friendly ground forces. To neutralize enemy airpower, three types of missions were regarded as essential: (1) fighter sweeps, escort missions, and interceptions that destroy enemy aircraft on the ground and in the air; (2) strike missions that hit grounded aircraft and the installations necessary for their support; and (3) reconnaissance, both visual and photographic, that provides the information needed to carry out the other two missions.<sup>2</sup> This information-gathering process is known as "tactical reconnaissance."

The second tactical target priority—enemy reinforcements and supply lines—comprise the substance and means of logistic support to enemy battlefield activity, and the activity directed against it is known as interdiction. Cutting off reinforcements invariably has a demoralizing effect on enemy troops at the front. Bridges, marshalling yards, ammunition dumps, and convoys are typical targets of interdiction work. Most targets of interdiction are situated behind enemy lines and well beyond the range of friendly artillery pieces. This fact makes the aircraft, with its range and flexibility, ideal for this type of air warfare.

Types of missions flown in the conduct of an interdiction program include: (1) armed reconnaissance, during which friendly aircraft search an enemy-held area and attack whatever targets, for example, truck convoys, locomotives, that they can find. These are otherwise known as targets of opportunity; (2) strike missions, which target highway junctions, bridges, troop concentrations, and supply dumps; and, again, (3) intelligence-gathering tactical reconnaissance that not only secures information essential to the two foregoing tasks, but also allows after-the-fact evaluation of the attacks themselves.<sup>3</sup>

The third and final tactical airpower target priority—battlefield targets—is addressed by way of close air support (CAS), which, by definition, is "air action against hostile surface targets which are so close to friendly forces as to require detailed integration of each air mission with the fire and movement of those forces."<sup>4</sup> Targets of CAS comprise anything on the battlefield that cannot be dealt with more effectively by ground weapons: the latter cannot always be at the right place at the right time; enemy defences may be too much for them to handle; or the terrain itself may preclude desired results. All of these obstacles can be effectively overcome with close air support, which, under the circumstances, becomes the prime protector of troops in the field.

Close air support subsumes several types of missions: (1) air alert strikes performed by orbiting aircraft called to the scene by an airborne or ground sited forward air controller; (2) ground alert strikes conducted by ground-briefed pilots whose aircraft are armed with specially-selected weapons; (3) column cover whose purpose is to protect rapidly advancing armour; and, inevitably, (4) reconnaissance sorties tasked with locating targets beforehand and evaluating the results of completed strikes.<sup>5</sup> To these four functions should be added the support of friendly troops in retreat.

## Historical Perspective

The post-war involvement of the Royal Canadian Navy (RCN) with tactical airpower was finally grounded in the Allied experience of WWII. Accordingly, it is worth our while to review the Allied wartime developments in that regard, because they laid the groundwork for what was to follow.

The first sequence of events fell within the context of what might be called long-range planning. It was determined during the war that Canada would possess a naval air arm of its own after the cessation of hostilities, and further, that it would be patterned after the Royal Navy (not the American) model. During the war, Canadians served as aircrew in Royal Naval (RN) air sqns operating from British carriers. Also, Canadian seamen formed the bulk of the ships' companies on two RN escort carriers. However, the Canadian Navy itself did not possess an air arm of its own; it was a small-ship service mostly comprising corvettes, mine-sweepers, and destroyers, whose primary role was convoy escort in the North Atlantic. What the wartime naval planners had in mind for the post-war period was a balanced task force "rather than an escort force solely for the protection of shipping."<sup>6</sup> The task force concept called for aircraft carriers and cruisers as well as destroyers. Such a formation would provide for a wider range of activities than those of which the Navy was capable in its familiar but limited convoy escort role.

Secondly, the RN's Fleet Air Arm, the service after which the post-war RCN aviation would be modelled, had a solid history of providing air support of infantry and amphibious operations in several theatres during WWII. The aircraft involved were primarily those we would describe as single- or twin-engine strike fighters, fighter bombers, reconnaissance fighters, dive bombers, attack bombers, and light ground-attack bombers.

Probably the earliest, fully-developed, successful CAS of Allied land forces by the RN took place in the 1942 occupation of the Vichy French-held island of Madagascar in the Indian Ocean. To prevent the enemy from obtaining a naval base for attacking convoys in the Mozambique Channel, it was deemed necessary to seize Diego Suarez, at the extreme north of the island, and the neighbouring town of Antsirane. The operation as a whole was a two-phase affair in that the participating aircraft initially operated from carriers. After the enemy-held shore facilities were secured, the naval aircraft operated from shore bases.

Profiting from the harsh experiences in the preceding Norwegian Campaign, nothing was left to chance. Detailed operation orders were issued; and by means of maps of the island, Admiralty charts, and photos taken by the South African Air Force, relief models of Diego Suarez and Antsirane were made for each of the two participating carriers, His Majesty's Ship (HMS) *Indomitable* and HMS *Illustrious*. These models enabled the aircrews to recognize the countryside in varying lights of day. Ship-based Grumman Martlets carried out tactical reconnaissance for the Army, and kept watch over the town and anchorage. Others ground-strafered enemy positions that were impeding the advance. Grumman Martlets flying top cover effectively dealt with enemy fighters, with the result that the troops were given complete protection. The carriers also performed a number of specific tasks for the Army, such as bombing points of enemy resistance and creating diversions. The naval air effort benefitted the troops in two ways: first, the military objectives as such were duly achieved; and, second, the Allied air superiority was as heartening to the friendly troops as it was demoralizing to the enemy.

After the towns were secured, the naval sqns were used mainly for reconnaissance, and they also performed valuable service in the assault on the final positions. Now land-based, they prevailed upon enemy troops with everything from bombs to empty beer bottles. When all was said and done, an important lesson had been learned: the success of combined operations in areas far from friendly



airfields could be ensured only by the availability of aircraft carriers giving support to the ground troops.<sup>7</sup>

The Madagascar experience was the prelude to Operation TORCH (the Allied invasion of North Africa in 1942), described by the First Sea Lord (Admiral Pound) as the greatest amphibious expedition of all time. This one was a combined British-American undertaking comprising three task forces, two of which were British. Noteworthy is the fact that a high-ranking officer of the United States (US) Army and his staff sailed with the Admiral of each of the British task forces. In addition, each of the carriers had on board American liaison officers and radio operators. These arrangements are reminiscent of the Carrier Borne Army Liaison Section (CBALS) system in the post-war RCN, of which more will be said later. The naval commander was in full control until the troops in the assault convoy had landed. The Army leaders then took over; the dividing line of authority was the beach.<sup>8</sup>

As at Madagascar, models of the objectives were made from photo mosaics, and maps were prepared. Each air sqn was given elaborate briefing on its task. The smaller carriers were closer inshore, and their task was to fly off fighters at first light to cover the assault transports and to patrol the landing beaches. Included among the target areas were nearby airfields to which flights of Martlet fighters were deployed. Their purpose was to prevent enemy—Vichy French—aircraft from leaving the ground and interfering with the landing operations.

As part of the plan for cooperation between the naval aircraft and the troops ashore, something new was in the offing: a sqn of Fairey Fulmars had been specially trained in tactical reconnaissance at an Army co-op school before embarking. As soon as the first Martlet had flown off, two Fulmars set out to reconnoitre the roads leading to Algiers. These reconnaissance flights were made every two hours, and in the following days were extended to a radius of 100 miles from Algiers. The Fulmars also carried out contact patrols to identify the forward positions of the landing forces.<sup>9</sup>

Another aircraft type to participate in the operation was the Fairey Albacore biplane. These flew reconnaissance, created diversions, and dropped propaganda leaflets and bombs, the latter on enemy artillery and a military airfield that was receiving the attention of ground troops. The accuracy of the dive bombing was such that the Allied troops were entirely unaffected by enemy air attack.

Overall, Operation Torch was barely a two-day affair, with events of the second day basically following the course of the one previous. In the end, the Fleet Air Arm had been able to protect the assault convoys and landing parties on the beaches. It had paved the way for the capture of the all-important airfields, thereby enabling shore-based sqns to take over. By keeping the French Air Force grounded, and it had saved the troops from being dive-bombed and machine-gunned from the air. It had reconnoitred the countryside for the Army, and when the ground advance was held up by the opposition, it had bombed and neutralized the strongly fortified enemy positions. Once again, it was shown that carrier-based aircraft could effectively provide air cover for an opposed landing until land-based air power could be brought to bear from captured airfields.<sup>10</sup>

With North Africa secured, Allied attention was now turned to Axis-occupied continental Europe. Operation Husky was put into play with the invasion of Sicily. Actually, carrier-borne aircraft were not needed here for the CAS role, thanks to the availability of airfields in Malta and Tunisia to provide all the needs of the amphibious forces. The invasion of the Italian mainland (Operation AVALANCHE), however, was another matter. The initial planned assault area was sufficiently far from the airfields of Sicily and Malta as to require the use of carrier-borne aircraft. Those used were Seafires, and although they were fundamentally ill-suited for carrier operations, the basic value of carrier support for amphibious operations was again demonstrated. Once shore bases were in hand, naval pilots and their aircraft joined the Royal Air Force's (RAF) Desert Air Force in providing close air support of ground troops, carrying out bombing missions and doing tactical reconnaissance.<sup>11</sup>

The ensuing Italian campaign is credited with an innovation of great significance to Allied land/air warfare. Liaison pilots flying light spotter aircraft started directing air strikes being carried out by fighter-bombers. This added a new dimension to tactical air control in that it freed the controller from the limitations of a strictly ground-level perspective.<sup>12</sup> In addition, CAS was very much coming into its own, as related by RAF pilot H. S. L. "Cocky" Dundas in reference to activity on the Senio River:



“A measure of the confidence which had grown up between us and the army may be found in the fact that we were asked to strafe the north bank of the Senio, a narrow river, not more than twenty yards (18 metres) across at any point, though with high flood banking, while our own troops were dug in on the south bank.”<sup>13</sup>

Close air support indeed!

On the other side of the world and in the final year of the war, the British East Indies Fleet was providing offshore support of the 14th Army amphibious landings in Burma. But, of course, the most spectacular operations of this nature fell to the United States Navy (USN). There, during the invasion of Tarawa, the Navy and the Marine Corps developed a joint CAS system. Liaison parties assigned to ground forces assisted commanders in selecting suitable targets, and then directed the incoming strike force using both airborne and ground controllers. The invasion of the Philippines simply could not have been accomplished without the support and air coverage provided by carrier aviation. At Iwo Jima, the Japanese defenders challenged the American troops with a variety of impediments, including natural caves in which they were firmly ensconced.

Dealing with these situations was especially demanding of precision and skill, as is shown by an incident during the subsequent Okinawan campaign. By this time, improved air-to-surface radio communications were enabling ground commanders themselves to call in air strikes.<sup>14</sup> In the scenario in question, Army troops were being held up by fire from a cave on the reverse side of the slope of a hill, the summit of which was actually occupied by American troops. The American lines were a mere 50 yards (45.7 metres) from the cave, but it was impossible to seal it off or throw hand grenades into it from above. Some 300 casualties had been suffered in trying to take the cave by ground assault alone. The sector commander had no recourse but to request the Navy to deliver a bomb into the mouth of the cave, notwithstanding the fact that his own men were situated a scant 150 feet (45.7 metres) away. Even if some of the Navy’s bombs landed within the American lines, their casualties would be fewer than had been experienced in the frontal attack.

The strike was delivered on target, with only one bomb falling within the American lines, and it was a dud. The position that had stalled the advance for days was taken with scarcely a casualty. The Army commander described the Navy’s work as the “acme” of close air support.<sup>15</sup>

With the D-Day invasion of France (Operation NEPTUNE/OVERLORD) and the subsequent Allied advance across Europe, tactical air support took on an overwhelmingly air force, as opposed to naval, flavour. But it also involved Canadians to an unprecedented degree as entire Royal Canadian Air Force (RCAF) sqns got into the act. Tactical reconnaissance sorties provided intelligence on enemy troop and tank concentrations that was relayed to Army headquarters. There the information was used to predict German offensive manoeuvres and prospective lines of retreat. The aircraft photographed changing enemy defences, obtained visual reports of enemy activity, and directed artillery fire.<sup>16</sup> In addition to serving as the eyes of the infantry, fighter-bombers served as “winged artillery.” The sqns moved from airfield to airfield to keep up with the Allied advances and to stay close to the bomb line—the line on a map behind which they could not bomb due to the nearness of Allied troops.<sup>17</sup>

This, then, was the background in Allied experience to the RCN’s evolution of its own tactical aviation program in the early post-war years. And the latter was not long in getting under way; in 1946, Major A. D. Egan of the Canadian Army was already on staff with the Directorate of Naval Aviation at National Headquarters as Army Air Liaison Officer. An Army unit, the No. 1 CBALS formed in 1946 with headquarters at the Naval Air Section, RCAF Station Dartmouth, later His Majesty’s Canadian Ship (HMCS) Shearwater, became an integral formation in the Navy’s tactical air support program. In the years ahead, army liaison officers would be detached to the carriers and to ground sites such as Rivers, Manitoba, to assist in the training of naval aircrews. While aboard the carriers, the army contingent, which sometimes comprised a major and a captain, but more typically a captain by himself, attended and participated in briefings for simulated strike operations against ship and shore target areas. The army liaison officer also organized photo reconnaissance exercises of islands and unfamiliar territory for the pilots while they were operating from the carrier.

In recognition of the growing importance of the closest possible coordination of ground and air forces, a Directorate of Air was created within the General Staff Branch at Army Headquarters in January of 1948. In the spring of that same year, when 803 Squadron (Sqn) was in Great Britain converting to Sea Furies, the pilots went to Yeovilton to do artillery spotting with the British Army as part of the expanding role in army co-op work. This was before any Canadian sqn began to train in close air support at home. When that day finally came, the event took place out of a former WWII air station near Rivers, and at nearby Camp Shilo.

## Canadian Joint Air Training Centre Rivers

Canadian Joint Air Training Centre (CJATC) Rivers, Manitoba, was a tri-service land/air/warfare-training base that, for the 24 years of its existence, was unique in the Canadian military establishment. For fully half of its life history, the Centre played host annually to operational air sqns of the RCN.

The value of such air support would continue to be demonstrated time and again by Western air forces throughout the 1950s and on into the 1960s, in Korea, during the Suez Crisis, and in Viet Nam. In all of these conflicts, carrier-based aircraft played a prominent role in interdiction and in close air support of ground troops. With their carriers positioned just offshore, the aircraft could be over their targets in relatively short order and could remain over the target areas for extended periods of time; such activities were not possible from fixed land bases situated some considerable distance away. In light of these advantages, carrier-based tactical aviation was destined to play an important and recurring role, and one for which intensive training was a fundamental prerequisite.

CJATC Rivers traced its history back to October of 1945 when the No. 1 Airborne Research and Development Centre was formed at Camp Shilo near Brandon, Manitoba. This unit resulted from a plan that had been drawn up for post-war army/air activities in Canada. The Centre was renamed the Joint Air School (JAS) in April of 1947 and moved to nearby RCAF Station Rivers.<sup>18</sup> The School was tasked with meeting all development and training requirements for the Canadian forces in tactical support of land and airborne operations. An RCAF fighter-reconnaissance unit, No. 417 Sqn, was formed at Rivers on 1 June 1947. Equipped with Harvards and Mustangs, its role was to carry out close support training with the Army. The sqn was disbanded on 1 August 1948, and shortly thereafter was replaced with the Tactical Fighter Flight. It is interesting to note that the commanding officer (CO) of this flight in 1950 was Stanley Charles Wood, a Navy pilot.<sup>19</sup>

In August of 1948, a resident naval section was added to the Rivers establishment. This move coincided with the first-ever arrival of operational air sqns, the sharp end of the Navy's involvement with Rivers. So began a tradition that lasted until 1962, which year saw the last visit of an operational RCN sqn to the centre.

On 1 April 1949, the CJATC was formed out of the elements of the JAS, and from its earliest days the Centre comprised four wings: administrative, technical, air training, and ground training. Of special interest here is the last-mentioned (known in later years as the "Land/Air Warfare Wing"), which provided both theoretical and practical courses on all matters relating to land/air warfare. The Ground Training Wing was in turn made up of four schools, these being the Airborne School, Transport Support School, Joint Air Photo Interpretation School, and Offensive Air Support School.<sup>20</sup>

The CJATC had several mandates, two of which were to provide training in matters relating to the joint employment of ground and air forces, and to evolve doctrines for the employment of air and ground forces in joint operations. The resident naval personnel at Rivers were primarily (but not solely) responsible for instruction relating to the employment of carrier-based tactical aviation in support of amphibious and ground operations. Their work was conducted at the Offensive Air Support School (subsequently renamed the Tactical Air Support School). Here they taught the principles and techniques used in providing CAS to the Army. In this connection, they conducted courses for all three services, and in addition gave specialist instruction to the naval sqns when they visited the Centre. The joint Air Photographic Interpretation School, as of 1955 at least, was the only tri-service school of its kind on the North American continent, and its primary function was to

train photo-readers from all three services for photographic intelligence work. The naval staff gave instruction in the interpretation of aerial photos of harbour installations, dock facilities, locks, canals, and shipping in general, as well as ship recognition and estimation of ship speeds.<sup>21</sup>

The naval aircraft that flew out of Rivers were types that would today be considered among the classics of fixed-wing military aviation. Over the years, Supermarine Seafires (the seagoing version of the famous Spitfire), Fairey Fireflies, Hawker Sea Furies, Grumman Avengers, and McDonnell Banshees were all annual residents of JAS/CJATC Rivers at one time or other. The Naval Air sqns came for several weeks at a time from their home bases at HMCS Shearwater and the Naval Air Facility, RCAF Station Summerside.

The first to arrive were the Seafires and Fireflies of 883 and 826 Sqns, respectively, in 1948. The tri-service flavour of the operation was in evidence from the start: the ground crew and 60,000 pounds (27,216 kg) of stores were flown out by RCAF transport aircraft, the loading of which was supervised by an Army air-carrying team. In 1949, the Sea Furies of 803 and 883 Sqns made the trip. The Avengers, owned and operated by 880 Sqn, made their inaugural appearance in 1951; and VF 870's jet-propelled Banshees, successors to the piston-driven Sea Furies, introduced themselves to the local scene for the first time in 1957.

The ordnance used by the Navy comprised 20-millimetre (mm) cannon ammunition, 11.5-pound (5.2-kg) practice bombs, 500- (227-kg) and 1,000-pound (454-kg) high-explosive bombs, and 3-inch (7.6-cm), solid-head or armour-piercing high-velocity aerial rockets (HVARs, also known as rocket projectiles, or RPs). Almost all of this was of WWII vintage, and the standard practice was to ship it to Rivers by rail.

Although all of the naval aircraft flown out of Rivers used the ubiquitous practice bombs, the actual payload varied from one type to the next. The Seafires, though classed as fighter-bombers, were the least capable in this respect, being restricted to a 500-pound (227-kg) external carrying capacity and having no provision for RPs. They did carry two 20-mm cannon and four .303 machine guns in the wings. The Sea Fury, the Seafire's successor, was a true fighter-bomber with a 2,000-pound (907-kg) bomb payload or provision for twelve 60-pound (27-kg), air-to-ground rockets, along with four 20-mm, wing-mounted cannon. The aforementioned 1,000-pound (454-kg) bombs were fitted to the Sea Furies only.

The fighter-reconnaissance Fireflies could be armed with eight 60-pound (27-kg) HVARs, or bomb loads of up to 2,000 pounds (907 kg) under the wings. Like the Sea Furies, they carried four fixed, wing-mounted, 20-mm cannon. As a footnote, mention should perhaps be made of the Firefly Mk2 trainers. In March of 1949, two ex-826 Sqn Firefly FR1s were delivered to Fairey Aviation of Canada Limited for conversion to this mark. The T2 was a two-seat gunnery (tactical weapons) trainer with a 20-mm cannon in each wing and synchronized gunsights in each of the cockpits. By the end of February 1950, this rework had been completed; however, there is some question as to whether or not these aircraft ever really served their specialized purpose. Certainly, as second-line machines, they did not figure in the training program at Rivers.

The Firefly's successor, the AS3 Avenger, was modified by the RCN for anti-submarine warfare (ASW); however, it could also function effectively in a close support strike role. With its capacious bomb bay, it was the only Rivers-based naval aircraft that could carry ordnance both internally and externally. This amounted to a maximum of eight RPs under the wings and 2,000 pounds (907 kg) of bombs in the bomb bay, all of which could be carried simultaneously if need be. A single .50-calibre machine gun was carried in each wing.

With the retirement of the Sea Fury in 1956, and the relegation of the Avengers to second-line sqns the following year, it fell to the Banshees alone to continue and eventually wind down the Navy's armament program at Rivers. To this end, the jets carried four nose-mounted, 20-mm cannon and eight wing-mounted pylons for rockets or bombs. Normally, it was possible to carry as many rockets as there were pylons, but a maximum of four 500-pound (227-kg) bombs at a time was standard.

For the most part, the Rivers-based naval aircrews were involved for their own benefit and that of their Army cohorts in air-to-ground work at the Camp Shilo Air Weapons Range, often under Army control in live ground-attack operations. The Shilo range was located some 50 miles southeast of Rivers. Established as a joint tactical facility for both the Navy and the Air Force, it was designed for heavy and light bombing and air-to-ground live firing exercises. Also, live artillery spotting work could be carried out there.

The air-to-ground syllabus at the Shilo range included low-level bombing, dive-bombing, and rocketry. During their firing runs, the aircraft flew an elongated, oblique racetrack pattern from south to north. The southern boundary of the range was the Assiniboine River; to the north of the target area was an unoccupied expanse to accommodate skips and overshoots, and beyond that to the north and northwest lay Camp Shilo proper.<sup>22</sup>

There were two main Army co-op exercises engaged in by the RCN sqns at Rivers and Shilo: artillery reconnaissance (Arty-R; also known as artillery spotting) and forward air control (FAC). Airborne forward air controllers riding in high-wing, light planes were introduced into tactical aviation among the Allies during the Italian Campaign of WWII. Notwithstanding their proven effectiveness in live combat situations (they were destined to remain in use throughout the Korean and Vietnam wars), they did not figure in the RCN's training program at Rivers. The forward air controllers in these exercises were ground based (see below), even though Austers and Cessna L19s and army pilots to fly them were available.<sup>23</sup> The one time that the RCN did become involved with Army light aircraft was in 1949 when the Sea Furies were grounded at Rivers due to engine problems, and, as a contingency measure, Navy pilots took a hand in artillery spotting from Austers.<sup>24</sup>

Arty-R involved flying in the roughly racetrack pattern at low level between a group of field guns at one end of the course and a target area at the other. The aircraft pilot specified a target grid location and called for corrections, and the soldiers on the ground fired their field pieces in response. The FAC exercise involved a reversal of the roles between the flyers and the people on the ground. In this drill, an Army air controller in a foxhole, usually located on the side of a hill, called the aircraft to attack ground targets specified by grid reference. The pilot defined the type of target and the load required, and then proceeded to rocket, bomb or strafe the target as requested by said ground controller.<sup>25</sup>

The CJATC tri-service philosophy manifested itself in true fashion with the staging of Exercise ASSINIBOINE, a demonstration of how air power can be deployed in support of an army. Basically, an in-house war games show for the benefit of students of the military staff colleges, it provided excellent training and experience in inter-service cooperation and in the practical use of their arms. The exercise was held on several occasions at the Canadian School of Artillery at Camp Shilo, with the participating aircraft operating out of Rivers.

In the 1951 version of ASSINIBOINE, for example, army units and air force sqns from across the prairies were invited to participate. The tactical scenario centred on an allied amphibious assault force working its way inland and getting stalled by an enemy strongpoint 25 miles from the coast. To eliminate the resistance, carrier- and land-based aircraft were directed to the scene. The exercise was staged primarily on behalf of students of the Canadian Army Staff College. The Navy's contribution took the form of the Shearwater-based 31st Support Air Group's Avengers (880 Sqn) and Sea Furies (870 Sqn). True to the inter-service nature of the operation, the Group's ground personnel and 12,000 pounds (5,443 kg) of stores were airlifted to and from Rivers by RCAF North Stars and Dakotas (such arrangements were in fact typical of the annual movements to and from Rivers).

For the purposes of the exercise, Avengers were armed with 500-pound (227-kg) bombs and 60-pound (27-kg), high-explosive aerial rockets, and the Sea Furies with rockets and 20-mm cannon. The Avengers opened the show with a low-level bombing run to soften up the defences. This was followed by a Sea Fury rocket attack in which 96 of the missiles were fired within a time span of 90 seconds—a real crowd pleaser. Next came a paradrop, followed by an artillery barrage in conjunction with a strafing attack by the Sea Furies and RCAF Mustangs. The Avengers then provided an encore by firing their rockets at an “ammunition dump” in a wooded area. The exercise was wrapped up with ground troops advancing on the target area while being supplied by air drops.<sup>26</sup>

Exercise ASSINIBOINE was not conducted solely during the temperate months of the year. The 1953 rendition of it, for example, was staged on 5 March during the annual Rivers training period that ran from 20 February to 12 March. These dates fall within what is generally the coldest time of the year in Manitoba, and 1953 was no exception.

Demonstrations of tactical airpower were not relegated to military audiences. The Navy also went public as well, although not to the extent or intensity manifested by Exercise ASSINIBOINE. For example, two Sea Furies and an Avenger from the 31st Support Air Group took part in the Armed Forces Day program at Rivers in June of 1952. On this occasion, an audience of more than 6,000 witnessed flying, ground strafing, and parachute demonstrations. The naval aircraft were placed on display, and in the simulated warfare demonstrations (demos), provided aerial support for paratroops, strafing, and bombing the “defenders.”

\* \* \*

During the months leading up to the annual removal to Rivers, a variety of preparatory activities and exercises were carried out at the Shearwater home base. Some indication of this can be gained from a perusal of the monthly reports of proceedings submitted by the commanding officer of VF 871 Sqn for the year 1956. For example, air control team practices were conducted with No. 1 Air Liaison Group (Naval Section) in January. These exercises formed part of the pilots’ operational training and comprised simulated (non-firing) ground attack missions preparatory to further such training at Rivers with army units in ground controlled fighter attack techniques.<sup>27</sup> The procedure went as follows: a formation flew from Shearwater to a target area, and strikes were made on ground positions given from a pre-positioned army radio post manned by personnel of the No. 1 Ground Liaison Group. The pilots air-identified the strike positions, simulated the attacks, and returned to Shearwater. These sorties also benefitted the participating army ground liaison officers in that it prepared them for the time on the Shilo range when live ordnance would be exploding near them. The target area was at Prospect Point near Terence Bay, a designated military low-flying area located 20 miles (32 km) southwest of Shearwater.

Under normal circumstances, the guns in the aircraft destined to go to Rivers were butt-tested, and such would have taken place in February 1956, had the Shearwater gun butts been serviceable (as it happened, they were not). However, a strafing program was carried out during the month.

In March, a rocketry program was conducted as a prelude to the Rivers deployment, and the CO and the operations officer flew to the CJATC to attend a meeting at which details of the forthcoming sqn visit were discussed. In April, all of the sqn pilots carried out numerous simulated artillery reconnaissance shoots at the Haskard Range provided by No. 1 Ground Liaison Group in direct preparation for live Arty-R activities out of Rivers the following month. The Haskard Range comprised a roughly 10-foot by 10-foot (3-m by 3-m) model of real estate with a grid on the floor underneath. It functioned as a simulated firing range, and was used to train pilots in the art of directing artillery fire from aircraft.

Also during April, considerable effort was expended by all maintenance personal to ready the Sqn aircraft for the move to the CJATC. On the 29th, the Sqn departed for RCAF Station North Bay, and from there proceeded on to Rivers where it arrived the following day for a month-long visit.

Phases of flying training conducted out of Rivers during May included bombing, rocketry, strafing, high-altitude air-to-air firing, and artillery reconnaissance. Much of the ground attack training was carried out as Live Air Control Team exercises with the cooperation of No. 1 Ground Liaison Group (Naval Section). In addition to these, the Rivers’ runway facilities were made use of for field carrier landing practice. Flying time for the month was 425.6 hours, with an average of eight available pilots who flew a total of 402 sorties. These figures represent actual training exercises flown from the CJATC and do not include the sqn’s move to and from the Centre. Included in the ground training phase of the operation were a short Tactical Air Support Course provided by the Land /Z Air Warfare School, and a one-day visit to Camp Shilo to view army installations and equipment.



The average serviceability for the month was 66 per cent. This was seen by the CO as reflecting a creditable effort by the maintenance personnel, considering the high number of hours and sorties flown during the period. Approximately 1,250 person-hours over and above scheduled hours were worked by sqn maintenance personnel. The Sqn departed for Shearwater on 3 June.<sup>28</sup>

The Sea Fury was retired from RCN service in 1956, and its place was taken by the jet-powered Banshee. On 13 July of that year, the Reformation Directive for VF 871 Sqn was issued by the Naval Secretary, and its stated mission was to intercept and destroy enemy aircraft and weapons during all conditions of weather and visibility, to provide all-weather defence for friendly forces, to provide a strike capability for the RCN; and, last but not least, to provide tactical air support for amphibious and land operations.<sup>29</sup> Under the latter directive, the Navy continued its program of tactical air training at Rivers by both VF 870 and VF 871.

The following account exemplifies the visits of the jet sqns to Rivers in the late 1950s and early 1960s. It describes the 1958 edition of tactical air support training, in which both fighter sqns co-participated.

The first personnel to arrive for the program, involving nearly 250 officers and men and one wren, were those of an advance party of armourers and No. 1 Ground Liaison Group. Maintenance personnel and equipment came later in RCAF C119s. The eight VF 871 Banshees arrived on 11 October after a 24-hour delay due to bad weather. A like number of VF 870 aircraft touched down two days later, followed that same evening by the C119s with VF 870's personnel and equipment.

For the first week of operations, both sqns enjoyed good flying weather and made ample use of the air-to-ground range at Camp Shilo. This work could best be described as firing practice comparable to that conducted earlier at the Chezzetcook Air to Ground Weapons Range near Shearwater. The difference was that the Rivers' firings were carried out with live as well as practice ordnance; whereas, the firings on the East Coast involved only practice bombs and rockets (see the section below headed "Foxtrot").

The second week began with VF 871 carrying out Arty-R with artillery support provided by "F" Battery from 2 Royal Canadian Horse Artillery, Winnipeg, and VF 870 exercising on the air-to-ground ranges. Two days later, the flyers were plagued with low ceilings and early morning fog, a condition that lasted for almost a week. With limited flying taking place for the remaining three days of the week, the opportunity was taken to attend a ground lecture training program.

The third week began with both sqns carrying out live advance control exercises and making a maximum effort to regain time lost during the previous week. Aircraft were over the range by 0800 every day, and the last were landing at last light. Forward air control for these exercises was performed by Lieutenant A. F. Cottingham of the joint Air Photo Interpretation Section, Rivers Ground Training Wing, one of only five naval officers and men actually stationed at CJATC year-round. During this time, each sqn averaged 25 sorties a day, thanks in large measure to the efforts of the armourers and maintenance people.

On Thursday morning, 30 October, VF 870 concluded its training program by launching a strike of all aircraft against targets on the range. The final eight sorties comprised a sqn strike with a total of 16,500-pound (227-kg) bombs and 32 60-pound (27-kg) high explosive rockets. The object was to destroy once and for all a particular lone pine tree that had withstood concentrated assaults over a number of years. Although the tree ended up being much the worse for wear, it survived the attack successfully.

The following day, VF 871 continued to attack targets on the ranges, while pilots of VF 870 took the opportunity to make cross-country flights. The weekend was taken up with maintenance, and on Sunday morning the first two C119s airlifting for VF 870 left Rivers. The next day, 3 November, the sqn followed suit. Meanwhile, 871 continued dropping high explosives on targets at the range, and in the evening six Banshees gave a firepower demonstration for Army and Air Force officers on the Land/Air Warfare (Intermediate) Course No. 7, and approximately 50 maintenance personnel of the naval sqn.

The flying program ended on Tuesday, 4 November, after a power demonstration by six Banshees for the local media who were concluding their coverage of the sqns' visit to Rivers. VF 871's aircraft left for Shearwater on 5 and 6 November, followed by the ground party over the next two days. During the training period overall, the two sqns flew a total of 389 sorties, dropped 248 and 463 500- (227-kg) and 11.5-pound (5.2-kg) bombs, respectively, and fired 1,042 rockets and 28,440 rounds of cannon ammunition.<sup>30</sup>

The Shearwater-Rivers trip, incidentally, was not always one-way. In December of 1958, for example, a team from CJATC conducted a three-day tactical air support course at Shearwater for the Banshee pilots.

In 1959, VF 871 was decommissioned and its aircraft and personnel transferred to VF 870. The latter continued its workups at Rivers until it too was disbanded in 1962. Today, Canadian Naval Aviation and indeed the CJATC itself are history. Seven years before the RCN and its Air Branch were abolished through Armed Forces unification, the Navy's yearly sojourn to Rivers in sqn strength came to an end with the disbandment of VF 870. A message sent to the sqn by the CJATC in observance of that occasion read as follows:

It is with a sense of real loss that we of the Canadian Joint Air Training Centre bid a final farewell to fighter sqn 870. The laying off of the sqn brings to a close an era of close joint professional and personal association spanning some 15 years during which this station has bid farewell to 803 and 883 Sqns and their Seafires, 18 and 19 Carrier Air Groups and their Sea Furies, and VF 871 with its Banshees. Each of these groups and sqns, however, was succeeded by a unit either reorganized or re-equipped to meet changing times. Unfortunately, it has become VF 870's unhappy lot to write finis to a long line of able and capable fighter sqns, aircraft, pilots and men. The Canadian Joint Air Training Centre joins all in saluting you, Fighter Sqn 870 and all those you represent.<sup>31</sup>

The Navy's finale at Rivers was attended by some interesting statistics. The aircraft flew 433.9 hours in 506 sorties and used more than 235,000 gallons (889,572 l) of aviation fuel. They fired 10,000 rounds of 20-mm ammunition, 390 3-inch (7.6-cm) rockets, 702 5-inch (12.7-cm) rockets, dropped 912 11.5-pound (5.2-kg) bombs, 30 500-pound (227-kg) bombs, and dropped 63,738 pounds (28,911 kg) of high explosives. The sqn rectified 720 unserviceabilities, maintained an average serviceability rate of 70.5 per cent, and did 10 minor inspections. The pilots spotted for 450 rounds of 105-mm artillery fire.<sup>32</sup>

CJATC Rivers was still in operation in February 1968 when Armed Forces Unification took effect and the RCN was abolished as a legal entity. In that sense, it can be said that the Navy's long acquaintance with CJATC Rivers well and truly came to an end at that point. Fittingly, perhaps, John Alexander Turner, a former RCN Air Engineer Officer, was the Canadian Forces Base Rivers Base Technical Services Officer in 1969 and Base Commander in 1970. The centre itself was closed down in September 1971 as part of a services-wide consolidation program, and its key functions—air portability and parachute training—were transferred to operational units of Mobile Command located at Edmonton.<sup>33</sup>

## Camp Gagetown

Another military establishment that saw its share of naval aviation was Camp Gagetown, New Brunswick. On 1 August 1952, it was announced that the base would be constructed over a period of two to three years. Between 8 and 11 August 1955, the largest concentration of RCN aircraft ever to participate in peacetime manoeuvres to date teamed up with the Canadian Army in Exercise RISING STAR at Camp Gagetown.

This undertaking was the inaugural field concentration of the First Canadian Infantry Division since its reactivation in October of 1953. For the Navy, it was the highlight for the summer of 1955. Fifty naval aircraft—Sea Furies, T33s, Avengers, Expeditors, Harvards, and helicopters—were drawn from six sqns. Operating out of Shearwater, the Naval Air Facility at Summerside, and other

conveniently located airfields, their role was to provide the ground forces with the closest possible tactical air support.<sup>34</sup>

For the purposes of the exercise, Camp Gagetown was divided approximately in half, with the northern half representing an aggressive country called “Philistia,” and the southern half the country called “Blueland.” Both the Philistia and Blueland air forces were represented by RCN aircraft, which flew some 70 sorties a day during the period. They were airborne from dawn to dusk, and in some cases they flew throughout the night.

The action commenced at 0610 hours on 8 August when the enemy was reported to have crossed the border in strength. Shortly after that, positions on Blueland’s 1 Division came under ground and air attack, and the invasion was underway. The division successfully withdrew in spite of flares that were dropped by aircraft during the night. The division’s camouflage was found to be very good, and the Philistine aircraft had considerable difficulty in locating positions or vehicles. Their effectiveness was further compromised during a spate of pouring rain, when they were grounded.<sup>35</sup>

The naval participation in RISING STAR covered various aspects of carrier-borne air support for army forces ashore, similar to that provided by naval aviation during the Korean War when carrier-based aircraft flew close-support bombing and strafing missions. The Sea Furies and Avengers provided tactical reconnaissance and support bombing; the jets provided fast air cover. The Expeditors and helicopters were used for liaison, reconnaissance (see below), general communications, and personnel and ammunition transport, including “casualties” evacuation. Because of their manoeuvrability and their capacity to operate close to the ground, the helicopters were relatively immune to aerial attack. When all was said and done, the naval aircraft had flown over 100,000 miles.

During the exercise, No. 1 Air Liaison Group (Naval Section) had a mobile air control team operating with each of the Army brigades. Each team consisted of a ground liaison officer and a naval controller whose joint purpose it was to brief pilots, control the aircraft, and assist in guiding them to engage their targets.<sup>36</sup>

The sqns that went to Rivers for CAS training were always first-line (i.e., operational) units. However, the annual summer Gagetown manoeuvres also saw the participation of second-line sqns such as VU 32 and Training Sqn VT 40. Although its principal role was aircrew (and, in particular, pilot) fixed-wing training, the sqn flights of VT 40 variously went operational with the army in tactical exercises. Sea Furies and Avengers of the Advanced Training Flight (ATF) and T33s of the Jet Flight delivered the actual punch. ATF Harvards were used for observation and gunnery-spotting, and Expeditors of the All-Weather Flight, with their ability to cover a wide area for many hours at a time without relief, became long-range observation platforms. Another second-line sqn, HU 21, provided the helicopters for communications and supply (e.g., ammunition replenishment) duties.<sup>37</sup>

The summer of 1956 saw yet another round of war games at Gagetown, code-named ARGUS I, ARGUS II, MATRIX, and MORNING STAR. The manoeuvres ran from June through early August, commencing with armed reconnaissance sorties and scheduled air strikes, and culminating in MORNING STAR, the latter designed to exercise the First Canadian Infantry Division in the occupation and defence of an area under nuclear conditions. It marked the first time that naval jet aircraft, McDonnell Banshees, participated in the Gagetown operations.

In the four exercises, the Banshees were used to support ground troops and to conduct tactical reconnaissance, as well as to secure air superiority for friendly forces. A total of 103 sorties were flown, for a grand total of 153 hours. This kept the pilots busy from morning until night, not to mention the ground crews who had to be on hand well before take-off and long after the last landing.<sup>38</sup>

While the first three exercises—ARGUS I, ARGUS II and MATRIX—were not as important nor as large as the last (MORNING STAR), the pilots gained experience carrying out tactical reconnaissance and armed support, mainly striking at small concentrations of troops, tanks and vehicles. Vehicles and troops moving along roadways were easy to find and attack, but those that were

camouflaged were a different story altogether, and it would clearly take a great deal of practice to find a well-camouflaged tank or truck.

Both Navy and Air Force units were involved in MORNING STAR. For the Navy fliers, not only were there numerous ground targets to deal with, but air opposition as well in the form of Sabres from RCAF Station Chatham. Fighter Sqn 871 exposed two large rolls of cine gun film showing the number of “enemy” aircraft they shot down. There was also a goodly amount of film available showing the rocketing and strafing of ground units.<sup>39</sup>

A joint operations centre was set up to control the air support made available for the occasion (a joint operations centre is a central joint agency at senior ground forces and air forces levels organized for the purpose of exchanging air and ground battle information, and for the organization of the combat effort of the air forces in tactical air support of ground forces operations).<sup>40</sup> Communications with Shearwater and the participating Air Force bases at Greenwood and Chatham were by commercial telephone and teletype. Control of aircraft in the manoeuvre area was exercised through communications resources provided by the Rivers-based Air Support Signal Unit. This formation was equipped with air contact signals vehicles used to control tactical aircraft operating in support of the ground forces.<sup>41</sup>

For the purposes of Exercise MORNING STAR, New Brunswick was divided into two countries: “Fantasia” and the ever-suffering “Blueland.” The border between the two countries ran along the main road across the north end of the camp, with Fantasia to the north and Blueland to the south. Blueland and Fantasia were part of a mythical continent known as “Atlanta,” located some 1,000 miles (1,600 km) east of Canada. Atlanta contained eight other small nations. Fantasia was depicted as being an aggressive nation, while Blueland, the other countries of Atlanta and five other nations, including Canada, had banded together in a treaty of defence against Fantasia. Under the terms of the treaty, the First Canadian Infantry Division and RCN and RCAF air units were stationed in Blueland.

In an effort to preserve peace, Blueland and Fantasia had declared a strip of 10 miles (16 km) on either side of the border to be neutral territory, and no troops were to be located in this area—a demilitarized zone (DMZ), in effect. In the event of hostilities, Fantasia would have air and ground superiority over Blueland, but the latter could establish air superiority for limited periods.<sup>42</sup>

At the beginning of June, it became apparent that the Fantasians were preparing to invade the neutral zone as a prelude to an attack on Blueland. During that month, VF 871 began flying their tactical reconnaissance and strike sorties against the Camp Gagetown area. On 13 July, naval sqns (VF 871, VT 40) commenced flying in support of the Army exercises, and on the 25<sup>th</sup>, MORNING STAR began in earnest. Throughout the latter, both the Fantasian and Blueland forces received CAS from VF 870 Banshees, VF 871 Sea Furies and VT 40 T33s, and Sabres and T33s of the RCAF. In addition, the Air Force supplied four helicopters. Air support for both sides in the “conflict” was controlled by a joint operations centre headed by an RCAF wing commander from Rivers.

Following Exercise MORNING STAR, the CO of VF 871 was pleased to report that the maintenance organization produced a very creditable effort in providing the many aircraft needed to fulfill the Gagetown commitments. The unpredictable and varied calls for air support exercised the sqn watch system and organization. Because of the long hours required each day, one full watch was on duty at the hangar at a time. Their involvement provided an opportunity for men of lower rates to accept more responsibility and to exercise their leadership qualities. Morale remained very high throughout the time of the exercise, notwithstanding the extra effort required by all sqn members. Pilots were often called up from 0400 until 2200, and often became very fatigued. In the end, the close support sorties flown during the exercise were considered to be of good training value, although that type of sortie was not considered to increase the combat readiness percentage of the sqn.<sup>43</sup>

Training Sqn VT 40 participated in the sequence of exercises that culminated in MORNING STAR. Jet flight T33s flew from dawn to dusk, logging 66 sorties for a total of 100.4 hours. Once again, the excellent serviceability during the exercises was directly attributed to the high morale and

keenness of the ground crew, who worked long hours, and in one instance completed a wheel change in seven minutes.<sup>44</sup>

From the 21st through the 28th August 1958, the Camp Gagetown exercises took the full attention of Sqn VF 870. The activities were broken down into two separate phases. The first, coded-named Exercise SNEAKY PEEKY, comprised mainly armed reconnaissance (as the name would apply) and prebriefed strikes. A total of 44 sorties were flown during this two-and-a-half-day exercise. The second phase, Exercise EBB TIDE, commenced on the 25th of the month. This involved primarily briefed strikes in support of troop movements and 32 sorties were flown.<sup>45</sup>

In the spring of 1959, T33s were flown by VF 870 pilots on photo-reconnaissance missions for an Army exercise called TEMPO. This was conducted near Harcourt, New Brunswick, and was used to exercise Gagetown units in camouflage activity and night movements.<sup>46</sup> On 4 July of that same year, a successful firepower demonstration was witnessed at Gagetown by some 5,000 Army personnel. Eight Banshees of VF 870 took part, each carrying two 500-pound (227-kg), general purpose bombs, four 3-inch (7.6-cm) high explosive rockets, and 400 rounds of 20-mm ammunition (100 rounds per gun). This mix of ordnance was appropriate to air alert-type strikes as defined above, and firepower demonstrations such as this one were an excellent means of reassuring infantrymen of the kind of support they could count on in battlefield situations.

Indeed, the commotion raised by such events sometimes yielded unintended results. The targets for this demo were an old wooden barn for the bombs, and some small tents for the rockets and cannon fire. The “live studio audience” was located less than half a mile north of the target area and parallel to the east-to-west target run of the Banshees. There was a north-south entrance road on the west side of the target area that the Banshees flew over on the approach into the target area. There was an east wind.

The first part of the demonstration was the bombing, and the CO of the Banshee sqn led the way in for the run on the barn. At 8,000 feet (2,439 m), he started his 40-degree dive, crossed the entrance road, released his two bombs, and broke away from the target area. The bombs were direct hits and the barn was summarily demolished. However, the explosion created an immense cloud of dust and dirt that not only obscured the remainder of the target area but also subsequently drifted toward the approaching Banshees. The pilots were obliged to release their bombs even though the target was invisible; their only recourse was to bomb on the moving dust cloud in the hope that the target was somewhere beneath.

As each Banshee made its pass and released its bombs, a new cloud of dust would appear and of course move downwind. In due course the cloud was over the aforementioned entrance road, which, by default, became the target! Like the barn, it was successfully destroyed, leaving a lasting impression on the army at Gagetown. The rocket and strafing attacks were uneventful.<sup>47</sup>

Whatever the fallout may have been from the above described firepower demonstration, VF 870 was back in action at Gagetown later that month to contribute to the annual army concentration. Ground support exercises FOU GAS and PINBALL were carried out from 13 to 17 and 20 to 24 July, respectively.

The sqn was committed to up to a total of 136 sorties in support of the two exercises, but fog and a lack of air support requests culminated in only 67 actually being flown. Of these, 54 were Banshee strike sorties and 13 were T33 photo-and visual reconnaissance missions. The two T33s were detached for a 24-hour period to operate from Fredericton.<sup>48</sup>

The year 1960 witnessed yet another return engagement at Gagetown. On 11 July, VF 870 commenced its annual flying program in support of the army war games, and on the 16th yet another rendition of the ever-popular bombing, rocketry, and strafing firepower demonstration was staged by eight Banshees for 3 Canadian Infantry Brigade Group. Between the 25th and 28th the sqn participated in three small exercises by providing armed reconnaissance sorties and strikes. Similar activities were carried out in the summers of 1961 and 1962, the latter marking the cessation of such involvement by the Navy as the Banshees were retired and the sqn disbanded in August of that year.



Generally speaking, the Navy's aircraft were shore-based during workups with the army at Gagetown. However, explicit use of the aircraft carrier in war gaming activities was the order of the day during Exercise BONNY BOY, staged in December of 1961. Alan Snowie, author of the book *The Bonnie*, stated very well the rationale for holding an exercise of this nature: "Should a Canadian flotilla, centred on the aircraft carrier, be placed at the disposal of the United Nations, fighter cover would be needed for the landing of troops on a hostile shore."<sup>49</sup> Note that this is precisely the philosophy behind phase two of Exercise MAINBRACE of a decade previous (see below).

The role of HMCS BONAVENTURE was to provide strike aircraft (VF 870 Banshees) from a station off the "enemy" coast in support of "Blueland" forces. Blueland, situated in a remote corner of Camp Gagetown, was (again) under threat of invasion by neighbouring "Fantasia." Intelligence reports had indicated that the Fantasian army was massing its forces on the banks of River "X" (the St. John), the topographical border between the two countries. The enemy was attempting to establish a bridgehead across the river. Blueland patrols, with their integrated air control teams, had penetrated the advanced Fantasian zone of concentration to serve as a delaying force. The role of the aircraft was to deliver conventional air-to-ground ordnance, live bombs and 20-mm cannon shells, in ground alert strikes in support of the Blueland armies.<sup>50</sup>

The first strike was conducted by a flight leader and his wingman. Having crossed the coast, the two aircraft proceeded up River X at tree-top level to avoid radar detection. Passing briefed landmarks, the final checkpoint was identified and the leader climbed to establish radio contact with the air control team in the battle area. After being given a target by topographical grid reference, he set up the direction of attack in preparation for the actual strike.

To reduce the enemy's chances of fighting back, time on target was kept to a minimum. Once the mission was completed, the attackers disappeared back down the river as quickly as they had appeared. As the pair retraced their route, another unit aboard the ship was being briefed for a similar mission. They too would get last-minute target coordinates, bomb, return to the target area for strafing, and then depart at low level. All of the air work was carried out below an altitude of 500 feet (152.4 m). Hour by hour, this same procedure was carried out.

For this exercise, the enemy territory, Fantasia, encompassed the southern coast of New Brunswick, up the St. John River to Gagetown and the territory to the west of the bordering river. Gagetown is about 25 miles (40 km) inland from the coast, and the carrier was stationed in the Bay of Fundy. The "battlefield" was a section of Camp Gagetown training area. Physical representation of the two armies was on a skeleton basis only, a considerable difference from the mass organization that incorporated the Canadian Infantry Brigade during the annual summer training periods in which the fighter sqn had always been an integral factor.

Exercise BONNY BOY was designed to test the air sqn in its role of air-to-ground support, and, also, its compatibility with maximum operation from the aircraft carrier. The entire undertaking called for close cooperation between the friendly army ground forces and the carrier. To meet these demands, an army liaison officer was stationed aboard the BONAVENTURE. In the battle area were two ground liaison officers of the air control team. Constant communication between the air control team and the carrier provided the on-board air liaison officer with the latest information on tactical developments, target positions, and strike requests and results.

Through the air liaison officer's (ALO) briefings before each mission, the pilots were able to get first-hand knowledge of the situation in the target area. After each section launch, the flight leader and his wingman would join up and streak along at treetop level to the battle area. Noting the briefed landmarks as they sped by, the fighters pulled up at the final checkpoint and established radio contact with their Army forward air controller. They were immediately given a topographical grid reference and the attack was on.<sup>51</sup> In all, 34 sorties were completed by the sqn in the two and a half days of sustained operations in the Gagetown area.

## Foxtrot

Whether carrying out CAS, interdiction, shipping strikes, or attacks on surfaced submarines, naval aviators are by definition exercising air-to-surface weapons delivery. And since practice makes

perfect, facilities are required whereby the pilot can hone his skills. So it was that in the fall of 1950, the Navy opened an air-to-ground firing range at a place called Grand Desert at the mouth of Chezzetcook Inlet not far from Shearwater. In the Annual Report of the Department of National Defence for the fiscal year 1950–1951, it was reported that this range, code-named Foxtrot, provided the air arm with all types of air firing practice.

The range comprised a control tower and two quadrant huts. Quadrant hut #1 was located several hundred yards from the target area and directly on the aircraft flight line to the target. Hut #2 was situated several miles away at 90 degrees to #1. Two armourers from the Shearwater Armament Section manned each hut. One took the dive angles; the other would bore sight the fall of shot and report it to the control tower for recording on each pilot's individual master plot. By these means the pilots' firing capabilities could be assessed.<sup>52</sup>

There were three kinds of targets at Foxtrot. In the early years the sole target on site comprised a large circle of stones painted white. At the centre was another smaller circle, also formed of white stones. This feature was situated on a small headland known as Cape Entry. For night operations, a portable electric arrow was used to direct the pilots to the target. In due course, the concentric circle gave way to three derelict armoured vehicles painted a bright yellow. These were the practice bomb targets; the HVAR target during the Banshee days was a large floating barrel painted a bright fluorescent red and anchored in a lagoon that formed part of the range.<sup>53</sup>

At the Chezzetcook range, only light bombing (i.e., using 11.5-pound (5.2-kg) practice bombs, not the 500 (227 kg) or 1,000 pounders (454 kg)), cannon-firing, and rocketry could be practiced, and the rockets were non-explosive. It was customary for pilots to undertake armament programs at Chezzetcook in preparation for deployment to Rivers and manoeuvres at Gagetown.

## Discussion

For all the practice, training, and experience gained by naval pilots at Chezzetcook, Rivers, and Gagetown, the guns of their aircraft were never fired in anger. This is all the more surprising considering that the Korean conflict was not only ongoing during that time, but tactical aviation was a major component of the United Nations' commitment there. And among the beneficiaries of these actions were Canadian troops.<sup>54</sup>

Furthermore, the Air Arm was equipped with the Sea Fury FB11, a type that was distinguishing itself at the hands of British and Australian pilots in Korea. Its low-level manoeuvrability suited it very well indeed to the ground attack role in the rugged Korean terrain, and was one of the factors that accounted for its low level of operational losses in that environment.<sup>55</sup> Finally, RCN surface ships (destroyers) were deployed to Korea, where they served with distinction. So why was Canadian naval aviation not involved along with the fleet air arms of other Commonwealth navies, particularly when Canadian sqns were trained for just such a role?

The answer lies in the primary task of Canadian Naval Air and its carrier, which was overwhelmingly anti-submarine (ASW) in philosophy, logistics, and training. With that mandate, it was initially considered inappropriate that it become involved in non-ASW operations such as the Korean conflict. This gives rise to other questions. Was, then, the Navy's CAS training of the 1950s a relic of the pre-NATO, pre-cold war days that somehow managed to remain part of naval aviation as an anachronism? One might well have expected the programme to be discontinued when, on 9 June 1950, the Minister of Defence stated in the House of Commons that "our role in naval operations is definitely known by all Canadians and certainly recognized by the House of Commons. It is anti-submarine work, largely in the waters across the North Atlantic and coastal protection on both coasts, something which I have stated since 1947 and which I do not think anyone has ever disagreed with."<sup>56</sup> What possible use could CAS of ground troops have served in the middle of the Atlantic Ocean?

In pondering these seeming inconsistencies in policy and planning, one must bear in mind that Canada was a member of NATO from the outset. And under Article 5 of the Treaty, it was agreed that an armed attack against any of the European or North American NATO powers would be considered an attack on the alliance as a whole. In this event, each member was obligated to aid

the member attacked by taking such action as was deemed appropriate and necessary, including the use of force.<sup>57</sup> What forms might such “use of force” take? Among other things, it would be close air support of NATO armies and interdiction of enemy reinforcements and supply lines. There was concern that diversion of this major component of the Canadian Navy to Korea could be interpreted as reneging by Canada on her commitment to defend European NATO nations should the cold war become hot.

A case in point was Exercise MAINBRACE, a major NATO training operation carried out in 1952. Its purpose was to assure the Scandinavian signatories, Norway and Denmark, that their countries could be defended in time of war. At the start of the exercise the following fictitious situation obtained: enemy armies from the East had overrun the West German plains and were pouring into Denmark. The NATO forces were holding along the Kiel Canal, but the enemy, having invaded northern Norway, was threatening to send an amphibious landing force around the North Cape. In the course of the 13-day manoeuvres, friendly carrier aircraft struck at Bodo in northern Norway to drive the invaders back. The role of Canadian naval aviation was combat air patrol and anti-submarine patrol as part of seagoing convoy protection manoeuvres.

The second phase of MAINBRACE saw the sole RCN’s aircraft carrier HMCS MAGNIFICENT operating with a carrier group within 25 miles (40 km) of and supporting an amphibious group. The latter had a reinforced battalion of US Marines for an assault in aid of ground forces in Jutland, Denmark. In the event, a Canadian Avenger sqn flew barrier anti-submarine patrols around the beach area where the Marines landed, while Sea Furies were on combat air patrol.<sup>58</sup>

None of the functions performed by the RCN in either phase of MAINBRACE involved interdiction or CAS of ground troops; however, the mutual defence mandate of the NATO agreement and the very nature of Exercise MAINBRACE showed that naval air sqns of any NATO country, including those of Canada, could have been called upon to render interdiction and/or CAS in the defence of a NATO country. Considered in this light, it is not difficult to understand why Canada maintained a serious involvement in tactical naval aviation for as long as it possessed equipment appropriate to the task.

As for Korea, something of a compromise was reached in early 1953 when 12 Sea Furies and 14 pilots, but not the MAGNIFICENT, were allocated for loan to the Royal Navy. Destined for embarkation in HMS *Warrior*, the RCN’s former ship, VF 871 Sqn underwent an intensive course in offensive air support at Rivers. However, the armistice was signed on 27 July of that same year and the sqn never did see action.

Notwithstanding, two RCN Air Branch officers did see service in the Korean Conflict. One of these was a pilot, Lieutenant (pilot) J. J. MacBrien, who was an exchange pilot serving with the USN aboard the carrier USS *Oriskany*. In December of 1952, he participated in a series of air raids on North Korean rail junctions, and for “courageous leadership and outstanding demonstration of pilot skill,” he was awarded the Distinguished Flying Cross (DFC) by the American government, the first Canadian to be so honoured in Korea.<sup>59</sup> It should be mentioned that Lieutenant MacBrien’s sortie is more correctly classified as interdiction, rather than CAS to ground troops per se.

The focus of this paper has been on naval aviation, and for that reason not much has been said about the involvement of the RCAF in tactical aviation. For the moment, however, I would like to speak to the question of where the Air Force stood in this matter throughout the 1950s. There has been the impression among certain army and naval personnel (and, indeed, some air force people as well) that during the post-war era the RCAF all but gave up on the tried-and-true task of tactical support of ground troops. This is in fact somewhat of an overstatement. Between April 1946 and March 1958, the RCAF’s Tactical Group—elevated to command status on 1 June 1953 and designated Tactical Air Command (TAC)—included within its mandate the planning, organization, and execution of procedures and techniques to provide air support to the Canadian Army. Fighter-bomber and light-bomber elements—that is, those stationed in Winnipeg, Saskatoon, Edmonton and Calgary—were under Tactical Air Group headquarters in Edmonton. These sqns had the specification of providing close air support for the Army’s Mobile Force. As such, they had to carry out ground and air training of sqn personnel, to a high degree of proficiency, in all aspects of tactical operations.<sup>60</sup>

Joint and combined exercises code-named SUND OG, BULLDOG, and MORNING STAR were carried out in all regions of Canada. The planning and conduct of these exercises contributed to the knowledge from which special doctrines of joint and combined operations were derived.

Two TAC auxiliary units, 418 “City of Edmonton” Sqn and 406 “City of Saskatoon” Sqn, played prominent roles in these exercises in supporting the regular formations. These sqns, flying B25 Mitchell light bombers, worked in close cooperation with the jet aircraft of the Tactical Fighter Flight (TFF) based at Rivers before their mission was changed to light transport and emergency rescue in March 1958. Indeed, 418 Sqn (and quite possibly 406 as well) had its own No.1 Air Liaison Section, as did naval aviation. Consisting of an army officer and three other ranks, this unit was attached to 418 for the purpose of assisting in the training of aircrew in the tactical support role. It was empowered to make and keep records on the training that was offered to the aircrew. “Obviously,” wrote one observer, “the army wanted to ensure that 418 took its ‘air-to-mud’ role seriously.”<sup>61</sup>

The aforementioned Rivers-based TFF was formed shortly after its immediate predecessor, 417 Sqn, was disbanded in the summer of 1948. It continued to operate Mustangs until the advent of the T33 in the early 1950s. As of the third quarter of 1961, the TFF comprised six T33s, all of which were fitted with full armament. Four of them had also been converted to carry cameras for photographic reconnaissance work. In support of the ground liaison officers’ course, these aircraft used the air-to-ground weapons firing range at Camp Shilo, and in live weapons demonstrations fired guns and rockets and dropped napalm. They were also called upon by the Army during summer concentration exercises to provide tactical air support for forces in the field.<sup>62</sup>

It should be noted that the TFF was in existence while the Navy was still sending sqns to Rivers for their annual workups. After the Banshees were retired and the Navy armament programme was discontinued, the Air Force maintained its involvement with the CAS role. In 1964, it was announced in the *White Paper on Defence* that Canada’s contribution to world peace would include mobile forces that could quickly intervene in brushfire wars before they could become major conflagrations. Ground forces would be prepared to go into the field with tactical transports and tactical fighters. Number 408 Sqn was assigned the task of providing aircraft and aircrews trained in weapons delivery. On 1 April 1964, the Sqn, then an element of Air Transport Command, was moved to Rivers from Rockcliffe and re-equipped in part with T33s.<sup>63</sup> Its mandate was to train pilots destined to operate CF5s in the tactical role. It was still performing that function (after March 1966 as a component of No. 10 Tactical Air Group of Mobile Command) at the time of Armed Forces Unification in early 1968.

A standard part of the RCAF student pilot’s syllabus in the 1950s was air-to-ground weapons training in bombing, rocketry, and gunnery at No. 1 Pilot Weapons School at RCAF MacDonald, Manitoba.<sup>64</sup> Nor was Army Co-op a stranger to Regular Force fighter sqns; in the summer of 1950, for example, four pilots of the RCAF’s operational 421 (Fighter) Sqn completed an air support course at Rivers, where they received theoretical and practical training in the use of aircraft in cooperation with ground forces.<sup>65</sup>

In sum, it cannot be said that the Air Force entirely ignored offensive air support among its range of commitments and responsibilities. In the final analysis, however, it was the Navy that really took tactical aviation to heart during the cold war era. It was they who committed entire operational sqns to the task: the RCAF TAC sqns were Auxiliaries; the TFF was a flight, not a sqn; and the T33-equipped 408 Sqn was a support unit, not a front-line, operational formation, as were the Navy’s Sea Fury, Avenger, and Banshee sqns. Historian John Hasek was correct in pointing out that, during the 1950s and early 1960s

the RCAF jet fighter aircraft division sent to Europe was totally separate geographically and by mission from our ground troops... it was an air force which could only give very limited support to the army... one sqn of T33 jet trainers was all that was left of ground tactical support... The Canadian air division in Europe had no connection with the Canadian Army brigade group.<sup>66</sup>

## Conclusions

Because Canadian Naval Aviation did not at any time become involved in a shooting war, it never really got the opportunity to put its tactical training program to the ultimate test. Of course, tactical airpower suffered from limitations that either delayed scheduled activities or precluded them altogether. For example, chronic power plant problems summarily grounded the 19th Carrier Air Group Sea Furies at Rivers in 1949, while difficulties with engines and wing-folding mechanisms curtailed or restricted full-scale programming with the Banshees in later years.

Weather could also prove a limiting factor. This fact was not lost on the Army, who had long taken the view that the Navy could not deliver in bad weather. The 1951 rendition of Exercise ASSINIPOINE was delayed and almost cancelled in its entirety due to low clouds; indeed, interdiction and dive-bombing by Air Force Mitchells and Mustangs, respectively, were scrubbed thanks to an 800- to 1,500-foot (244- to 457-m) ceiling and intermittent heavy snow. When the clouds finally began to lift and the show could proceed, they still relegated the Avengers to low-level bombing, without the benefit of their bombsights. In 1958, low ceilings and early morning fog combined to keep the Banshees on the ground for almost an entire week. Seasonal fog also occasionally reduced air involvement with the Gagetown workups, although adverse weather was not always regarded as a bad thing—during Exercise RISING STAR, the grounding of the naval aircraft due to pouring rain was considered to add a touch of realism and was exploited accordingly by the ground elements.

The bad-weather problems could be dealt with if the appropriate hardware was available. During the Korean War, the Americans used bombing director radars by means of which aircraft could be guided right up to the aiming point by a ground controller. Indeed, the bomb-release handles were under the control of the ground controller, who aimed and dropped the bombs; the pilot simply flew the aircraft to and from the target area.<sup>67</sup> The RCN was apparently not in a position to make use of this technology.

Tactical air support was in large measure a daytime or dawn-to-dusk occupation. Night interdiction was made possible during the Korean War by United Nations air forces with the aid of flare ships. Flares were dropped by RCN aircraft during the Gagetown exercises, but for the benefit of ground troops, not offensive aircraft. And “night-time close air support” is a virtual oxymoron. Considering the near proximity of friendly troops to the target area, the delivery of high explosives in CAS during night, even with the aid of flares, is extremely risky and presumably would only be attempted under extreme and desperate circumstances.<sup>68</sup>

Notwithstanding its inherent constraints, particularly in the earlier years, tactical airpower remains to this day a critical component of military aviation. Had their training, practice, and experience ever been put to the test, one can only wonder how well Canada’s naval aviators might have performed. Perhaps some hint is to be gained from an observation made by Stu Soward in his book *Hands To Flying Stations* (volume one) when, in writing about the accomplishments of the aforementioned Lieutenant J. J. MacBrien, DFC, he stated: “He [MacBrien] was... pleasantly surprised to find how valuable his air training in the RN and RCN turned out to be, particularly the Air Weapons Course, the joint air training at Rivers, and the practical aspects of photo interpretation and excellent background provided by the CBAL Army groups attached to both MAGNIFICENT and Shearwater.”<sup>69</sup>

Also, consider this: the RCN sent one pilot to Korea, and he won a DFC. What are the statistical probabilities of this? Had an entire sqn gone and one or two of their number been so decorated, such an outcome would have been considered entirely understandable. But one RCN pilot participated in the conflict, and he proved to be fully worthy of special recognition. Considering the overall high level of skill and professionalism of Canadian naval pilots, of which Lieutenant MacBrien was representative, I would have to conclude that the showing of an entire Canadian sqn would have been remarkable indeed.



## Acknowledgements

I am pleased to extend my thanks to Messrs Roy DeNevers, H. S. (“Red”) Johnson, Carl Mills, John Searle, and Stu Soward for providing information toward the preparation of this paper. For any and all errors of omission and commission, the responsibility is entirely mine.

### Notes

1. As can be seen, the information upon which the following paper is based is overwhelmingly of a secondary nature, rather than official, primary, archival documentation. Accordingly, this paper should be regarded as a literature review and an introduction to the subject, rather than as a scholarly work. Clearly, inasmuch as the present paper constitutes the single most comprehensive synthesis on Canadian naval tactical airpower published to date, the definitive study of the subject has yet to be attempted.
2. Unknown author, “The Air-Ground Operation in Korea,” *The Roundel* 3, no. 7, 1951, 9.
3. *Ibid.*, 11.
4. *Ibid.*, 2.
5. *Ibid.*, 13.
6. J. Sokolsky, “Canada and the Cold War at Sea, 1945–1968” in *The RCN in Transition 1910–1985*, ed. W. A. B. Douglas (Vancouver: University of British Columbia Press, 1988), 211.
7. O. Rutter, *The British Navy’s Air Arm: The Official Story of the British Navy’s Air Operations* (New York: Penguin Books, 1944), 229.
8. *Ibid.*, 231.
9. *Ibid.*, 235.
10. D. Brown, *Carrier Operations in World War II*, vol. 1, *The Royal Navy* (London: Ian Allan Ltd. 1968), 83.
11. R. Sturtivant, *British Naval Aviation: The Fleet Air Arm, 1917–1990* (Annapolis: Naval Institute Press, 1990), 96.
12. R. P. Hallion, *The Naval Air War in Korea: The Inspiring History of Unsung Heroes in a Forgotten War* (New York: Kensington Publishing Corp, 1988).
13. H. L. Dundas, “Fighting Up Italy,” in *Fight for the Sky: The Story of the Spitfire and Hurricane*, D. Bader (London: Sidgwick and Jackson Ltd., 1973), 172.
14. Hallion, 71.
15. R. C. Sherman, *Combat Command: The American Aircraft Carriers in the Pacific War* (Toronto: Bantam Books, 1982), 298.
16. L. Milberry, *Sixty Years: The RCAF and CF Air Command 1924–1984* (Toronto: CANAV Books, 1984), 143.
17. T. Coughlin, *The Dangerous Sky: Canadian Airmen in World War II* (Toronto: The Ryerson Press, 1968), 146.
18. C. F. Heide, “Stations of the RCAF: CJATC Rivers,” *The Roundel* 13, no. 8, 1961, 11.
19. J. MacFarlane and R. Hughes, *Canada’s Naval Aviators* (Victoria: The Maritime Museum of British Columbia, 1994), 180.
20. P. M. Simpson, “Introducing Canadian Joint Air Training Centre,” *The Roundel* 7, no. 5, 1955, 30.
21. Unknown author, “The Navy at Rivers,” *The Crowsnest* 3, no. 6, 1951, 6.
22. J. Searle quoted in C. Mills, *Banshees in the Royal Canadian Navy* (Toronto: Banshee Publication, 1991), 130.
23. Unknown author, “Wings for the Canadian Army,” *Canadian Army Journal* 16, no. 2 (1962): 84–89.
24. Stu Soward, *Hands To Flying Stations: A Recollective History of Canadian Naval Aviation*, vol. 1 (Victoria: Neptune Developments, 1993), 239.
25. *Ibid.*, 130–31.
26. Unknown author, “31 SAG Has Its Day,” *The Crowsnest* 4, no. 4 (1952), 7.
27. Mills, 279–80.
28. R. Laidler, Reports of Proceedings, VF 871 Sqn, January through August 1956. HMCS Shearwater, Nova Scotia. Records held at the Directorate of History, Department of National Defence, Ottawa.
29. Mills, 106.
30. Unknown author, “Banshees Over the Prairie,” *The Crowsnest* 11, no. 2, 1958, 22–23.
31. Unknown author, “Banshee Farewell,” *The Crowsnest* 14, no. 13, 1962, 13.
32. *Ibid.*
33. Canada, Department of National Defence, *Defence 1971* (Ottawa: Information Canada, 1972), 54.
34. Unknown author, “Navy Planes Fly in Army Exercise,” *The Crowsnest* 7, no. 11, 1955, 14.
35. W. A. Milroy, “Exercise RISING STAR,” *Canadian Army Journal* 9, no. 4 (1955): 14.

36. Unknown author, "Navy Planes Fly in Army Exercise," 14.
37. Unknown author, "870 Sqn Flies the New Banshees, and VT 40 Gives Training in Jets" *The Crowsnest* 8, no. 7, 1956, 8; and, E. R. Heuchan, "The RCASC at Camp Gagetown," *Canadian Army Journal* 10, no. 2 (1956): 138–39.
38. G. L. E., "VF 870," *The Crowsnest* 8, no. 11, 1956, 22–23.
39. Ibid.
40. Unknown author, "31 SAG Has Its Day," 5.
41. J. McLean, "Operation Airborne," *Canadian Aviation* 22, no. 1, 1949, 18.
42. W. A. Milroy, "Exercise RISING STAR," *Canadian Army Journal* 10, no. 4 (1956): 2–4.
43. Laidler.
44. C. G. Patton, Report of Proceedings, VT 40 Sqn, July 1956, HMCS Shearwater, Nova Scotia.
45. Mills, 36.
46. Ibid., 49.
47. M. Sherman quoted in Mills, 53.
48. Ibid.
49. A. Snowie, *The Bonnie: H.M.C.S. BONAVENTURE* (Erin, ON: The Boston Mills Press, 1987), 133.
50. J. J. V., "Exercise BONNY BOY," *The Crowsnest* 13, no. 5, 1961, 17.
51. Snowie, 133.
52. P. Charlton and M. Whitby, *Certified Serviceable, Swordfish to Sea King: A Technical Story of Canadian Naval Aviation* (Ottawa: CNATH Book Project, 1995), 220.
53. D. Patterson, quoted in Mills, 74.
54. J. Melady, *Korea: Canada's Forgotten War* (Toronto: MacMillan of Canada, 1983), 95.
55. R. Williams, "Sea Fury," *Aeroplane Monthly*, no. 155, March 1986, 90.
56. J. D. E. Kealy and E. C. Russell, *A History of Canadian Naval Aviation* (Ottawa: Department of National Defence, 1965), 128.
57. B. Crane, *An Introduction to Canadian Defence Policy* (Toronto: Canadian Institute of International Affairs, 1964), 12.
58. Unknown author, "31 SAG Has Its Day," 4; Kealy and Russell, 83.
59. Ibid., 124, 156.
60. Unknown author, "31 SAG Has Its Day," 86.
61. A. P. Vaughan, *418 City of Edmonton Squadron History* (Hamilton: The Hangar Bookshelf, 1984), 69.
62. Heide, "Stations of the RCAF: CJATC Rivers," 10.
63. S. Kostenuk and J. Griffin, *RCAF Squadrons & Aircraft* (Toronto: Samuel Stevens Hakkert & Co., 1977), 160.
64. See, for example, L. V. Johnson, *A General For Peace* (Toronto: James Lorimer & Co., 1987), 27; D. Fletcher and D. MacPhail, *Harvard! The North American Trainers in Canada* (Dundas: OCF Flying Books, 1990), 129.
65. Air Historian, "No. 421 (Fighter) Sqn," *The Roundel* 3, no. 2, 1951, 10.
66. J. Hasek, *The Disarming of Canada* (Toronto: Key Porter Books Ltd., 1987), 136, 137, 138.
67. L. Davis, *Air War Over Korea: A Pictorial Record* (Carrollton, Texas: Sqn Signal Publications, 1982), 95.
68. Actually, the US Marines did undertake night CAS sorties from time to time during the Korean War. Earlier on in the conflict, ground troops pinpointed battlefield targets and guided attacking strike aircraft by firing converging tracers from two widely spaced machine guns. Toward the end of the war, the Marines experimented with intersecting beams from two searchlights to achieve a similar effect (Hallion, 222–223.)
69. Soward, 239.

### **Leo Pettipas**

*Leo Pettipas is an avocational historian with a special interest in Canadian Naval Aviation. In his capacity as Honorary Historian with Winnipeg (Sea Fury) Chapter, Canadian Naval Air Group (CNAG), he authored and self-published seven books on the subject. In recognition of his writing efforts on behalf of Naval Air history, he was formally recognised nationally as the CNAG Member of the Year in 1986. He has published over 60 articles on Canadian military aviation in various books, journals, magazines, newspapers and newsletters in Canada and the United States. He was Editor Emeritus of the volume Certified Serviceable: Swordfish to Sea King (1994), a major work covering the ground crews and support units of Canadian Naval Aviation and the post-unification Maritime Air Group. He has given public lectures on Naval Aviation to a variety of audiences in Winnipeg, and has participated in ground display programmes at the Moose Jaw and Portage air shows. He is a regular member of the Shearwater Aviation Museum Foundation, and in 1999 he was appointed an Associate Air Force Historian, Office of Air Force Heritage and History, 1 Canadian Air Division, Winnipeg. In this capacity he was a co-author of the book 402 "City of Winnipeg" Squadron History: On Guard for 75 Years, published in 2007, and has written articles for the 402 Sqn publication Bear Tracks and the CFB Winnipeg newspaper Voxair. He was technical advisor to Patrick Martin's comprehensive "Royal Canadian Navy Aircraft Finish and Markings 1944–1968," published in 2007.*

## Chapter 8

## Canada's Army Loses its Air Force: The Royal Canadian Air Force and the Origins of 10 Tactical Air Group

*Dean C. Black*

*This paper reflects the early judgements and opinions of the author, based on preliminary research into what the author has dubbed the Canadian Army's air force. The paper is not necessarily consistent with any position or policy of the Department of National Defence and Canadian Forces.*

In 2001 it was an honour for me to be invited to the annual gathering of the Canadian Fighter Pilots' Association. At the time, 403 Squadron was celebrating its 60<sup>th</sup> anniversary, and as Commanding Officer, I made a special effort to represent the squadron, especially knowing as many as seven veteran 403 Squadron fighter pilots might be there. I was wearing a flight suit at the gathering, having flown a Griffon helicopter to the site. But such was not the case one year later, when I was invited to return. For that second visit I wore my air force blues. I did not have a helicopter to bring the second time around, since I had relinquished command of 403 Squadron earlier in 2002. As the second reunion began to wind down, a veteran approached, thanking me for being there. He said it was nice to finally see someone decked out in air force blue. "Last year," he continued, "some wanker brought a helicopter, of all things; that's not air force, what?" For a very brief moment I was speechless. "That was me," I eventually blurted out. He made a hasty retreat. I, on the other hand, was left standing there wondering if army aviation had ever been considered a respectable part of Canada's air power.

Why would someone want to discount the tactical aviation element as a part of Canada's air power, in the first place? Hugh Halliday once emphasized that "in the beginning, air power was tactical and nothing more."<sup>1</sup> What more proof do we need? This issue of the inclusion of army aviation in a nation's air power is relevant to a discussion of the establishment of Canada's Air Command, 30 years ago, because that momentous event in the history of Canada's air power was about reclaiming all things that operated in the aerospace dimension in defence of Canada, and placing them under one air power-minded commander. But the inclusion of tactical aviation in Canada's Air Command is a multi-faceted, complex issue. To illustrate, in 1996, I was a flight commander with 408 Tactical Helicopter Squadron, preparing for Command and Staff College, when a junior pilot approached me somewhat curious if not entirely confused about tactical aviation doctrine and Canada's missing attack helicopters. Surely the 1975 assimilation of army aviation and the organization known as 10 Tactical Air Group (TAG) by Air Command reflected the importance of army aviation. Some amongst Canada's Air Force visionaries must have felt 10 TAG was critical to a future air force. Coincident with that assimilation, however, was the demise of the Canadian Army's anti-tank helicopter project. Were these two events connected in any way? This reflection on the establishment of Air Command in 1975 will consider this question, not in any great depth, but simply to see if we can peel away some layers of historical obscurity left by the passage of time to gain a better appreciation of that momentous event.

This paper explores some aspects of the Canadian Army's military air power capability—a capability that was eventually absorbed by Air Command in September of 1975. An understanding of the evolution of the Canadian Army's "air force" may shed some light on the reasons for the assimilation by Air Command of that air force. The Canadian Army's military air power capability had its beginnings during the closing months of the Second World War (WWII). Army visionaries recognized the value of aviation in direct support of ground forces—one of the many lessons learned from the First World War, but forgotten during the interwar period. Lessons learned during the Korean War emphasized those earlier combat experiences, reinforcing efforts to establish a military air power capability organic to Canadian Army units. By 1955, the Army was well along a path to establish its own air force.<sup>2</sup> Helicopters and organic tactical aviation support to land forces were formally introduced as a subject of study at the Land Forces Staff College that year. While the Army was taking to the sky, however, a passive observer the Royal Canadian Air Force (RCAF) was not. From the closing moments of WWII, when Canadian soldiers first demonstrated

a growing interest in aviation, RCAF officers were there to shape the Army's "above ground" activities. Three decades would pass, however, before the RCAF would assume full command of the Canadian Army's air force in 1975. The fundamental question we seek to answer concerns what that outcome says about the Canadian Army's cold war facility for innovation. Essentially, to what can we attribute the Canadian Army's decision to back away from pursuit of an organic aviation capability? If the RCAF had assumed the Canadian Army was incapable of managing its own air force, was that assumption a reasonable one? Additionally, if we gain an understanding about what led the Army to so decide, and what problems proved to be such a challenge, if any, it is likely that we will understand better the momentous task that our Air Force predecessors had taken on when they established Air Command three decades ago. It will be shown that while early Army efforts to innovate were promising, as aviation doctrine grew more complex and concepts of warfare evolved, capability biases and organizational preferences may have interfered with the Canadian Army's efforts. A greater degree of centralization may have helped to overcome the challenges the Army had been trying to deal with, and some hard decisions had to be made about the Canadian Army's future air force.

The inherent flexibility of military air power has been a double-edged sword. A singular, understandable focus on air superiority during the early part of WWII exposed a critical weakness in terms of another important mission: air force support to ground forces on the battlefield. An unrelenting air force focus on the air superiority role during the cold war forced many a Western army to take the matter of support to the land forces into their own hands by forming their own army air forces. Canada did not escape this controversial evolutionary period of air power history. The Canadian Army pushed for its own squadrons during WWII, and continued to do so throughout the cold war. While the Canadian Army was actively trying to create its own air force, however, it is suggested that difficulties the Army experienced with its aviation innovation led air power visionaries to fear the likelihood of a greater decline in Canada's air power for as long as aviation remained in the hands of those without adequate experience in such matters. Therefore, this future may have been simply unacceptable for air power proponents, thus prompting them to push for greater air force centralized control of the Army's air force.

The Canadian Army's air force began as a fixed-wing capability using gliders and other airplanes for spotting, reconnaissance, and mobility purposes. However, that air force gradually transformed into a helicopter-borne or aviation force beginning about 1955. By 1975, sufficient command and control of the aviation force was transferred from the Canadian Army to Air Command. As a consequence, that aviation force grew less and less organic to the Army. In his 1992 analysis in *Military Helicopter Doctrines of the Major Powers, 1945–1992: Making Decisions About Air-Land Warfare*, Matthew Allen claimed that the key to success in terms of the helicopter innovation in the United States (US) Army was ensuring that "helicopters did not become so independent of land forces that the integration required by air-land warfare was impossible, and at the same time they had to prevent helicopters from becoming so closely linked that their unique mobility advantage over ground vehicles was lost."<sup>3</sup> The degree to which aviation forces are considered organic to land force formations depends in part on the command and control measures employed. This issue of command and control featured prominently in the doctrine-based debate between the Canadian Army and the RCAF throughout the period in question. With respect to doctrine, assumptions are supposedly made about the nature of future battlefields, and those assumptions are reflected in doctrine that stipulates what the division of labour on those battlefields will be between different military capabilities.<sup>4</sup> Doctrine, it turns out, helps to determine organizational hierarchy in military formations responsible for capabilities. Effective doctrine would have contributed to the Army's efforts to successfully innovate in regards to the employment of helicopters in an organic air force. The Canadian Army's effort to innovate, however, by implementing a helicopter-borne aviation force, may have introduced aviation doctrine threatening to the Canadian Army's war-fighting philosophies. But what do we mean by innovation? Possibly the simplest definition of "innovation" is "alternative(s) to the established."<sup>5</sup> Implementing an innovation can be a complex act vulnerable to politics at many levels, and the politics of innovation are laid bare in those processes designed to "promote, disseminate and implement" the innovation.<sup>6</sup> This paper is a limited exploration of the lengths to which various Canadian Army organizations may have favoured preservation of the established over introduction of alternatives.



In 1975, a reorganization of Canada's military air power components culminated in the establishment of a formation known as Air Command. Up to that point, the organization of Canada's military component of air power could best be described as a diaspora of formations, some of which were not under command of an entirely air power-minded officer. The existence of that diaspora can be attributed in part to the Canadian government's unprecedented effort to unify the Canadian Forces, a process that had begun with the release of the government's White Paper on Defence in March 1964.<sup>7</sup> Of the three former services, however, it was the RCAF that was most affected by the force structure changes that followed.<sup>8</sup>

The functional-based partitioning of the RCAF resulting from the integration process was problematic for military air power proponents for two reasons, not necessarily of the same significance. First, owing to the existence of Maritime Command and Force Mobile Command, Navy and Army officers in general could reasonably expect to rise to command their own service at the rank of lieutenant-general or vice-admiral. The same could not be said for Air Force officers who may have aspired to three stars, since the aforementioned partitioning and integration only served to close such doors for them. Secondly, and more importantly for air power proponents, under the threat of further budget constraints of the early 1970s, the Commanders of Force Mobile Command and Maritime Command were inclined to cut, if not eliminate, their components of military air power first, before cutting anything else. No air power-minded officers employed within these formations were in a position to protect, defend, or promote military air power in these formations; thus, the conditions were present to ensure air power's future demise rather than growth.<sup>9</sup> In some cases, senior Army commanders were unabashedly contemptuous of their Air Force brethren.<sup>10</sup> When General Allard, the Chief of the Defence Staff (CDS) designate, was invited into the incumbent's office, Air Chief Marshal Miller suggested Allard try out his chair "to see if it fit." Allard complied, but in doing so he openly complained that "the back [of the chair] was... soft." Allard's written account of this event suggests nothing other than the intent to insult. A thorough analysis of other passages that hint of similar disdain for the Air Force are beyond the scope of this paper; however, it is clear from his accounts that Allard felt the Air Force as it existed exceeded that which Canada needed.<sup>11</sup> Allard's selection of the CFS Freedom Fighter aircraft over other types preferred by the Air Force is an interesting case in point. As a consequence of certain events, military air power proponents worked hard to re-establish an air force to protect it from arbitrary decisions such as this, which were seemingly designed to gut Canada's military air power capability. However, while their efforts contributed to the centralization of military air power under an Air Force commander, reorganization came at a cost. A natural evolution to the Canadian Army's air force came to an end in September 1975, as did the Canadian Forces' ability to participate effectively in all aspects of air-land battle—the preferred concept of war fighting at that time.

The Canadian Army, like a number of its counterparts, had gradually developed a helicopter-based air force capability. Many armies had opted to build their own such capability because air forces responsible for providing air support to those armies chose to invest instead in other military air power needs.<sup>12</sup> In the meantime, as the cold war unfolded, the enemy's development of massive armoured formations—or tank and mechanized infantry units—and a wide array of battlefield air defence vehicles multiplied at an alarming rate. The West soon recognized that they lacked the conventional military capability to deal with these evolving threats. "It [became] clear that... Western forces [would have to] fight at a quantitative disadvantage, and qualitative parity" if war broke out.<sup>13</sup> The helicopter was just the sort of innovation needed because it offered improved mobility to move soldiers around the battlefield at speeds greater than those that might have been possible with tanks and the armoured personnel carriers that were the mainstay of mechanized infantry formations. The helicopter would also eventually offer more in terms of firepower. The helicopter became an important means by which land forces could improve their anti-tank capabilities. By adding an anti-tank version to their mobility-focused helicopter formations, many Western militaries believed they had found a more effective means of dealing with the evolving enemy armoured threat.

The anti-tank helicopter was but one element of a four-pillared capability known as tactical aviation; the others were reconnaissance, utility, and medium-lift helicopters. In the face of the aforementioned massive armoured formations, a significant number of Western militaries undertook efforts to acquire anti-tank helicopters. And, yet, Canada was a notable exception. Neither the

Canadian Army nor the “new” Air Force, known as Air Command, pursued to the acquisition phase an anti-tank helicopter. Royal Canadian Armoured Corps (RCAC) doctrine included references to equipping “reconnaissance helicopters... with anti-tank missiles” as early as 1962.<sup>14</sup> Ten years later, RCAC pilots and non-commissioned crew members proved to be key players in the Ansbach Trials, during which the lethality of the missile-laden anti-tank helicopter was demonstrated.<sup>15</sup> A plan to acquire such helicopters was in circulation in Canada, yet little seems to have come of it. Why was this so? Two possibilities seem plausible: the transformation of the Army’s helicopter force to include anti-tank helicopters may have been at odds with the Canadian Army’s views, culture, or longer term plans; or, secondly, the Army may have opted to place all their trust in the Air Force to secure for them the helicopter variants expected to be needed in future conflicts. Either the Army wanted their helicopter forces to evolve apace the evolving nature of conflict, or they did not. At the time that Air Command stood up, however, the Air Force’s focus was on fighters, not helicopters. For that it would seem part of the blame belongs to Allard and the aforementioned decision to buy the CF5 aircraft. That decision may have been one of the “last straws” for air force proponents. In 1966, Allard, an infantry officer who by virtue of having successfully completed a pilot training course was qualified to wear the Canadian Army’s flying badge, referred to himself as a “FINK,” or “Flying Infanteer with Naval Knowledge.”<sup>16</sup> More importantly, to Allard, Force Mobile Command was a tactical command, nothing more.<sup>17</sup> He structured it according to his perceptions of the tactical mission he had been given. His grasp of military air power doctrine, reflected in the selection of the Northrop CF5 Freedom Fighter ground-attack/reconnaissance aircraft, confirmed a greater understanding of the tactical, rather than the strategic, when it came to matters of air power.

To the optimists among them, the end of the beginning for the Canadian Army’s air force came in 1972, near Ansbach, Germany. One long-serving member of the Royal Canadian Army Service Corps, Jim Grant,<sup>18</sup> explained that it was in fact a bit of good fortune that Canada was permitted to participate in the Ansbach [European Cobra] Trials.<sup>19</sup> Lieutenant-Colonel Paul D. Manson was the Canadian Forces Europe (CFE) officer apparently responsible for Canada’s “good fortune.”<sup>20</sup> A joint steering group consisting of military personnel from Germany, Canada, and the US was formed, and Manson served as the CFE representative responsible for initial and final planning of the evaluation and conduct of the field trials.<sup>21</sup> The senior data analyst from the US, Dr. Harrison H. Hoppes, recalled that Manson observed the trial, participating during “a number of runs.”<sup>22</sup> Therefore, Manson’s role in the trial and interest in the results should have provided him with some early understanding as to the lethality and effectiveness of these anti-tank helicopters in a ground-attack role.<sup>23</sup> The Ansbach Trials’ final report concluded that “anti-armor helicopters [were] extremely effective in destroying attacking enemy armor,” and that “high performance aircraft [were] not impressive [against such] helicopters.”<sup>24</sup> It was thus declared that anti-tank helicopters outperformed most if not all other anti-armour weapons systems.

The Ansbach Trials were “one of the most realistic experiments ever conducted on the place of helicopters in conventional warfare.”<sup>25</sup> The trials’ conclusions pointed to the efficacy and survivability of helicopters as platforms from which one could wage more effective anti-tank warfare and thereby provide enhanced support to ground forces. The transformation of the two-dimensional battlefield into a three-dimensional battlespace by the helicopter was on the verge of taking hold in 1972. By virtue of their performance in the trials, Canadian armoured reconnaissance pilots had all the skills needed for Canada to participate in the transformation, and doing so would seem to have been important to those concerned with Canada’s interoperability with the US. Finely-honed tactical helicopter anti-tank skills netted the Canadians results that exceeded by an extraordinary margin those realized by the US participants in the trials.<sup>26</sup> Canadian helicopter crews attained a notional ratio of tanks killed to helicopters killed of 41.7 tanks per aircraft lost.<sup>27</sup> Despite their considerable Vietnam combat experience with helicopters, the Americans could only muster a ratio of 8.6 tank kills per helicopter lost. “No matter how the statistics were sliced, the [aggregate] score was between 12- and 20-to-1 in favor of helicopters.”<sup>28</sup>

“[M]ost who witnessed the trials felt that these ratios were quite conservative.”<sup>29</sup> Captain Bruce Muelaner was Canada’s lead helicopter pilot,<sup>30</sup> and his accomplishments during the trials were noteworthy. The results reinforced the not uncommonly held view that “the quality of Canadian Forces was much above the NATO average.”<sup>31</sup> Hoppes “was not inclined to disagree,”<sup>32</sup> with the claim

that Canadian skills at nap-of-the-earth flying contributed to the decision to cancel the Cheyenne helicopter project in favour of the Apache. Colonel (US Army) James W. Bradin (Retired), author of *From Hot Air to Hellfire: The History of Army Attack Aviation*, believed that training and military élan accounted for the Canadians' "excellent performance."<sup>33</sup> Brigadier-General George Patton, Assistant Commandant Armor Center Fort Knox, had ordered Bradin to Ansbach to observe the trials.<sup>34</sup> One of the Canadian pilots participating took Bradin flying on a mission and Bradin was so impressed with the crew's skills that he immediately advised the US Army Colonel (Ferris) responsible for the Ansbach Trials at the time.<sup>35</sup> It was the crew concept employed by seasoned, professional Canadian armoured corps pilots and crewmen observers that Bradin was most impressed with.<sup>36</sup> The Canadians just seemed to take to the anti-tank helicopter role naturally.

By the time the Ansbach trials concluded, the US Army had made a pivotal decision regarding its anti-tank helicopter program. On 10 August 1972, the Cheyenne helicopter project was officially cancelled, and the Advanced Anti-tank Helicopter Project began.<sup>37</sup> The end result would be the purchase of the Apache helicopter rather than the Cheyenne. The former proved more manoeuvrable and more stable than the latter. This was especially important for pilots who needed to position their anti-tank helicopters close to the ground and to other obstacles such as vegetation. The ability to sneak about the battlefield at nap-of-the-earth ground-hugging altitudes was of paramount importance. Less than a year after the Ansbach Trials concluded, in November 1973, Lieutenant-General V. Gatsolayev of the Soviet Union published his concerns about "the [flying] tactics of Western" helicopters. He stated that "Soviet Ground Forces and air defences had much greater reason to be concerned about helicopters than they did fixed-wing aircraft ... citing [the helicopter's] ability to change flight altitude and speed very quickly, a cargo-carrying capacity that enabled them to carry various types of guns and instruments, the fact that helicopters did not require costly and vulnerable airfields, and, most importantly, that they were much more effective against small, mobile targets than their fixed-wing counterparts."<sup>38</sup>

The anti-tank helicopter was the quintessential icon of the innovation that was the helicopter, and all indications are that Canadian armoured corps helicopter crews were more than just well-suited for the role. During the 1970s and 1980s, tactical helicopter aviation became a manoeuvre arm in the close fight, and was the weapon of choice for nations who believed in the expansion of the battlespace. "In terms of the mechanics of land warfare, the most significant innovation since [WWII] was the helicopter. It [surpassed] fixed-wing aircraft for battlefield transportation and close air support, and [gave] new meaning to the term 'air-land battle.'"<sup>39</sup> No less than eight NATO allies set as a goal for their land forces the adoption of air-land battle standards, in which helicopters were to play a significant role.<sup>40</sup> Perhaps astonishing to some, in the face of all this it would appear that the Canadian Army fell rather silent. The requirement for an anti-tank helicopter faded away. One Canadian Army Operational Research Study reported that "[a]tomic powered long-range heavy tanks" with engines giving "20,000 miles cheaply" held out much promise in 1970, but the report was less optimistic about the prospects for helicopters.<sup>41</sup>

The question remains: how does one account for what seems like Army inaction? Was the Canadian Army's effort to implement a full-suite of tactical aviation helicopters sacrificed on the Air Command altar of higher priority air power requirements? A brief look at how organizations tend to protect themselves in the face of innovation serves to highlight some possibilities worth considering in a larger study of the evolution of the Canadian Army's air force. It also suggests that the transformation or transition to Air Command may have had less of an impact on the anti-tank helicopter project than one might think. For these possibilities, we now consider additional challenges the Canadian Army faced while trying to build its fledgling air force capability, and remain interoperable with allies. It would be unfair to hold the former commander of Mobile Command accountable for all of the Air Force decisions made by the Canadian Army. After all, the RCAF had a hand in some aspects of the Canadian Army's air force aspirations from the outset. One former senior RCAF officer who commanded the Canadian Joint Air Training Centre (CJATC) circa 1961 claimed that while Army air force training units existed within the CJATC, they were still under his (RCAF) command.<sup>42</sup> The idea of soldiers taking to the air was anathema to a number of nations' air forces in the wake of WWII, so we should probably not be surprised to see the RCAF's hands so deeply in the Canadian Army's air force pockets. The experiences of armies in the US, the United Kingdom (UK),

and Australia testify to the rivalry that arose between the air force and army in these countries, as a consequence of army efforts to build an air force of their own. Air force leaders typically opposed army efforts to establish an organic air capability, “especially in the armed helicopter and larger transport categories.”<sup>43</sup> Canada’s Army and Air Force did not escape this rivalry. “Like the [Royal Air Force], the [Royal Canadian Air Force] was loath to let the army fly any aircraft.”<sup>44</sup> Regardless of their location, all army air force units were under command of the nearest RCAF Station or unit commander for the purposes of flight safety. As a result of these flight safety concerns, flight training, and other such impositions, it may not have been possible for the army to respect to the extent necessary certain tenets of air power theory.<sup>45</sup> Such a possibility may explain why air power proponents believed that full command of the Canadian Army’s air force more properly resided in the hands of Air Command.

The strength of the North Atlantic Treaty Organization (NATO) in part depended on the degree to which member nations’ armed forces were compatible with each other as the cold war unfolded. Incompatible forces, or those that were non-interoperable, became less relevant as doctrine and strategy evolved. In this vein, the Canadian Army’s efforts to establish an organic air force capability were, out of operational necessity, supposed to be compatible with those of the UK, and later, the US. Canadian divisions were eventually organized and equipped using US methods and weapons so as to “obtain experience with the US organization and equipment in view of the obvious necessity to coordinate [their mutual defence].”<sup>46</sup> These policies of interoperability led to a considerable number of Canadian Army pilots being trained in the US during the 1950s and 1960s. As a result, these pilots could be found at the coalface of the tactical helicopter innovation. Paul Hellyer, Canada’s Minister of National Defence in the mid-1960s, appears to have believed in the helicopter-based airmobility concept, for the seeds of helicopter acquisition were sewn during his tenure. Subsequent purchases eventually led to the delivery of US-manufactured tactical reconnaissance and utility helicopters in 1971 and 1972. Claims that Canada’s tactical helicopter force used as its model the 1962 Howze Board<sup>47</sup> testify to the extent Canada’s Army remained committed to interoperability with the US Army, in so far as tactical helicopter operations were concerned.<sup>48</sup> Nevertheless, such an interoperability-focused desire on the part of the Canadian Army imposed increasing demands on the Canadian Army’s capital equipment requirements. One officer explained that at about this time he was responsible for delivering a \$12 million cheque to the US manufacturer that built the Chinook helicopter, eight of which Canada had purchased. The cheque, he explained, represented almost the entire capital budget for the Army for that year.<sup>49</sup> Faced with these pressures, self-preservation probably became more important for each of the Canadian Army’s sub-units that could boast of an air force capability. After all, history suggests that individual military sub-services, such as the artillery, armoured corps, or the air force, have tended to place their own survival ahead of all other concerns, regardless of what the evolving battlefield logic might be telling them about the irrelevance of the capability each has to offer.<sup>50</sup> However, by 1972, interoperability demanded the implementation of yet another helicopter type—the anti-tank helicopter—and adoption of new strategies such as active defence, and, later still, air-land battle. As a consequence, the artillery, armoured corps, infantry, and the Royal Canadian Army Service Corps (RCASC) competed amongst themselves for shrinking funds needed to help them meet their overall interoperability aspirations. As long as each of them remained wedded to traditional war fighting methods, however, there seemed to be less and less manoeuvre space for implementing the full tactical helicopter innovation in the Canadian Army.

As one scholar has explained, this type of competition is natural in any organization, especially the military. To Barry R. Posen,<sup>51</sup> certain factors tend to account for why states stress one type of military service or capability over another. Even within the various services (army, navy or air force) available to the state, different types of weapons tend to be privileged over others. Consequently, “military doctrine [reflects] the preferences of a group of services, a single service, or a sub-service,” such as the artillery.<sup>52</sup> This military doctrine, therefore, is a product of the rivalry that exists amongst the various groups with a vested interest in ensuring their capabilities are reflected in the state’s military doctrine. Since rivalries tend to be resolved through compromise, it would be important to determine what compromises may have played out between the Canadian Army and Air Command, and to what extent the anti-tank helicopter played a role. Secondly, identification of the compromises

reached by the various arms within the Canadian Army should provide a greater understanding of the evolution of the Canadian Army's air force. For example, can the Canadian Army's decision not to pursue an anti-tank helicopter be tied to any concerns expressed by the artillery? In other words, was the anti-tank helicopter seen as a threat to the artillery's long-range indirect fire role? From the artillery's perspective the anti-tank helicopter project name—Aerial Artillery Fire Support (AAFS) System—itself may have been enough to convince them of the degree to which an anti-tank helicopter threatened the artillery's traditional role and future well-being. According to one senior officer from the US Army, a significant dispute erupted over this issue between the US Army artillery and armored branches. Owing to the "aerial artillery" reference, the artillery branch put much effort into demanding that aviation fall under their jurisdiction. In response, the commanding general of the armored corps argued that since artillery self-propelled howitzers were now "tracked vehicles," it was clear they should belong to the armored corps.<sup>53</sup> What, for that matter, did the Canadian Army's tank corps think of the anti-tank helicopter? Were reports that the helicopter served as a better anti-tank weapon than the tank sufficiently upsetting to the Canadian armoured corps?

Are we to conclude from such events that the anti-tank helicopter was not relevant to an evolving Canadian Army? Or, was the helicopter seen as a threat to the traditional combat arms (artillery, armoured, infantry, and service corps) in Canada? Armies everywhere else fell for the helicopter, forgiving its "relatively considerable expense and extensive maintenance challenges."<sup>54</sup> But, at approximately \$400,000 (US) each, the Cobra anti-tank helicopter was not as expensive as the fighter aircraft that were declared suitable for that role. Perhaps the Canadian Army could not overcome these financial and maintenance problems. Perhaps the Army believed that Air Command would pursue an anti-tank helicopter on its behalf, once Air Command assumed responsibility for all aspects of air power throughout the Canadian Armed Forces in 1975. Nevertheless, the probity of the Canadian Army's decision, if one was made, possibly privileging the Army's traditional capabilities, calls into question the kind of war for which the Canadian Army was bracing itself.

As late as 1972, the Army's air force consisted of three different groups operating their own different aircraft for their own purposes. Preferences and biases within the Army may explain why capability overlaps and duplication in roles were problematic. From an air force perspective, the Army seems to have been challenged in its efforts to implement army-wide air power efficiencies. The artillery, for example, was reluctant to abandon its L19 "Bird Dog" low-wing monoplanes<sup>55</sup> in favour of the kind of light reconnaissance helicopter their armoured corps brethren had introduced into service, despite the helicopter's utility in the artillery mission. The armoured corps also had problems with its organic aviation, but its problems were manpower related. For example, a number of armoured corps pilots admitted to disincentives employed by career managers and senior officers in regards to any armoured corps pilot who volunteered for a second flying tour on helicopters.<sup>56</sup> Perhaps most interesting of all is the eight-year-long effort of one senior armoured corps officer-turned-air-force helicopter pilot to discredit the very Ansbach Trial results he himself scored as a participant. Recalling that the Ansbach experiment proved anti-tank helicopters would easily destroy no less than 19 and as many as 41 tanks before a helicopter would be lost, given the conditions of the experiment, Andy Séguin could not bring himself to accept these results. In a follow-on experiment he personally devised, he came to the conclusion that based on the attacking speed of tanks and the effective range of anti-tank missiles, he and his helicopter would probably traverse the entire width of West Germany while engaging enemy tanks from the east, and would run out of time and geography before being able to take shots at that many tanks.<sup>57</sup> It is clear from the rest of Séguin's testimony that he understood how such incredible results were to be achieved, based on numbers of helicopters employed and depth and breadth of defensive coverage. Yet it is revealing that a Canadian armoured corps officer-turned-helicopter pilot went to such mistaken lengths to disprove one of the more credible experiments. Finally, we can understand his motivation when we consider the lengths to which one of the other Canadian armoured corps officers-turned-helicopter pilot said about the Ansbach Trials. Despite the aforementioned and remarkable official results, published in the Ansbach Trial final report, which we are to believe Captain Bruce Muelaner had a hand in writing, Muelaner's *Canadian Defence Quarterly* article is surprising for its nuance and general lack of support for the anti-tank helicopter concept.<sup>58</sup> The contrast between the final report and Muelaner's article deserves to be thoroughly deconstructed to gain a better understanding of why he seems to have chosen to discredit in that way the very results he helped to attain.



Under conditions like these it may have been quite difficult for a military air power element to thrive, let alone evolve. For these reasons, and many others, to be sure, the future of the Army's individual air force elements may have seemed uncertain as the 1970s unfolded. To the extent to which it could be referred to as such, the Canadian Army's pre-1975 air force was seemingly adrift, and perhaps, only by dint of its own air power organizational and operational experience, was Canada's air force, now known as Air Command, able to resolve this military air power challenge by giving land aviation some sort of new direction. From its experience-based lofty vantage point the true Air Force recognized that a proper application of air power principles might help meet the army's military air power needs. By gathering together the disparate elements of Canadian air power found within the Army, the organization known as Air Command was able to help preserve and then enhance an air force more readily dedicated to the whole Canadian Army. That post-integration, post-unification air force capability dedicated to supporting Canada's land forces was known as 10 Tactical Air Group.

Little seems to be known about the Canadian Army's reaction to the establishment of Air Command from a purely air force perspective. The Army appears to have made a decision to back away from such a capability, circa 1975. For reasons not readily evident, the Army abandoned that goal, accepting, possibly reluctantly, a tactical aviation capability considerably less organic to the Army. As the Canadian Army's military air power capability grew ever more complex, did the evolution of that capability threaten to eclipse other traditional army capabilities? It might be possible to attribute the Army's decision to shed its air force to a desire, in the absence of adequate funding, to preserve and protect core army competencies, such as tanks and artillery, instead. But, much work remains to determine the exact quality of the Canadian Army's air force before Air Command was stood up in 1975. It would appear that that air force was in very good hands at the lowest levels. Pilots and crews flying helicopters and aircraft in the artillery, infantry, armoured corps, and service corps were dedicated, professional airmen. However, some tribalism is evident in action that can only be described in terms of protecting land forces first. How else can we account for the inability to innovate into the realm of anti-tank helicopters? The time was certainly ripe for such an endeavour, and the advent of new battlefield strategies seemed to demand such a helicopter variant. And yet, nothing ever came of the Canadian Army's anti-tank helicopter project. Perhaps the establishment of Air Command had something to do with this turn of events, but the issue requires much more analysis.

.....  
**Notes**

1. Hugh A. Halliday, "Tactical Air Power: Some Observations Respecting its Origins, Development and Battlefield Impact" in *The Evolution of Air Power in Canada: 1916 to the Present Day and Beyond*, vol. 1 (papers presented at the 1st Air Force Historical Conference, Air Command Headquarters, Winnipeg, MB, November 18-19, 1994), 39
2. All of the RCAF Staff College (Toronto) students traveled to Kingston for joint training sessions that year. See the Directorate of History & Heritage collection of précis for the Canadian Land Force Command and Staff College, 1955.
3. Matthew Allen, *Military Helicopter Doctrines of the Major Powers, 1945-1992: Making Decisions About Air-Land Warfare* (London: Greenwood Press, 1993), 230.
4. "Military Innovation: Technology, Strategy and the Security Environment" (course notes, Massachusetts Institute of Technology Seminar, June 2003).
5. Allen, xxvi.
6. Frederic A. Bergerson, *The Army Gets an Air Force: Tactics of Insurgent Bureaucratic Politics* (Baltimore: The Johns Hopkins University Press, 1980), 79.
7. F. R. Sharp, "Reorganization of the Canadian Armed Forces," *Air University Review*, 1967. Air Marshall Sharp described Canada's efforts as pioneering
8. K. R. Pennie, "The Impact of Unification on the Air Force," in *The Evolution of Air Power in Canada: 1916 to the Present Day and Beyond*, vol. I (papers presented at the 1st Air Force Historical Conference, Air Command Headquarters, Winnipeg, MB, November 18-19, 1994), 105
9. *Ibid.*, 107.
10. See Jean V. Allard and Serge Bernier, *The Memoirs of General Jean V. Allard* (Vancouver: The University of British Columbia Press, 1988), 249.
11. *Ibid.*, 252.

12. Louis A. Sigaud, *Air Power and Unification: Douhet's Principles of Warfare and their Application to the United States* (Harrisburg, PA: The Military Service Publishing Co., 1949), 36. See also Harold R. Winton, "A Black Hole in the Wild Blue Yonder: The Need for a Comprehensive Theory of Air Power," *Air Power History*, Winter 1992, 32.
13. Steven Metz, "Centers of Gravity and Strategic Planning," *Military Review*, April 1988, 23.
14. Canada, Royal Canadian Armoured Corps CAPTP 23-100, Provisional Training Précis, RCAF Helicopter Reconnaissance (includes Amendment #1), May 1962, paragraph 10, 3.
15. The evaluation of the anti-tank helicopter took place in two formats: experiments, and actual combat. The experiments were those that took place as part of the "European Cobra Trials" near Ansbach, Germany. The actual combat took place at about the same time, but in Vietnam. See J. C. Burns, "XM-26 TOW: Birth of the Helicopter as a Tank Buster" (master's thesis, unknown location, 1994).
16. Allard and Bernier, 257.
17. See National Library of Canada XC34-271/1-11, First Session—Twenty-seventh Parliament, 1966, Standing Committee on National Defence, Minutes of Proceedings and Evidence No. 11, Tuesday, June 21, 1966, Respecting Main Estimates 1966–67 of the Department of National Defence, Ottawa, 304. In response to a question from the Chairman (David W. Groos) as to why there seemed to be a shortage of naval officer representation in Force Mobile Command, Lieutenant-General Allard responded by emphasizing that his was a tactical command.
18. Lieutenant-Colonel Jim Grant retired in 1981 after thirty years of service. In his last few years with the Canadian Forces much of his time was spent in aid of the formation of the 10th Tactical Air Group in St-Hubert, Quebec.
19. See James W. Bradin, *From Hot Air to Hellfire: The History of Army Attack Aviation* (Novato, CA: Presidio, 1994), 127–31. Bradin explains that the Ansbach Trials were divided into two phases, the first of which has been referred to as the "Cobra Trial."
20. See Jim Grant, "From Pharmacy to Helicopters," [www.hillmanweb.com/grant01.html](http://www.hillmanweb.com/grant01.html) (accessed June 24, 2010).
21. NATO, Headquarters Joint Evaluation Group, *Joint Anti-tank Helicopter Instrumented Evaluation*, vol.2, *Main Report*, December 1972, 3 (hereafter cited as NATO).
22. General P. Manson, correspondence with author, n.d. He confirmed Hoppes' claim after referring to his pilot's log book entries for 1972, noting that he had observed as many as two Ansbach Trial experimental runs.
23. Dr. Harrison H. Hoppes, interview with author, January 8, 2005 (hereafter cited as Hoppes); General P. Manson, e-mail message to author, n.d. It was confirmed that his pilot's log book did indicate that he did partake in at least two flights, one of which was on a Cobra attack helicopter.
24. NATO.
25. Allen, 24.
26. Bradin, 126–33. Average Canadian and German results exceeded 40 notional tanks killed to one notional helicopter lost, while the American crews were not able to exceed a ratio of 8:1.
27. One participant's recollections were that the ratio was closer to 34:1. See Andre J. Séguin, interview by J. R. Digger MacDougall, Canadian War Museum, Oral History Program Interview Transcript, Interview Control Number: 31D.4.SEGUIN, February 9, 2004, 20.
28. Brooke Nihart, "Score: TOW/Cobras 20, Armor 1," *Armed Forces Journal* 110, no. 1 (September 1972): 20.
29. Hamilton H. Howze, "The Case for the Helicopter," *Army*, March 1979, 18.
30. Jim Grant, e-mail message to author, December 2004.
31. Canada, Minister of National Defence, "Report of the Ad Hoc Committee on Defence Policy: The Sutherland Report" (Ottawa: September 30, 1963), Section IX, 107, para 9.
32. Hoppes.
33. Bradin, 129
34. Hoppes.
35. André "Andy" J. Séguin, "From Saint-Henri to Singapore," in *Blackdown to the Wild Blue Yonder: A Collection of Fond Memories, by Former Members of the RCASC*, ed. Jim Grant, 111, <http://www.tachelmemories.ca/memories/RCASC/BlackdownToTheWildBlueYonder.pdf> (accessed June 30, 2010).
36. James Bradin, interview with author, January 7, 2004.
37. While the final report for the Joint Anti-tank Helicopter Instrumented Evaluation was not released until December 1972, which would have been after the aforementioned date for the cancellation of the Cheyenne, the anti-tank helicopter phase of the Ansbach Trials was the subject of an advanced report titled "Joint Anti-tank helicopter Instrumented Evaluation, Preliminary USAREUR [US Army Europe] Report," July 1972, and also published as Annex III of Appendix C of volume 4 of a report titled "Advanced Anti-tank Helicopter Task Force Report." Also, Jean M. Southwell, e-mail correspondence with author, Aviation Technical Library, Fort Rucker, AL, n.d.

38. Dan Shephard, *Soviet Assessments of US Close Air Support: Research Report No 86-4* (Cambridge, MA: Massachusetts Institute of Technology, 1986), 11.
39. Christopher Bellamy, *The Evolution of Modern Land Warfare: Theory and Practice* (London: Rutledge, 1990), 108.
40. US, UK, France, Germany, Netherlands, Italy, Spain, and Belgium.
41. Canada, Department of National Defence, Canadian Army Operational Research Establishment, Memorandum 59/10, "An Assessment of Scientific and Technological Advances of Military Interest During the Next Decade," (Ottawa: November 1959), 9.
42. Group Captain Cliff Black (Retired), interview with author, November 1, 2004.
43. Shelby Stanton, *The 1st Cav in Vietnam: Anatomy of a Division* (Novato, CA: Presidio, 1999), 23.
44. D. L. Fromow, *Canada's Flying Gunners: A History of the Air Observation Post of the Royal Regiment of Canadian Artillery* (Ottawa: Air Observation Post Pilots' Association of Canada, 2002), 31.
45. Tenets of air power may not exist. However, some work has been done to define principles or propositions of air power. See Phillip S. Meilinger, "Ten Propositions: Emerging Air power," *Air Power Journal* (Spring 1996).
46. John Swettenham, *McNaughton*, vol. 3, 1944-1966 (Toronto, 1969), 171.
47. Lieutenant-General Hamilton H. Howze. The Army Tactical Mobility Requirements Board would eventually be referred to as the Howze Board, after the name of its chairman. The purpose of this early 1960s board was to make recommendations to Secretary of Defense Robert S. McNamara with respect to the viability of sky cavalry in combat.
48. Lieutenant-Colonel Jim Grant, interview with author, January 20, 2005.
49. Colonel Bert Casselman, interview with author, February 14, 2005.
50. See Shelford Bidwell, *Modern Warfare: A Study of Men, Weapons and Theories* (London: Allen Lane, 1973), 96. See also Carl Builder, *The Masks of War: American Military Styles in Strategy and Analysis* (Baltimore: Johns Hopkins University Press, 1989).
51. Associate Professor of Political Science, Massachusetts Institute of Technology, and author of *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (London: Cornell University Press, 1984).
52. Barry R. Posen, *The Sources of Military Doctrine: France, Britain, and Germany Between the World Wars* (London: Cornell University Press, 1984), 14.
53. The "Aerial Artillery Fire Support System" appears to have been the project name for the AH-1 Cobra anti-tank helicopter. The same name was used in Canada as late as 1973 to designate the project reflecting the Canadian Army's interest in an anti-tank helicopter. Interview and e-mail correspondence with a US Army Colonel (Retired) and tactical aviation author, February 2005.
54. Peter Mead, *Soldiers in the Air* (London: Ian Allan, 1967), 81.
55. Interviews with various Air Observation Post (Air OP) pilots, January, 2005.
56. John Martinson, interview with author, November 15, 2004.
57. See Andre J. Seguin, *Canadian War Museum, Oral History Program, Interview Transcript*, 20-21.
58. B. A. Muelaner, "The Search for the Best Anti-tank Defence," *Canadian Defence Quarterly* 3, no. 4, Spring 1974, 24-30.

### ***Lieutenant-Colonel Dean C. Black, CD (Retired)***

*Dean Black was born in Lachine, Quebec, and joined the Canadian Forces in 1977, earning his pilot's wings in November 1982. He holds a B.Sc. (1981) and an M.A. (2001) in War Studies from the Royal Military College. Dean joined the UN Mission in Haiti (1995), and commanded 403 (Helicopter) Operational Training Squadron from 2000 to 2002. Following three years as a strategic defence analyst, Dean reported to the Defence Research & Development Establishment (Ottawa) as the Senior Military Advisor (2005).*

*Dean began pursuing a Ph.D. at Queen's University in 2003. His thesis employs organizational behaviour, military culture and military history to explore the Canadian Army's decision to abandon its organic air force in 1975. Dean presented papers at the Inter-University Seminar (Toronto, October 2004), the NATO Concept Development and Experimentation Conference (Calgary, November 2004) and the McGill-Queen's Graduate Conference in History (Kingston, March 2005). Dean retired from the Canadian Forces in 2007, having served as a tactical helicopter pilot on six operational tours. He became the Executive Director of the Air Force Association of Canada in January 2007. After two years of studying association management he earned his CAE in June 2010 from the Canadian Society of Association Executives.*

## Chapter 9

# “Committed to Make a Difference:”<sup>1</sup> Canada’s Role in the Inception of NORAD Counter-drug Operations

*Dixie Dysart*

Canada has a long history of international cooperation in the interdiction of drug trafficking. For example, it joined other nations in signing the United Nations’ conventions concerning drugs: the 1961 Single Convention on Narcotic Drugs and its 1972 Protocol, the 1971 Convention on Psychotropic Substances, and the 1988 Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances.<sup>2</sup> Despite international and Canadian efforts to control the import, production, export, distribution, possession, and use of narcotics, by the late 1980s, trade in illicit drugs had reached epidemic proportions.<sup>3</sup> In 1987, sales of controlled substances in Canada totalled an estimated \$10 billion.<sup>4</sup> Royal Canadian Mounted Police (RCMP) records indicate that during the late 1980s and early 1990s, Colombian smugglers transported substantial amounts of cocaine into Canada by ship and aircraft.<sup>5</sup> At the same time, the drug problem in the United States (US) had also become acute, and an increasing number of narcotics seizures taking place in the vicinity of the US-Canadian border highlighted the vulnerability of the world’s longest undefended frontier to criminal activity.<sup>6</sup> An amorphous, deadly enemy threatened North American air sovereignty.

In 1987, Canada launched a five-year national drug initiative: “Action on Drug Abuse.” The Department of National Health and Welfare served as lead agency for that programme, which focused on reducing the demand for illegal drugs in Canada. The plan called for nationwide improvement in education and prevention efforts, enforcement and control, treatment and rehabilitation, research, and international cooperation to combat the problem. On August 21 of that year, a Memorandum of Understanding between the Department of National Defence (DND) and the RCMP authorized the DND to provide ship-days and aircraft-hours to monitor and track offshore craft suspected of involvement in illegal drug operations, setting a precedent for civil-military cooperation in combating narcotics trafficking.<sup>7</sup>

The role Canadian Forces (CF) played in interdicting drug dealing soon expanded. Canada’s emphasis on combating the narcotics problem by curtailing demand underwent revision between 1989, when it concurred with North America Aerospace Defence Command’s (NORAD) participation in anti-drug operations, and the formal inclusion of counter-narcotics operations as one of NORAD’s missions in 1991. As members of the bi-national command worked together to perform that mission, Canada and the US developed agreements that more clearly defined the parameters for international military-civilian cooperation in law enforcement activities and air traffic control, enhancing both Canada’s internal security and its air sovereignty.

In 1958, when Canada and the US signed the first NORAD Agreement, radar systems had already been linked to form an extensive North American air defence network designed to provide warning of manned bomber attacks and to assure both nations’ air sovereignty. These systems, including the Pinetree Line, Mid-Canada Line, Distant Early Warning (DEW) Line, and installations in the Continental United States (CONUS), were subsequently connected to the computerized semi-automatic ground environment (SAGE) system, which provided the commander of each NORAD region a visual display of air traffic over his area.

In 1975, the Permanent Joint Board on Defence agreed that the expensive and obsolescent SAGE network should be replaced with Region Operations Control Centers (ROCCs). In the US, NORAD established the Joint Surveillance System (JSS), an air surveillance network of joint-use United States Air Force (USAF) and Federal Aviation Administration (FAA) radars. In combination with the E-3A Airborne Warning and Control System (AWACS) aircraft, it was designed to replace the SAGE system in CONUS and the manual ground environment system in Alaska.<sup>8</sup> The remaining online Canadian radars were connected to two Canadian ROCCs, which provided centralized automatic

data processing and display of sensor data. All the NORAD ROCCs<sup>9</sup> transmitted information to the Cheyenne Mountain Combat Operations Center. A May 1976 JSS Program Memorandum noted that the “revised regional configuration [was] designed to satisfy US and Canadian Air Surveillance and Control requirements with the means to conduct an effective airspace sovereignty mission within US and Canadian airspace.”<sup>10</sup> The Program Memorandum also called for an alignment of NORAD regions along national boundaries.<sup>11</sup> In 1983, NORAD region configurations were defined accordingly, and the ROCCs at North Bay assumed control of all aircraft in Canadian airspace.<sup>12</sup>

The air defence radars put in place in the 1950s had been designed to detect high-altitude subsonic bombers, but by the early 1970s, the availability of cruise missiles and the Soviet use of low-altitude penetration techniques cast doubt on the effectiveness of the continent’s radar shield. Reduced funding for air defence resulted in a decline in the number of operational NORAD radars in both Canada and the US. As aging radars were retired, air surveillance capabilities in Canada diminished. In fact, the 1986 report of the House of Commons Standing Committee on External Affairs and National Defence contended that current radar coverage was “incomplete,” and quoted Chief of Air Doctrine and Operations Major General Ashley, who described it as “very porous.”<sup>13</sup>

A similar situation existed in the US, where vulnerabilities in low altitude and coastal surveillance prompted Congress to charge the USAF with developing an Air Defense Master Plan to improve US capabilities.<sup>14</sup> Canada and the US responded to the challenge by undertaking the joint North American Air Defence Modernization Program,<sup>15</sup> which the two powers agreed upon at the March 18, 1985 Quebec City Summit. The program’s objective was to establish a surveillance and warning system surrounding the US and Canada capable of detecting aircraft and cruise missiles approaching at any altitude.<sup>16</sup> The modernization program could not have occurred at a more opportune time. Military units on both sides of the border were about to be enlisted to combat illicit drug trafficking.

*The Fiscal Year 1989 National Defense Authorization Act* named the US Department of Defense (DoD) as the lead agency for detecting and monitoring the smuggling of illegal drugs into North America by air and sea. In January of that year, DoD tasked the Commander, US Element NORAD (USELEMNORAD), to assume responsibility for air surveillance in support of that mission. DoD further charged him with responsibility for integrating NORAD assets into the counter-drug command, control, communications, and intelligence network, and with coordinating with other US agencies involved in detecting and monitoring suspected drug traffic.<sup>17</sup> But the Commander-in-Chief NORAD (CINCNORAD) also served as commander, USELEMNORAD. The unilateral action of the DoD thus presented him with a dilemma. As commander, USELEMNORAD, he had no staff or formal command structure assigned, and Canadian personnel served throughout the NORAD force. Since illegal drugs posed a threat to both NORAD partners, CINCNORAD suggested that the US State Department seek Canada’s approval to assign the counter-drug mission to NORAD, and its consent for Canadians assigned to NORAD to participate in that effort as part of NORAD’s warning and air sovereignty mission.<sup>18</sup>

On February 4, 1989, Canada’s Chief of Defence Staff approved the use of NORAD assets in the performance of the US counter-drug mission. Six days later, the Canadian government concurred with CINCNORAD’s assumption of responsibility for drug surveillance, eliminating the necessity for USELEMNORAD to perform the mission without Canadian support.<sup>19</sup> CINCNORAD General John L. Piotrowski, determined to employ the full spectrum of the command’s technological resources and classical air power doctrine in the fight against illegal drugs, then promulgated SNOWFENCE 90, his four-phase anti-drug campaign plan. Phase one focused on the southwest border region of CONUS. Phase two encompassed the entire southern CONUS border. Phase three concentrated on the “entire periphery” of Canada and the United States, and phase four comprised the entire North American continent.<sup>20</sup> Under the plan, Canada was charged with establishing “terms, relationships, agreements, and enforcement procedures” with Canadian law enforcement agencies and other Canadian and US entities participating in anti-drug operations.<sup>21</sup> Coordination between Canadian federal and law enforcement agencies was to be accomplished through National Defence Headquarters (NDHQ) in Ottawa.<sup>22</sup>



CINCNOAD’s SNOWFENCE 90 plan anticipated that the North American Air Defence Modernization Program would make “the [radar] barrier... much more difficult to penetrate by airborne drug traffickers.”<sup>23</sup> The program called for improvement in US radars, a Caribbean basin radar network, the purchase of Canadian coastal radars to replace inactivated Pinetree radars, completion of the North Warning system to replace 27 DEW Line radars in Alaska and Canada, and an Over-the-Horizon Backscatter Radar system. It also called for modernization of NORAD’s communications system including implementation of the anti-drug computer network (ADNET), which would link military and civilian control centers through a computer network.<sup>24</sup> To implement SNOWFENCE, NORAD planners developed counter-narcotics tactics that incorporated existing command assets:

Current NORAD forces are comprised of alert air defense fighters, AWACS surveillance and command and control systems, air and ground surveillance radars, intelligence data gathering and correlation systems, and command and control nodes—The air defense assets will be used to provide counter-narcotics airborne patrol and supplementary radar surveillance, in addition to their normal air sovereignty mission. Surveillance resources will be used to provide an all altitude radar surveillance barrier around the entire perimeter of North America.<sup>25</sup>

In accordance with SNOWFENCE 90, which outlined the operation’s command and control relationships and force employment criteria, the NORAD Sectors were required to provide the surveillance information they collected to the appropriate law enforcement agency or control center. NORAD commanders were authorized to launch alert fighters to intercept, identify, and monitor suspected drug smugglers, and NORAD fighters engaged on such a mission were authorized to operate in both US and Canadian airspace under the control of the appropriate Sector Operations Combat Center.<sup>26</sup> The Military Cooperation Committee accepted the terms of SNOWFENCE 90 on condition that future revisions of the plan be submitted to it for bi-national approval.<sup>27</sup>

Canadian participation in NORAD counter-drug operations began shortly after Canada’s concurrence with NORAD’s expanded mission. The first Canadian-US cooperative military drug interdiction mission took place on March 12, 1989. Upon its completion, CINCNOAD General John L. Piotrowski’s congratulatory message to Chief of the Defence Staff General Paul D. Manson noted that the process of interdicting the “illegal activities threatening our bi-national security” would require refinement and improvement.<sup>28</sup> A description of the events that took place confirms General Piotrowski’s assessment that Canada and the US needed to develop guidance for the conduct of such missions. On March 12, 1989, US air defence radar off the south coast of Florida detected a Rockwell Turboprop Commander 980 that had not filed a flight plan and showed false Canadian registration markings. Two USAF fighters pursued it as it entered Canadian air space over Nova Scotia. Shortly after it landed at the Sorel airport in Quebec, another aircraft carrying three US Customs agents followed it down. The agents, armed with rifles, apprehended the two occupants of the aircraft as they ran from the airport office, forcing them and the facility manager to lie face down on the parking lot while they searched for narcotics. The airport manager’s son, seeing this activity from his home nearby and fearing that terrorists were kidnapping his father, summoned the Quebec Provincial Police, and then went to his father’s aid. When he arrived at the airport, he too was held at gunpoint. Provincial police, the first Canadian law enforcement officers on the scene, arrived at the airport about 45 minutes after the Turbo Commander touched down. There they observed US Customs officers reading the suspected smugglers their rights as a Black Hawk helicopter carrying two US military personnel landed at the airstrip. About ten minutes later, the RCMP arrived. The customs officers searched the aircraft thoroughly but found no drugs aboard.<sup>29</sup> RCMP sources speculated that the illicit cargo might have been dropped over Nova Scotia, or perhaps removed before the Customs plane landed by a truck that had been waiting at the airport.<sup>30</sup>

RCMP Staff Sergeant Jacques Grilli subsequently assured the Canadian public that US Customs officers had followed established procedures by notifying DND they were entering Canada and asking permission to take the required steps to apprehend the suspected smugglers. The incident, however, provoked an expression of concern from the Canadian Embassy in Washington to the US State Department related to a possible “violation of Canadian sovereignty.”<sup>31</sup>

As procedures for bi-national cooperation in NORAD's counter-narcotics effort became more firmly established, subsequent drug interdiction missions went more smoothly. Being informed that members of the Medellin drug cartel planned the purchase of an airstrip in a remote area of New Brunswick, the RCMP developed plans to facilitate the purchase of Weyman Field, located 20 kilometres northwest of Fredericton, with \$43,000 provided by the cartel.<sup>32</sup> In response to intelligence concerning the case provided by the RCMP to the US Customs Service (USCS), NORAD launched an AWACS that detected and monitored an aircraft subsequently identified as a customs interest track referred to as a Special 17. USCS then launched a P-3 from Brunswick, Maine, to intercept the Special 17, an Aero Commander 980.<sup>33</sup> When the smugglers' Aero Commander, piloted by Colombians Jose Galindo Escobar and Fernando Mendoza Jaramillo, attempted to land at Weyman, it struck treetops at the end of the strip and skidded off the runway as it touched down. RCMP officers posing as participants in the drug ring took the aircraft's cargo of 1,100 pounds (500 kg) of cocaine, worth \$50 million, and replaced it with sugar. They then delivered the spurious contraband to its intended destination in Montreal, where they arrested three South American residents of New York. The two pilots, who had remained under police observation, were then arrested in Toronto.<sup>34</sup>

During 1989 and early 1990, Canada hosted three exercises designed to hone the skills of NORAD personnel tasked to perform the command's new mission. The first, a surveillance operation dubbed DAY TRIPPER, took place in NORAD's Canada East and Northeast Sectors. It was planned to "enhance anti-drug cooperation and connectivity as well as possible interdiction."<sup>35</sup> Based on intelligence information from the USCS, the Canadian Customs National Aviation Center elected to conduct DAY TRIPPER from August 24 to September 5, 1989, a time when the RCMP, Canadian Customs Service, and USCS anticipated that the operation would detect drug-smuggling aircraft entering Canada. During the exercise, an AWACS monitored the Western Atlantic area in order to detect northbound aircraft planning to enter northeast US or Canadian airspace in the evening or at night.<sup>36</sup>

The USCS requested the placement of one radar controller at a Nova Scotia radar site and permission for USCS aircraft and aircrews, including USCS, RCMP, and Canada Customs personnel, to operate on alert status from Canadian Forces Base (CFB) Shearwater near Halifax. NORAD AWACS and USCS P-3s flew an increased number of sorties in support of the operation.<sup>37</sup> NDHQ approved the request for one USCS detection systems specialist (a controller) to participate at Canada East Control Centre at North Bay, for USCS Piper Cheyenne and Beech King Air aircraft to operate from Shearwater, and for operations room facilities for the Canadian and US law enforcement officers.<sup>38</sup> NDHQ noted, however, that if similar operations were to be undertaken in the future, the agreements currently in force between US and Canadian law enforcement agencies would have to be expanded, and the Memorandum of Understanding between the RCMP and DND authorizing surveillance for offshore vessels would need to be revised.<sup>39</sup>

NORAD personnel detected no tracks of interest during Operation DAY TRIPPER, but the exercise provided an excellent training opportunity for all participants and laid the groundwork for the conduct of similar operations in the future.<sup>40</sup> A memo from NDHQ to NORAD HQ noted, however, that NORAD HQ "must continue to be aware that DND and DoD are not functioning under similar government direction concerning anti-drug operations and significant changes to increase DND responsibilities will not likely be forthcoming in the near term."<sup>41</sup>

The RCMP and DND conducted two anti-drug operations during the winter of 1989–1990: Operation OWL-1 from CFB Shearwater from December 29–30, 1989, and Operation WHALE-1 in NORAD's Canada East Sector from January

9–11, 1990. OWL-1 provided some particularly valuable insights into conducting joint military-law enforcement operations. The RCMP made available a Cessna Citation chase plane and apprehension team, and Maritime Command provided a target aircraft to play the drug smuggler. US Drug Enforcement Administration and USCS personnel also participated in the exercise.<sup>42</sup> During the operation, two F-15s intercepted a suspect aircraft south of Nova Scotia and observed bales and barrels of fuel inside the fuselage. The F-15s called for the chase plane, but the target aircraft outran it when the fighters were forced to land for refuelling. An Electronic Warfare Challenger then took

off from Shearwater and sighted the suspect, which was instructed to land at Halifax International Airport for a customs inspection. Customs and the RCMP searched the aircraft but found no drugs. The pilot, however, was cited for violating his airworthiness ticket by carrying fuel inside his aircraft.<sup>43</sup>

A DND-RCMP liaison team and command headquarters for the units involved in the exercises analysed them and concluded that:

1. RCMP aircraft were ill-suited to the task of aerial drug interdiction because they were too slow and lacking in equipment.
2. Fully interoperable communications systems were vital to the success of such operations.
3. Effective aerial interdiction in support of the RCMP required resources beyond those assigned to NORAD.
4. The legality of procedures outlined in various air orders concerning directed landings should be reviewed.
5. RCMP-DND-Customs members involved in the exercises were not aware of applicable Transport Canada and FAA air regulations.

Nonetheless, those who participated in the exercises concluded that the experience they gained would aid in the formulation of standing operating procedure for conducting aerial interdiction.<sup>44</sup>

Canadian and US statutes defined the role their military forces could play in enforcing civil law differently. Title 18 United States Code Section 1285 and its amendment, the Posse Comitatus Act, prohibited US forces from conducting law enforcement duties during peacetime that directly involved military personnel in search, arrest, or similar law enforcement activities. Exceptions to that act allowed US military support to civilian law enforcement, such as the exemption of National Guard troops in state service, but Canadian Forces were free to assist law enforcement agencies within Canada when acting at the request of such an agency. The NORAD Instruction governing counter-drug operations therefore mandated that a request to use the CF to augment Canadian law enforcement agencies be approved by the NDHQ-RCMP Liaison Officer. The Instruction further required that the Canadian NORAD Region ensure that Canadian law regarding the use of military forces to augment civilian law enforcement agencies was scrupulously observed.<sup>45</sup>

In accordance with an agreement between the DND and the RCMP, CF18s took an active part in NORAD’s drug interdiction effort. In a 1992 mission, they assisted in capturing an aircraft loaded with 3,919 kilograms of cocaine worth about \$2.7 billion. The suspect aircraft, a twin-turboprop Convair 580, departed from Colombia on November 18. USCS and NORAD monitored it during most of its flight, and Canadian Region NORAD tracked it as it approached Canadian airspace. Four Fighter Group CF18s were scrambled from Bagotville, Quebec, and Goose Bay, Labrador, to intercept the Convair as it entered the Canadian Air Defence Identification Zone. The CF18 pilots signalled the Convair to land at a Nova Scotia military base, but the suspect aircraft continued flying until it reached Casey, Quebec. There it was met by an RCMP interdiction team that had been carried to the site by four CF 10th Tactical Air Group CH136 Twin Huey helicopters. The RCMP seized the plane’s illicit cargo and arrested three Colombian passengers, the Canadian pilot, and two Canadians who arrived on the scene to refuel the Convair.<sup>46</sup>

The CF18 pilots were skilled at tracking smugglers who used a variety of subterfuges to avoid detection. Pilots ferrying drugs often failed to file flight plans, or they approached the coast at low altitudes in an attempt to exploit gaps in the radar coverage. The criminals also sought intelligence that would help them penetrate the continent’s air surveillance network. NORAD personnel countered these tactics by establishing relationships with local law enforcement agencies; by participating in ADNET, which enabled military members, law enforcement officials, and other drug enforcement agencies to share information; and by developing drug intelligence sources.<sup>47</sup>

Canada also participated in other international information-sharing initiatives. Project NORTHSTAR, a system for collecting and distributing drug enforcement information for the Canadian-US border region, became the principal means of communication between law enforcement agencies and military organizations from both countries. NORAD was a member of the NORTHSTAR executive committee, which met annually to draft bi-national, counter-drug policy for the border region. NORTHSTAR linked provincial-state and local law enforcement agencies in eight Canadian provinces and fourteen US states along the international boundary. It facilitated military support to anti-drug operations by prioritizing law enforcement requests for assistance when it received conflicting requests for military support.<sup>48</sup> Both the Canadian Forces and the RCMP received further intelligence support from the NORAD Tactical Intelligence Cell (NORTIC), which became operational at Cheyenne Mountain Air Force Station in February 1990.<sup>49</sup>

Diplomatic considerations shaped Canadian participation in NORAD counter-drug operations. The CF began serving in NORAD's Airborne AWACS program in 1979. CF members stationed at Tinker Air Force Base (AFB) Oklahoma and Elmendorf AFB Alaska flew on AWACS missions in North America. Canada also took part in the NATO AWACS program.<sup>50</sup> But a new situation arose with the inception of the counter-drug mission. The AWACS, one of NORAD's premier detection and monitoring assets, could serve as a valuable tool in interdicting drug trafficking. On an August 8, 1989 visit to NORAD HQ, the Minister of National Defence authorized Canadians assigned to NORAD, including those serving on AWACS, to support the command's counter-narcotics mission fully. The Defence Staff originally proposed that Canadians involved in counter-narcotics operations be authorized to participate in missions in Canadian, US, and international airspace "unless such flights are in support of a unilateral US action that involves the use of or show of force not supported by the Canadian government."<sup>51</sup> The proposal required any other missions to be specifically authorized by the Canadian and US governments.<sup>52</sup> JSS HQ then authorized HQ Tactical Air Command (TAC)<sup>53</sup> to employ CF members in anti-drug missions that met the above criteria:

TAC HQ needs to ensure that any sorties that will fly through foreign airspace do not have Canadians scheduled unless prior specific approval of the Canadian government and foreign government(s) concerned has been obtained. If circumstances arise involving [Canadians in a way] ... not ... supported by the Canadian government, TAC HQ needs to request specific authorization through AF/XOO [AF Operations], and if denied, replace any Canadian crewmembers with US personnel.<sup>54</sup>

As the Persian Gulf crisis began placing increasing demands on AWACS crews, the Canadian Defence Liaison requested the Canadian government to consider authorizing blanket clearance for NORAD Canadian AWACS crewmembers to participate in counter-narcotics missions "without geographical constraints."<sup>55</sup> The liaison officer noted that:

Missions are flown off the coast of Colombia and inside Colombian airspace with government of Colombia approval through the Colombian Ministry of Defence. For short notice requests, taskings may be approved by the Chief of the Colombian Air Force. While such missions are not automatically approved, cooperation has been very good and improving. When specifically asked, contact stated that no AWACS missions are covert.<sup>56</sup>

On June 26, 1991, the Department of External Affairs approved CF members flying on AWACS counter-narcotics missions in international airspace and in Colombian airspace when the over flights were handled like other state aircraft over flights, including the submission of a diplomatic note for each flight.<sup>57</sup> The note was to contain the statement: "Canadian Air Force personnel may be on board as integral members of the crew."<sup>58</sup>

Unlike the individually coordinated AWACS missions, day-to-day NORAD counter-drug operations entailed 24-hour-a-day surveillance of North American air space. NORAD Regulation 55-14, dated June 30, 1988, prescribed the criteria for identification of air traffic within the NORAD system. It required the appropriate NORAD region to identify all air objects (tracks) detected either entering or operating within the Air Defence Identification Zone (ADIZ) surrounding North America.<sup>59</sup> All aircraft entering or passing through it were required to file a flight plan with either Transport Canada or the FAA. The regulation allowed tracks originating within the NORAD air

defence area to be automatically classified as “friendly.”<sup>60</sup> NORAD operators categorized the tracks as “friendly,” “special,” or “hostile” by means of flight plan correlation, by electronic means, or by determining the classification of an unknown track by voice authentication, manoeuvres, or visual observation. With the exception of traffic originating in areas to the southeast of the US and from the western Polar Regions, all tracks traveling at a speed of 180 knots or less could be classified as “friendly.”<sup>61</sup>

Drug smugglers used two types of aircraft. For intercontinental flights and long-distance smuggling, they generally chose large, multi-engine planes with extended range capability and a capacity for internal fuel transfer. They preferred older models with a high payload capability, and with foreign or no registration. For internal smuggling runs, the planes most frequently employed in Canadian and US airspace were small and slow flying, either single-engine aircraft suited for short range, small payload missions, or multi-engine aircraft used for over-water destinations.<sup>62</sup>

To combat short-range, internal drug trafficking, NORAD proposed requiring identification of all aircraft regardless of the speed at which they traveled. The command directed that the new standard be imposed by September 1, 1989, in areas where, in cooperation with the USCS and FAA, quick implementation was feasible, and as soon as possible in other areas. The plan required not only close liaison with customs, intelligence, and air traffic control personnel, but improved equipment: “To more fully implement CINC NORAD guidance throughout the system, we must move toward the automation of air movement information service, upgrade R/SOCC [Region/Sector Operations Control Center] computers to handle additional flight plan data, and revise appropriate (NORAD-FAA-MOT [Ministry of Transport]) directives.”<sup>63</sup>

Implementing the reduced speed rule required increased support from Transport Canada and closer coordination between NORAD Sector Operations Control Centers and the FAA Air Route Traffic Control Center.<sup>64</sup>

NORAD sought to determine the extent of the impact the proposed changes in identification criteria would have on those responsible for identifying aircraft in North American airspace.<sup>65</sup> As of September 5, 1989, Transport Canada estimated that between 150 and 200 aircraft per day operated within the ADIZ at 180 knots or less.<sup>66</sup> Transport Canada, which was operating under a staff freeze, predicted that a change in the speed standard would place a heavier workload on its employees at that time. It did not expect to be able to increase its staff for another two to three years. It further noted that changing the ADIZ speed criteria would require an amendment to Canadian law through Parliament, a process that would require at least two years.<sup>67</sup> Fighter Group, Canada NORAD Region (FGCANR) and Transport Canada worked diligently to resolve the problems presented by the new regulation. In a November 13, 1989 memo to FGCANR, NORAD HQ commended those who had laboured to implement it successfully: “Your efforts to work out formal and informal agreements to provide flight plan and air movement data to region identification personnel are applauded. Also, please express NORAD’s appreciation to the air traffic control personnel who have and are going far beyond their normal job requirements to provide the sorely needed flight plan and air movement data.”<sup>68</sup>

On May 1, 1990, Minister of National Defence Bill McKnight announced that, effective May 3, 1990, the Canadian NORAD Region would begin directing all unidentified aircraft entering the Canadian ADIZ to land at a recognized point of entry to be cleared by Canadian Customs and the RCMP. He further noted that as of that date, any aircraft entering the Canadian ADIZ would be required to file a flight plan, a regulation that had previously applied only to aircraft traveling at speeds over 180 knots.<sup>69</sup>

Counter-drug operations became an official part of NORAD’s mission under the terms of the renewed NORAD Agreement effective May 12, 1991. In his April 30, 1991 note to the US State Department that formed an integral part of the agreement, Canada’s Ambassador to the US Derek Burney declared: “With respect to our common interest in maintaining effective surveillance and control of North American airspace, our two governments understand that such control includes the surveillance and monitoring of aircraft suspected of smuggling illegal drugs into North America.”<sup>70</sup> The agreement designated the first of NORAD’s primary objectives as “assisting each country



to safeguard the sovereignty of its airspace to include the surveillance and monitoring of aircraft suspected of smuggling illegal drugs into North America....<sup>71</sup> Addition of the anti-drug mission and recognition of its central role in the preservation of continental air sovereignty represented the only change to the NORAD Agreement that Canada and the US had entered into in 1981 and renewed without amendment in 1986.<sup>72</sup>

An October 23, 1991 white paper entitled “NORAD Defence Policy and Strategy Review” analysed changes in the strategic environment that had taken place over the preceding three years. It noted that the NORAD strategy in place at that time had been developed during the cold war and focused on a major aerospace attack perpetrated by the Soviet Union against North America. But the USSR no longer controlled Eastern Europe, and the dissolution of the Soviet Union itself was imminent.<sup>73</sup> The principal menace to continental security was shifting from a monolithic enemy to an aggregation of non-traditional threats. The white paper cited a September 17, 1991 address by Minister of National Defence Marcel Masse that acknowledged the “ill-defined, relatively uncertain situation” facing Canada as it attempted to reduce its budget deficit.<sup>74</sup> Nonetheless, Masse reaffirmed Canada’s commitment to participate with the US in the “defence of North America, the surveillance of our airspace, and strategic deterrence,” including, “in particular,” an intention to retain “the means for controlling all movements within our territory, in our airspace, in our territorial waters, and in the areas adjacent to them.”<sup>75</sup> NORAD’s air surveillance program remained one of the command’s principal tasks, but the focus had shifted from strategic defence to maintaining air sovereignty and suppressing drug trafficking. NORAD’s counter-drug mission thus became inextricably linked with the maintenance of Canadian air sovereignty, and it highlighted Canada’s importance in the air defence of the entire North American continent.

The counter-drug mission was readily integrated into NORAD’s command and control network. But the radars that once focused solely on detecting enemy bombers were employed to track aircraft carrying another lethal cargo—illicit drugs. Aircraft equipped with electronic detection equipment left their training base at North Bay to patrol Canada’s East and West Coasts, and CF18s kept suspect aircraft under surveillance until RCMP planes moved in to take them into custody. For 33 years, NORAD had kept a tireless watch over North America, providing warning of hostile incursions into its airspace. When faced with a new, asymmetrical threat, the NORAD partners developed policies and procedures that defined the working relationship between the two nations’ civil and military sectors more clearly. As a result, the Canadian Forces’ ability to prevent the compromise of Canada’s air sovereignty and protect its national security was enhanced.

.....  
**Notes**  
 .....

(Unless otherwise stated, all sources are unclassified. Only unclassified material was used from classified sources.)

1. “I can’t measure this month’s activity against last year’s when we weren’t in the business,” said General John Piotrowski, NORAD Commander-in-Chief, “but we’re committed to make a difference.” *Colorado Springs Gazette Telegraph*, September 17, 1989, A1.
2. Office of Alcohol, Drugs, and Dependency Issues, “Canada’s Drug Strategy,” 1998, 10.
3. Ibid.
4. John F. Burns, “Arrests Raise Canada’s Fears on Drug Smuggling,” *New York Times*, September 16, 1987, n. p.
5. Royal Canadian Mounted Police Criminal Intelligence Directorate, “Drug Situation Canada, 1999,” March 2000.
6. James E. Bowen, Operation Alliance, memorandum to Hugh J. Brian, Border Patrol, “Operation Northstar Draft Proposal,” November 2, 1988.
7. Lieutenant-General D. Huddleston, confidential memorandum to Commander, Maritime Command, et al., “National Drug Strategy, Deputy Chief of the Defence Staff (DCDS) Guidance for Canadian Forces Support of Anti-Drug Operations,” December 6, 1989.
8. Memorandum by Major Stevens, “Joint Surveillance System,” December 9, 1976.
9. The Canada East and Canada West ROCCs were both located at North Bay, Ontario.
10. Memorandum, “Program Memorandum on the Joint Surveillance System,” May 14, 1976.
11. Ibid.

12. History (S/NFIWINTEUFOUOIDECL OADR), “History of Space Command ADCOM,” January-December 1983, 111–12; House of Commons, Standing Committee on External Affairs and National Defence, Report: “NORAD 1986,” February 1986, 77.
13. *Ibid.*, 28.
14. Daniel C. Dose, “NORAD: A New Look,” in *National Security Series* (Kingston, ON: Queen’s University Centre for International Relations, 1983), 40.
15. Elements of the modernization program included the North Warning System, over-the-horizon backscatter (OTH-B) radars, coastal radars, the construction of landing strips in forward operating locations, and the upgrading of other airfields to accommodate AWACS aircraft.
16. House of Commons, Standing Committee on External Affairs and National Defence, Report: “NORAD 1986,” February 1986, 30.
17. Undated memorandum by NORAD, “Counter-drug Operations.”
18. Plan (NORAD SECRETIDECL OADR), “CINC NORAD Counter-narcotics Campaign Plan: SNOWFENCE 90,” October 15, 1989, 12.
19. History (SECRET/RECLANUS/ DECL OADR), “History of North American Aerospace Defence Command,” January-December 1989, 250.
20. Jim Shaw, Background Paper, J5D, “CINC NORAD’s Anti-Drug Campaign Plan (SNOWFENCE 90),” October 25, 1989.
21. Plan (NORAD SECRETIDECL OADR), “CINC NORAD Counter-narcotics Campaign Plan: SNOWFENCE 90,” October 15, 1989, 2.
22. *Ibid.*, 30.
23. *Ibid.*, 3, 24, 26–27.
24. *Ibid.*, 28.
25. *Ibid.*, 21.
26. *Ibid.*
27. Brigadier-General Harold B. Adams, USAF, Director, NORAD Planning Staff, memorandum to CINC, “SNOWFENCE 92, CINCNOAD Counter-Drug Campaign Plan,” November 26, 1991.
28. General John L. Piotrowski, NORAD HQ, Message to General Manson, NDHQ, “Personal for General Manson,” March 17, 1989.
29. Ric Dolphin, Dan Burke, and Ross Laver, “Flight into Danger,” *Maclean’s*, April 3, 1989, 13. Canadian officials charged the occupants of the aircraft, Diego Jose Canuza of Miami, and Hector Chrisostomo Sedeno of Colombia, with several minor crimes, including entering Canada illegally and bringing a stolen aircraft into Canada. They pleaded guilty to all charges and paid their \$23,000 fine from an estimated \$20,000 to \$30,000 in American currency they had in their possession when arrested.
30. *Ibid.*, 12–13.
31. *Ibid.*
32. Peeter Kopvillem, et al., “Shuttle to Jail,” *Maclean’s*, November 27, 1989, 14–15.
33. NORAD HQ (NORAD CONFIDENTIALJDECL OADR), memorandum to Joint Staff, Washington, DC, SITREP, May 7, 1989.
34. Kopvillem, et al., 14–15.
35. Confidential Memorandum from NORAD HQ to NDHQ, North Bay, “NORAD Anti-drug Operation,” August 7, 1989.
36. Major-General E. I. Patrick, Director, NORAD Combat Operations, confidential memorandum to NSA, et al., “CINC Question on DAY TRIPPER,” n.d.; Undated Point Paper (NORAD CONFIDENTIALJDECL OADR), NORAD, “Point Paper on Operation Day Tripper.”
37. John G. Underwood, US Customs-NORAD Liaison Officer, memorandum to Major-General E. I. Patrick, “Operation Day Tripper,” August 4, 1989.
38. Confidential memorandum from NORAD HQ to NDHQ, Ottawa, “NORAD Anti-Drug Operations,” August 7, 1989; Memorandum from NDHQ, Ottawa to NORAD HQ, “NORAD Anti-Drug Operation: Utilization of DND Facilities,” August 11, 1989.
39. *Ibid.*
40. Undated Point Paper (NORAD CONFIDENTIAUDECL OADR), “Point Paper on Operation Day Tripper.”
41. Confidential memorandum from NDHQ, Ottawa to NORAD HQ “NORAD Anti-Drug Operation: Utilization of DND Facilities,” August 11, 1989.
42. Confidential memorandum from NDHQ, Ottawa to AIRCOM, Winnipeg, “Anti-drug Op OWL 1: Utilization of CFB Shearwater Facilities,” December 5, 1989.
43. Briefing, “Presentation to maritime component command (MCC) 1/90, DND Drug Interdiction,” May 1990.

44. Ibid.
45. N1 IO-24 (SIRELCANUSIDECL OADR), "NORAD Counter-drug Operations," December 2, 1996, 9–10.
46. David Hughes, "CF18s. NORAD Shift to Drug Interdiction," *Aviation Week & Space Technology*, August 2, 1993, 48.
47. Ibid.
48. D. Collings, NJ3DX, "Point Paper on Canada-US Border Counter-drug Operations," June 23, 1992.
49. "NORAD Tactical Intelligence Cell (NORTIC) After Action Report (SECRET) Executive Summary for December 1, 1989 to August 1, 1990.
50. Patrick J. Todd, "Canadian Involvement with AWACS," NCOS Project, January 5, 1989.
51. Secret message from NDHQ, Ottawa, to HQ USAF, "Use of Canadian Co-Manning Crew Members on AWACS Counter-narcotics Missions," October 5, 1990.
52. Ibid.
53. At that time, TAC served as NORAD's force provider for AWACS.
54. Memorandum from HQ USAF to NDHQ, Ottawa, "Use of Canadian Co-Manning Crew Members on AWACS Sorties," October 23, 1990.
55. Confidential message from Canadian Defence Liaison Staff (CDLS), Washington, DC, to NDHQ, Ottawa, "AWACS Co-Manning Issues - Counter-narcotics," January 16, 1991.
56. Ibid.
57. Letter (SECRET), Mark J. Moher, Director General, International Security, Arms Control, and Conference for Security and Cooperation Europe (CSCE), Affairs Bureau, External Affairs, and International Trade Canada, to Stephen W. Buck, Minister-Counsellor for Political Affairs, US Embassy, Ottawa, June 26, 1991.
58. Secret message from NORAD HQ to NDHQ, Ottawa, "Canadian Co-Manning Crew Members on AWACS CN Missions," June 28, 1991.
59. The ADIZ established in Canada on May 5, 1988, and in the US on June 30, 1988, replaced the Distant Early Warning Identification Zone (DEWIZ) with an Air Defence Identification Zone extending from the outer limits of long-range radar coverage to 60 nautical miles south of the Arctic region short-range radar sites, expanded the Canadian East Coast ADIZ to meet the ADIZ surrounding the North Warning System, extended Canada's West Coast ADIZ to connect it with the Alaskan ADIZ, eliminated the domestic Canadian ADIZ, and abolished the ADIZ on the Canadian-US border. History (NORAD SECRETIDECL OADR), "History of North American Aerospace Defence Command," January-December 1988, 82–83.
60. NR55-14, June 30, 1988; OPOD (NORAD SECRETIDECL OADR), "CINCNORD OPOD 3199-93," September 1, 1993, iv.
61. NR55-14, "Identification of Air Traffic," 3.
62. Briefing For official Use Only (FOUO), NORTIC, "Drug Smuggling Aircraft and Tactics," November 1, 1989; Operation Order (CONFIDENTIAL), "Air Command Counter-Drug Operation Order," April 1, 1994, 6.
63. Message from NORAD HQ to ANR, et al., "Identification of Air Traffic in Support of Anti-Drug Operations," August 8, 1989.
64. Memorandum, "Identification of Air Traffic Below 180 Knots (Draft)," August 18, 1989.
65. Undated memorandum, NORAD HQ to HQ FAA, "Impact Estimate, Identification Speed Criterion."
66. Message, ARU, Ottawa to NORAD HQ, "Identification Speed Criterion Impact," September 5, 1989.
67. Message, ARU, Ottawa to NORAD HQ, "Speed Criterion," September 13, 1989.
68. Memorandum (NORAD CONFIDENTIALIREL CANUSIDECLAS OADR), NORAD HQ to FGCANR, "Counter-narcotics Operations," November 13, 1989.
69. Canada, Department of National Defence, News Release, "McKnight Announces Directed Landings Policy," May 1, 1990.
70. 1991 NORAD Agreement.
71. "Terms of Reference, Commander in Chief, North American Aerospace Defence Command," n.d.
72. "Point Paper on NORAD Agreement Renewal," April 30, 1991.
73. The Russian Parliament ratified President Boris Yeltsin's proposal to establish a new commonwealth of independent states open to all former members of the Soviet Union on December 12, 1991.
74. White Paper, ANSER, "NORAD Defence Policy and Strategy Review," October 23, 1991.
75. Ibid.

### ***Dixie Dysart***

*Dr. Marie Dixie Dysart, PhD, is currently the Deputy Director of the United States Air Force, Air Force Historical Research Agency located at Maxwell, Air Force Base, Alabama.*

## Chapter 10

## Canadian Hornets Over Kosovo: A Small Part of a Future Model for Air Power?

*Paul Johnston*

For generations, air power theorists have dreamt of an independent war winning role. Now, in the recent experience of Operation ALLIED FORCE, the 1998–99 North Atlantic Treaty Organization (NATO) air campaign over Yugoslavia,<sup>1</sup> we may just have stumbled onto the model for such a thing. Indeed, perhaps it is possible to perceive in that operation the outlines of a whole new category of offensive air power. This new category would be, like so many air power theories in so many wars, dedicated to victory independent of ground forces. However, such a new strategy could turn out to be quite different from past theory because of a focus on tactical rather than strategic targets. How could such a development come to pass? Two new factors came to the fore in ALLIED FORCE. First of all, for the first time ever a war began with a specific and overt foreswearing of the commitment of ground forces. However, while widely remarked upon, that is only the first unique feature of ALLIED FORCE. Less noticed is a trend towards restricting the target list considered legitimate in a strategic bombing campaign. Extrapolating and putting those two trends together raises the novel prospect of an air campaign prosecuted independently of any ground effort, but aimed at enemy tactical rather than strategic targets. Such an emphasis on tactical targeting is highly contentious. For instance, the air campaign's operational commander, United States Air Force (USAF) Lieutenant-General Michael Short, was so frustrated with the limitations on the strategic targeting and the pressure to concentrate on tactical targets in Kosovo that he now refuses to even call it a campaign. Rather, he maintains that it was simply a "random bombing of military targets."<sup>2</sup> In fact, ambivalence surrounds the whole campaign: the larger diplomacy behind its origins, the ruling out of a ground campaign, and the efficacy of air power alone as a war winner. This paper will not focus on any of these larger debates about the war's origins, purpose, or resolution.<sup>3</sup> Rather, it will focus on what is perhaps for airmen in general and Canadian airmen in particular the most contentious debate of the war, which is the nature of the air war that NATO chose to fight over Yugoslavia. To do this, some background is necessary.

### Douhet's Holy Grail?

Since at least the First World War, fervent believers in air power have been arguing that wars should be won not by massed armies or fleets, but rather by massed air power. Nowadays, intellectual credit for this argument is usually accorded to the Italian soldier/pilot and fervent air power propagandist, Giulio Douhet.<sup>4</sup> Douhet's vision, of course, was to use air power not on the battlefield, but to strike directly at the enemy homeland, in particular the enemy capital.<sup>5</sup> This, Douhet believed, would result in damage no nation could sustain, forcing it to sue for peace. In Douhet's view, the only roles left for armies would be defensive actions along the nation's frontiers while the air forces fought the decisive battle, and perhaps, occupation of the enemy homeland after the surrender.

Despite repeated attempts at "strategic" applications of air power in this way, the efficacy of such efforts has remained hotly contested.<sup>6</sup> The Germans tried it in the Battle of Britain and were forced to abandon the effort. The Allies tried it in reverse from 1943 on, but a costly land invasion of the continent proved necessary anyway. Similarly, down to the Gulf War of 1990–91, a ground operation always seemed to play the conclusive or at least concluding part. Now, finally, in Operation ALLIED FORCE we have a case in which air power alone was used, and the enemy state did indeed eventually capitulate. Even the eminent British military historian John Keegan set aside his previous doubts about the efficacy of air power in an independent role and concluded, "This was a victory for air power."<sup>7</sup> At long last, is this Douhet's holy grail: a victory due to air bombardment of the enemy homeland alone?

## ...Or Air Power's Failure Over Kosovo?

More discordant voices, however, have also been raised against any neo-Douhetian triumphalism. Initially, NATO claimed to have degraded 30 per cent of Yugoslav heavy weapons in Kosovo.<sup>8</sup> The prestigious *Jane's Defence Weekly* summarized the widely circulated claims that by the end of the war the Alliance had struck some 270 armoured personnel carriers and approximately 150 tanks.<sup>9</sup> It now appears, however, that the Serbs made widespread use of deception efforts, including impressive numbers of dummy artillery pieces and armoured vehicles, resulting in far fewer kills of actual Yugoslav military hardware.<sup>10</sup> Some critics have claimed that only 12 destroyed armoured personnel carriers have been found in Kosovo.<sup>11</sup> Press accounts of the initial after-action report of the Royal Air Force (RAF) for operation ALLIED FORCE have gone so far as to claim that there is "clear evidence that the 11-week NATO bombing campaign did almost no damage to Serb fielded forces in Kosovo."<sup>12</sup> NATO has disputed these claims, arguing that their own post-mortem concluded that the destruction or damage in Kosovo of at least 93 tanks and 153 armoured personnel carriers could be confirmed.<sup>13</sup> How many tanks did NATO really destroy?<sup>14</sup>

## Two Separate Air Campaigns

Of course, all of this talk applies to just one aspect of the air war—the efforts to destroy Yugoslav ground forces field deployed in Kosovo. The Douhetian reply to all of this talk about NATO ineffectiveness in destroying Yugoslav tactical forces would doubtless be to argue that it is irrelevant because the decisive issue was the strategic campaign against Serbia proper. Indeed, *Jane's* quotes senior Royal Air Force sources as opining that Yugoslav Army losses in Kosovo were "largely academic. The decisive factor that forced Milosevic's hand was the rapidly mounting material and political damage being inflicted on his regime by the NATO air campaign."<sup>15</sup> This was certainly the view of General Short, who publicly denigrated what he called "tank plinking" in Kosovo.<sup>16</sup> Spoken like a true Douhetist. Doubtless, John Warden<sup>17</sup> would agree. This highlights the fact that:

ALLIED FORCE actually consisted of two—largely separate—air campaigns: a strategic one against all of Yugoslavia and a tactical one within Kosovo itself. The strategic campaign was relatively orthodox (albeit spasmodic). National command and control (both military and governmental) and national infrastructure (in particular fuel, bridges and electric power) featured prominently in the targets struck, and clearly the aim was to hurt the Milosevic regime until it would concede—classic air coercion theory.<sup>18</sup>

This is how the campaign began, with the first air strikes of the campaign on the night of 24 March against a set of 50 carefully screened and agreed targets in the Federal Republic of Yugoslavia. Mostly, the targets were components of the Yugoslav integrated air defence system. While this was an essential first step to breaking into Yugoslav airspace for any sort of air campaign, the initial aim appears to have been less preparation for a long campaign than to deliver a short sharp response to the collapse of talks at Rambouillet. Only 214 aircraft were committed—112 American, 12 Canadian, and 90 other Allied—and the prevailing belief in NATO apparently was that a night or two of strikes would convince President Milosevic to concede.<sup>19</sup> As we all know, it did not.

NATO's initial gamble having failed, more aircraft were committed to the operation, and the target set was broadened. On 28 March, United States (US) Secretary of State Madeleine Albright publicly announced the new approach to Milosevic of "making sure that he pays a very heavy price."<sup>20</sup> A renewed air plan was drawn up, with a two-pronged approach: attacks against strategic targets, and attacks against tactical targets in Kosovo itself, in particular, those Yugoslav forces conducting the ethnic cleansing that had suddenly produced a massive wave of refugees. A few days later, on 3 April, the first airstrikes were flown against central Belgrade.

The first target set was termed "fixed targets of unique strategic value." This included all of the classic Douhetian sort of targets: national command and control; military facilities, such as barracks and depots; and infrastructure, such as bridges and oil refineries. The second target set included the Yugoslav fielded forces in Kosovo, such as the actual Yugoslav army elements deployed there, their command and control machinery, and their supplies and concentration areas. In the history of airpower, this second effort was more unusual. Here was an attempt to use air power alone, without any associated ground combat, to stop enemy ground force operations (i.e., Yugoslav ethnic



cleansing) or at least to destroy enemy ground forces. This last aim was intended not to soften up the enemy for a subsequent ground offensive, but to convince him to retire *even without a ground offensive*.

Now that is novel, perhaps unprecedented. It should also be noted that most of the disputes about air power in ALLIED FORCE centre upon this effort against tactical forces in Kosovo. Speaking of this portion of the air war, CF18 pilot Major Todd Balfe said, “It was a horrible mission and we hated it.”<sup>21</sup> Most airmen sided with their operational commander, believing that air power is best used “going after the head of the snake.”<sup>22</sup>

Regardless, this dual track strategy is how the war was fought, with mounting anxiety, as more and more aircraft were committed to the campaign, and the sortie rate and target list slowly expanded night after night. Tension between the two approaches also grew, exemplified by tension between NATO’s Supreme Allied Commander Europe, General Wesley Clark—an Army officer—and the Air Commander, Lieutenant-General Short. Clark wanted less strategic bombing and more emphasis on tactical operations in Kosovo; Short, on classic Douhetian grounds, considered the effort inside Kosovo itself at best subsidiary and at worst a dangerous diversion from the “decisive” strategic campaign.<sup>23</sup>

In this environment, operations came to be flown round the clock, and the weather (which had been poor in March and early April) improved. In late April, Canada augmented our own contribution with a further six CF18s, bringing our total to eighteen. Finally, on 3 April, the cumulative pressure told and probably to the immense relief of everyone on the NATO side, Milosevic suddenly agreed to accept NATO’s terms. After a stutter step over the details of implementation of a cease-fire, on 10 April the air campaign was formally ceased.

## Tactical Targeting

While any Douhetian crowing might be premature,<sup>24</sup> the critics who argue that air power failed are being unfair. ALLIED FORCE was no test of Allied theory and doctrine for air power. One of the key doctrinal concepts of recent years has been “synchronicity,” which goes beyond mere “jointness.” Ground and air efforts should be synchronized to maximize the effectiveness of each. For instance, if the ground front is largely static and the enemy is conducting little movement, it is difficult for air power to strike enemy forces effectively, as they are all dispersed and hidden. But when friendly ground forces maintain offensive pressure on an enemy they force him to move reserves, reinforcements, and resources, all of which make good targets for air attack. Think of the “Highway of Death” out of Kuwait or the Falaise Gap in Normandy. Conversely, the interdiction from the air of those enemy assets greatly facilitates friendly ground manoeuvre by weakening the enemy and undermining his counter-manoeuve. Thus, when working together, both the ground and air efforts become more effective than either would be alone. While some have suggested that the NATO ground forces on Kosovo’s borders<sup>25</sup> constituted an implicit threat and had an effect on President Milosevic, it would be stretching things to suggest that there was overmuch synchronicity between NATO ground and air forces in operation ALLIED FORCE. Others have suggested that the Kosovo Liberation Army’s efforts on the ground were what finally flushed out the Yugoslav Army.<sup>26</sup> It is unclear, however, that the Kosovar guerrillas were capable of such an effort, or indeed, that there was any real rise in the tempo of their efforts at all. On balance, it seems safe to say that this air campaign was fought with no complementing ground effort.

The importance of this principle extends down to the lowest levels. Consider the case of the Apache helicopter gunships sent to Albania part-way through the campaign. The media made much hay out of the failure of these “tank hunters” to immediately begin destroying Yugoslav armour. But tank-hunting helicopters have always been meant to move into ambush sites on open flanks or loiter behind the lead ground elements, only popping up to fire and then ducking back down again. Breaking into enemy air space with helicopters for the purpose of destroying dispersed and hidden armour in an air-only campaign was never envisioned in anyone’s doctrine; hence, the Apaches’ apparent failure.

The simple truth is that no one in any Western air force planned to be conducting an air campaign like this, and for good reason. For years, Western military doctrine has stressed jointness,

synchronicity, and top-down campaign planning. Air attacks meant to kill individual tanks field deployed deep in enemy territory were never envisioned being mounted alone, completely separate from an integrated ground campaign.<sup>27</sup> Yet this is exactly what Western militaries wound up attempting over Kosovo. Few of the classic military schools of thought appear to have been happy with this state of affairs. The Douhetists, such as General Short, fumed that operations against tactical targets in Kosovo were a diversion from the decisive strategic targets. The more mainstream believers in jointness, such as General Clark and most pundits, including the likes of John Keegan, suggested that foregoing fully joint operations that included a ground component was folly, and contrary to venerable principles of war. Either or both of those schools of thought may be right, but what they both miss is that a limited air-only campaign may be exactly what the politicians will ask NATO air forces to do again, even if it is recognized that doing so is not militarily optimal.

## Categories Of Air Power

Insofar as Western air doctrines have considered the independent use of air power, it has been envisioned as strategic attack. Tactical operations have been seen as a joint undertaking, meant to complement action by other services, either by interdiction or close air support (CAS). Classically, the categories of air offensive action have been offensive counter-air (OCA), strategic attack, and counter-land (or counter-sea).<sup>28</sup> The OCA is meant to gain and maintain air superiority, an essential prerequisite to any other operations by either air or surface forces, but not a positive aim in and of itself. As regards defeating an enemy, this leaves two categories of air action: strategic attack, which is to say the classic Douhetian role, and counter-land operations. The latter can be defined as:

Operations conducted to attain and maintain a desired degree of superiority over surface operations by the destruction, disrupting, delaying, diverting, or other neutralizing of enemy forces. The main objectives of counter-land operations are to dominate the surface environment and prevent the opponent from doing the same.<sup>29</sup>

Provisional US doctrine goes on to say that: “Counter-land can either be accomplished in direct or indirect support of large-scale ground operations, or can be carried out with minimal or no friendly ground forces in the area.”<sup>30</sup>

Notwithstanding those brave words about “no friendly ground forces,” a reading of current doctrine suggests that attempting counter-land operations by air power alone, except as a preparatory phase before a land offensive, has never really been envisioned. This impression is reinforced by the fact that doctrine specifies only two types of counter-land operations: air interdiction (AI) and CAS. Clearly, CAS is applicable only in cases where friendly ground forces are present, but even AI is defined as “operations conducted to destroy, neutralize, or delay the enemy’s military potential before it can be brought to bear effectively against friendly forces.”<sup>31</sup> The caveat “before it can be brought to bear effectively against friendly forces” would seem to indicate that AI is anticipated to be part of a joint campaign with friendly ground operations.

Canadian doctrine is explicit: Counter-surface operations<sup>32</sup> involve the use of aerospace power, *in cooperation with friendly surface and sub-surface forces* to deter, contain or defeat the enemy’s land and maritime forces.<sup>33</sup> The independent use of air power is specifically defined as strategic offensive operations (i.e., Douhetian).

In other words, there has been no real consideration of the independent use of air power against tactical level enemy ground forces, except perhaps as just one part of a strategic campaign, or as a preparatory phase to a ground campaign. However, that combination—*independent but tactical air operations*—is precisely the model suggested by the experience of the recent NATO air operations over Kosovo. This raises the novel prospect of using air power alone to compel the withdrawal of an enemy force. What might such operations look like, and what considerations might they involve?

## Independent Air Power at the Tactical Level?

Imagine a scenario in which an aggressor invades a small province that borders no friendly or allied state. Western statesmen might want to see such an aggression reversed, and yet be reluctant

not only to commit ground forces but also to unleash a strategic air campaign against the aggressor's homeland. That combination of no ground offensive and no strategic air offensive may represent a military worst case, but this is precisely the scenario suggested by the Kosovo experience, for good or ill. Certainly, trends in both those directions are discernible in the modern world.

The growing aversion to ground action and its attendant risk of casualties is clear and widely remarked upon.<sup>34</sup> As yet there is much less evidence of a clear trend away from strategic air attack, but that too may yet come. The legality (not to say morality) of the strategic campaign against the Federal Republic of Yugoslavia has set off a firestorm of controversy, and indeed some legal actions.<sup>35</sup> The inevitable effect of such campaigns on the civil populace attracts growing attention and concern, as do newer concerns about environmental effects. But quite aside from all of this, there is the historical precedent of the Korean War, when strategic air attacks were ruled out for higher level geopolitical reasons. Given all of this, who can say with assurance that Western air forces will never be asked to perform an air operation with no strategic attack component, even if such an option is recognized as being less than the military ideal?

What does all of this suggest? Perhaps it suggests a new model air campaign that the politicians will ask for in the future. The *sine qua non* of these new model operations would be a political decision to forego at the outset any prospect of either friendly ground operations or strategic attack on the enemy homeland, presumably because of political considerations. Furthermore, ground operations might not only be ruled out by the political leadership, but in the worst case there might be no friendly ground forces on the borders of the target area at all. The politically mandated aim would then be to destroy the enemy's military forces in the target area, to punish the enemy, and thereby to force him to withdraw. This is precisely the pattern suggested by the experience of ALLIED FORCE.

### **A Precedent: "Decisive Halt"**

A relatively new idea that to a certain extent provides a precedent for this sort of thing is the concept of "decisive halt" operations, also sometimes called "rapid halt."<sup>36</sup> Decisive halt is the argument that modern capabilities, in particular precision guided munitions (PGMs), could allow air power alone to halt an invading aggressor, especially a mechanized one. This, the argument goes, would stop the aggressor's offensive in its tracks and buy time for friendly forces to be assembled. This is a new idea because it obviates the need for ground forces in theatre, at least initially. Also, given the strategic mobility of air power, decisive/rapid halt could allow intervention in an aggression anywhere in the world on extremely short notice.

The independent application of air power against tactical targets on a battlefield is probably not something that Douhet would have approved, and traditionally, air power theorists have equated independent air power with strategic bombing. Decisive halt is thus innovative in its vision of air power being applied independently of friendly ground forces, and against tactical targets rather than strategic targets. However, as the very word "halt" implies, in most talk of decisive halt is the idea that these operations would only halt the aggressor, buying time for friendly forces to be assembled. An eventual friendly ground offensive, it would seem, is still required by decisive halt theory.

What the nascent pattern of Kosovo suggests, however, is the possibility of attempting to go decisive halt one better, using air power against tactical targets not just to halt an aggressor but to force his withdrawal, or to borrow a concept from manoeuvre warfare theory, to dislocate him.<sup>37</sup> We might call this a "decisive dislocation" operation.

### **The Limitations of Jointness?**

With this in mind, it may be wise for Western air forces to broaden their skill sets a bit. Quite frankly, a major high intensity war of the sort Western joint war fighting doctrine was designed for is unlikely in the foreseeable future. While that may not herald the end of warfare as we have known it, it is true that over the next decade or two, Western militaries are more likely to be asked to do something like ALLIED FORCE than to fight a major conventional war.<sup>38</sup> This will be true especially if our politicians conclude that ALLIED FORCE worked, and got them what they wanted.

If one accepts this proposition—that Western politicians are likely to try the application of force at a distance by air power alone again—then surely we ought to think about how best to do that, a certain professional distaste for such diversion of air power to tactical targets notwithstanding. Currently, doctrine stresses either jointness or independent strategic attack. But what if it is to be neither of those? What if we are ordered to destroy individual armoured vehicles in a remote and inaccessible region by air power alone in an operation that has no ground component and no strategic attack? What indeed? As we have just seen in Kosovo, doing so is a very difficult proposition. It is a proposition that raises all sorts of questions. PGMs are clearly the answer to many of those questions, but ultimately PGMs are just a tool. We will need doctrine for the best way to utilize those tools. What sort of targets should be struck first? Are tanks or artillery more important? How about bridges or other such choke points in the area? Are there any combinations of target sets that might have synergistic effects? These are the sorts of questions that need hard answers. Without such hard answers, do we have doctrine for the mounting of an air campaign designed, in complete isolation from any theatre campaign with a ground component, to destroy discrete, tactical level, enemy ground forces dispersed in the field? Do we, in short, have doctrine for *decisive dislocation*?

Perhaps we should begin thinking about this. Doing so need not displace the current, absolutely sound emphasis on jointness, nor need it be a repudiation of the advantages of true strategic attack. Perhaps, after due consideration, we might even conclude that attempting such independent counter-land operations really is folly, and unworkable, except perhaps as part of a larger strategic campaign. That too would be a worthwhile result, because the politicians are likely to ask for this again, and next time they may not want to allow a wider strategic air campaign.

This is not just a question for the US Air Force. With their new PGM capability, our CF18s were an integral part of both aspects of the air campaign in ALLIED FORCE: the strategic campaign against Serbia and the tactical campaign inside Kosovo. Do we wish to have any preferences over how our air power is used in the future? How might we need to go about a tactical campaign in the future?

.....

**Notes**

1. The Federal Republic of Yugoslavia (FRY) is a federal state consisting of the two republics of Serbia and Montenegro. Throughout this paper, “Yugoslavia” will denote the federal level of government, of which Slobodan Milosevic is President. “Serbia” will be used more loosely to refer both to the republican level of government, which was responsible for the police and paramilitary security forces in Kosovo, and to Yugoslav government elements overall, since Serbs dominate the rump FRY.
2. General Michael C. Short, interview with PBS, the War in Europe series, n.d, <http://www.pbs.org/wgbh/pages/frontline/shows/kosovo/interviews/short.html> (accessed June 24, 2010).
3. Perhaps the best introduction to the general Kosovo question is in Noel Malcolm, *A Short History of Kosovo* (New York: New York University Press, 1998). An account of the events that precipitated the Rambouillet peace conference and NATO’s resulting air campaign can be found in Greg Campbell, *The Road to Kosovo* (Boulder, CO: Westview Press, 2000).
4. Almost certainly, the RAF did not in fact derive its doctrine from Douhet, but rather independently developed what were essentially the same ideas. Robin Higham, *The Military Intellectuals in Britain: 1918–1939* (New Brunswick, NJ: Rutgers University Press, 1966), 257–59. The United States Army Air Forces, on the other hand, appear to have been more directly influenced by early translations of Douhet in use at the Air Corps Tactical School; see, for instance, Michael S. Sherry, *The Rise of American Air Power: The Creation of Armageddon* (New Haven: Yale University Press, 1987).
5. Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (New York: Coward-McCann, 1942), in particular chapter 1 of book 1, 3–33, and chapter 4 of book 2, 187–207.
6. See in particular the recent book by Robert A. Pape, *Bombing to Win: Air Power and Coercion in War* (Ithaca: Cornell University Press, 1996), which examines the Second World War, Korea, Vietnam, and Iraq, and concludes flatly that “strategic bombing does not work.” *Ibid.*, 314. An opposing view is given by John Warden (see note 17 below) in “Success in Modern War: A Response to Robert Pape’s *Bombing to Win*” *Security Studies* 7, Issue 2, Winter 1997.
7. John Keegan, “So the Bomber Got Through After All,” *London Daily Telegraph*, June 4, 1999, 28.
8. Nick Cook, “Special Report: War of Extremes,” *Jane’s Defence Weekly*, July 7, 1999, 20–23.
9. *Ibid.*
10. *Ibid.*

11. Richard J. Newman, "The Bombs that Failed in Kosovo," *U.S. News and World Report*, September 20, 1999, 29.
12. *The Sunday Telegraph*, July 25, 1999.
13. William Drozdiak, "Kosovo Success Confirmed, NATO Chief Says," *The Washington Post*, September 17, 1999, 22.
14. Anthony H. Cordesman, "The Lessons and Non-Lessons of the Air and Missile Campaign in Kosovo" (Washington: Center for Strategic and International Studies, 1999), <http://csis.org/publication/lessons-and-non-lessons-air-and-missile-campaign-kosovo> (accessed June 24, 2010) This article contains some interesting food for thought, arguing that NATO's claims are largely unsupported.
15. Cook, 23.
16. John A. Tirpak, "Washington Watch: Short's View of the Air Campaign," *airforce-magazine.com* 82, no. 9, September 1999, <http://www.airforcemagazine.com/MagazineArchive/Pages/1999/September%201999/0999watch.aspx> (accessed June 24, 2010).
17. John Warden, *The Air Campaign* (New York: Pergamon-Brassey's, 1989). USAF Colonel (ret'd) John Warden is a famous advocate of simultaneous strategic air attacks designed to paralyze an enemy state, an argument he elaborated in "Employing Air Power in the Twenty-first Century," in *The Future of Air Power in the Aftermath of the Gulf War*, eds. R. H. Schultz and R. L. Pfaltzgraff (Maxwell AFB: Air University Press, 1992), 57–82.
18. For an excellent (albeit contentious) scholarly overview of air coercion theory, see Pape.
19. "The Kosovo Campaign: Airpower Made it Work/Operation Allied Force Begins," An Air Force Association Special Report, Air Force Association, 1999. Available online at [http://www.afa.org/media/reports/allied\\_force.asp](http://www.afa.org/media/reports/allied_force.asp) (accessed May 14, 2010).
20. Madeleine Albright, interview on *Face the Nation*, CBS Television, March 28, 1999.
21. Bruce Wallace, "Canadian Aces over Kosovo," *Macleans*, March 27, 2000, 18–24.
22. *Ibid.*
23. Dana Priest, "The Battle Inside Headquarters: Tension Grew with Divide Over Strategy," *Washington Post*, September 21, 1999, AD1. This debate is rather reminiscent of the Second World War arguments about diverting the strategic bombers to support for OVERLORD.
24. It remains—to this author at least—unclear exactly what convinced President Milosevic to concede and allow NATO forces into Kosovo.
25. In both the Former Yugoslav Republic of Macedonia and in Albania.
26. Bryan Bender, "KLA Action Fuelled NATO Victory," *Jane's Defence Weekly*, June 16, 1999, 5.
27. For a thoughtful examination of this, see Peter F. Herry, "The Plight of Joint Doctrine After Kosovo," *Joint Forces Quarterly*, Summer, 1999.
28. For instance, US Air Force doctrine, which arguably sets the tone for all Western air forces, defines no less than 17 "functions" for air power, but the major ones are counter-air, counter-land / sea and strategic attack. Air Force Basic Doctrine (USAF: AFDD 1, P 45 000/AF-000, 1997), 83.
29. AFDD 1, 48.
30. "Air Warfare," USAF AFDD 2-1 First Draft, June 1998, 12.
31. Canada, Department of National Defence (DND), Defence Terminology Bank, Record #3343, <http://terminology.mil.ca/term-eng.asp> (accessed June 24, 2010).
32. A Canadian term meant to encompass both counter-land and counter-sea air operations.
33. Canada, DND, *Out of the Sun: Aerospace Doctrine for the Canadian Forces*, B-GA-400-000/AF-000, 1997, 83, emphasis added.
34. See, for example, Edward N. Luttwak, "A Post-Heroic Military Policy," *Foreign Affairs* 75, no.4, July/August 1996, 33–44. Luttwak writes that "[p]olitical constraints make ground forces effectively unavailable," and discusses the increasing attractiveness of air power to Western politicians.
35. For an examination of this question, see Albert Legault, "NATO Intervention in Kosovo: The Legal Context," *Canadian Military Journal*, (Spring 2000): 63–66.
36. The concept of the decisive halt is described in AFDD I, 42–43, but goes back at least to the USAF sponsored RAND study "The New Calculus: Analysing Airpower's Changing Role in Joint Theatre Campaigns" (Santa Monica: RAND, 1993). For a recent sample of some optimistic discussion of decisive halt's possibilities, see D. A. Ochmanek, et al, "Find, Hit, Win," *Air Force Magazine*, April 1999, 50–59.
37. For more on the concept of "dislocation" in manoeuvre warfare theory, see Robert Leonhard, *The Art of Manoeuvre* (Novato California: Presidio Press), 1991; and Richard Simpkin, *Race to the Swift: Thoughts on Twenty-First Century Warfare* (London: Brassey's Defence Publishers), 1985.
38. The Korean peninsula being perhaps an exception.



***Lieutenant-Colonel Paul Johnston, CD***

*Lieutenant-Colonel Paul Johnston is an Air Force intelligence officer, currently employed on the staff of the Canadian Forces College in Toronto. Lieutenant-Colonel Johnston's career has ranged from tactical positions in the fighter community, to operational level headquarters, to the strategic level at the Chief of Defence Intelligence in Ottawa. His most recent deployment was as the Chief Assessments Officer of the Joint Intelligence Centre at International Security Assistance Force (ISAF) Headquarters in Kabul. Lieutenant-Colonel Johnston is also a doctoral student at Queens University in the history programme; his area of research interest is the evolution of tactical air power within NATO. Although Paul maintains a small apartment in Toronto for the work week, his family residence remains in Trenton, Ontario, with his wife Sheila, four children, and the family dog Wolseley.*

## Chapter 11

## Rethinking Maritime Air: Preparing and Maintaining Canadian Sea King Helicopters for Operations in the Persian Gulf 1990–1991

*Richard Gimblett*

The Persian Gulf deployment of 1990–1991 was a defining moment in the Canadian military experience. This paper will take certain instances from that crisis to illustrate the way we handle organic maritime air—that is, embarked helicopters at sea—in the Canadian Forces. I will proclaim my bias right now, as that of a naval officer having served as the combat officer of Her Majesty’s Canadian Ship (HMCS) PROTECTEUR in the Gulf. That, I hope, is tempered by having been one of the official historians, and having had full access to the written record and numerous interviews.<sup>1</sup>

When Saddam Hussein invaded Kuwait on 2 August 1990, he could not have anticipated the scale of the reaction of the world community. Within a few weeks, a vast range of 35 nations had been assembled against him under United States (US) leadership and the auspices of the United Nations (UN).

Among the earliest of those joining the Coalition, Prime Minister (PM) Brian Mulroney announced the Canadian response on 10 August: two destroyers, HMCS ATHABASKAN and TERRA NOVA, and the supply ship PROTECTEUR, with their embarked Sea King helicopters, would deploy to the Gulf region in an operation codenamed FRICTION “to deter further Iraqi aggression.”<sup>2</sup> This imprecise mission statement reflected the uncertainty over just what the government hoped to achieve by the deployment, but the early selection of a naval task group, instead of an army brigade or an air force fighter squadron, defined the Canadian response. Although supportive of the United States in the broad aim of halting the further spread of Iraqi forces into Saudi Arabia and evicting them from Kuwait, Canada was not prepared to become directly involved in the active defence of the Gulf States, or in American offensive operations to restore the previous regional order.

Instead, the Canadian government was acting under the auspices of the UN, where, at that time, Canada held a temporary seat on the Security Council. With the thawing of the cold war, the members of the Security Council were working in rare unanimity not to interfere with the US deployments underway for Operation DESERT SHIELD, but at this point they were agreed upon only imposing sanctions to demonstrate the world’s displeasure. On 25 August, the day after the Canadian task group sailed from Halifax, the UN passed Security Council Resolution 665, calling for the maritime embargo of Iraq.

You will note the two-week delay between the Prime Minister’s announcement and the date of sailing. Mr. Mulroney had qualified his remarks with the observation that the task group would get underway “as soon as necessary preparations are undertaken.”<sup>3</sup> The rust-out of the Canadian Navy through the 1980s is well documented elsewhere. For our purposes, it suffices to note that the ships were basically armed and fitted for their established North Atlantic Treaty Organization (NATO) mission of anti-submarine warfare (ASW) in the North Atlantic Ocean. To meet the challenges of the much hotter environmental and operational climate which would be faced in the Persian Gulf, the ships would have to be fitted to operate in the anti-surface warfare (ASUW) and the anti-air warfare (AAW) roles. Extensive re-equipment was required. Even before the official announcement was made, detailed plans were worked out between the naval staffs in National Defence Headquarters (NDHQ) and those in Maritime Command (MARCOM) headquarters in Halifax. Anti-submarine mortars were removed from the destroyers and replaced with Phalanx Close-in (anti-missile) Weapon Systems. Harpoon surface-to-surface missiles were strapped on to TERRA NOVA, and all three ships were installed with new chaff and satellite communications systems.

As Mr. Mulroney spoke to the nation, the dockyard was already in motion, and the next two weeks, from 10 to 24 August, witnessed a whirlwind metamorphosis of the three ships. If fortune had any role to play in the process, it was that practically all of the new weapons and systems were available from Canadian sources, awaiting installation in the new-construction ships of the Canadian Patrol Frigate (CPF) programme, or for refit under the Trump Tribal-Class Update and Modernization Programme.

A similar but separate effort was underway to prepare the helicopters which were to embark on the ships. The upgrade process of the CH124 Sea Kings, although smaller in scale, was no less sweeping in its purpose, also literally turning the mission orientation of the helicopters upside-down. However, it started somewhat after that of the ships. At that time, Maritime Air Group (MAG) Headquarters was co-located in the MARCOM Headquarters building, with the Commander of MAG double-hatted as MARCOM's Chief of Staff, Air (COS AIR). Like so many others that summer, Brigadier-General Barry Bowen was new in his position, having assumed command in July. Upon his return to Halifax on Tuesday, 7 August, from a tour of his West Coast forces, Vice-Admiral Bob George, the commander of MARCOM, advised Bowen of the possibility of the naval option. Although any such deployment would include embarking helicopters, contrary to the staffing of the ship preparations, which was already well underway by that time, the need to examine the role of the Sea Kings did not generate much activity until two days later, when notice of the NDHQ Warning Order was received, apparently because "no one told MAG until just prior to the PM's announcement!"<sup>4</sup> General Bowen was left thinking of the whole matter of a deployment as only an abstract possibility.<sup>5</sup>

In part, this was due to the sensitive nature of the planning at that stage and the need for tight security; indeed, the lack of activity in MAG was consistent with that in MARCOM itself, where few persons outside the offices of the Chief of Staff for Operations (COS OPS, double-hatted as CANCOMFLEET), and Commodore Ken Summers, the designated task group commander, were aware of what was transpiring. It was more a reflection of the fact that all of the early planning effort on Operation FRICTION was centred in NDHQ, where the early emphasis on the naval option caused several factors to work against the inclusion of maritime air concerns in the staff estimation process.

Paramount was the fact that MARCOM had been identified as the lead command for the operation. But even so, the organization of NDHQ and the Canadian Forces allowed for a definite oversight in the planning process. Within the air community, Maritime Air Group had long been the poor cousin to Fighter Group and Air Transport Group; the Directorates of Maritime Air Requirements (DMA) and of Maritime Air Engineering and Maintenance (DMAEM) did not carry the same weight within the staff of the Chief of Air Doctrine and Operations (CADO) as the Directorates of Naval Requirements (DNR) and of Maritime Engineering and Maintenance (DMEM) did within the Chief of Maritime Doctrine and Operations (CMDO). It is also significant that DMA was not included by CMDO in the early naval (DNR/DMCS/DMEM) staff discussions. Given the physical location of DMA (near the Directorate of Maritime Force Development [DMFD]) within NDHQ, this was regrettable.<sup>6</sup> The problem was exacerbated by the fact that, even with Commodore Summers in constant touch with his Ottawa counterparts, no one thought of establishing a similar process for General Bowen.

And there is yet another dimension to this whole problem in the air community. Even at this early stage in mid-August, Air Command was already exploring the possibility of sending a squadron of CF18 Hornets to the Gulf (which eventually did come to pass, to fly protective combat air patrol top cover for the ships), and this was occupying their staffing efforts. That did not prevent Air Command HQ from complaining quite strongly after the fact that "[AIRCOM itself] was excluded from the preparations for deployment of the Naval task group... [which] prevented arbitration of priority conflicts and resource allocation within NDHQ."<sup>7</sup> At all levels, there seems to have been little thought given to the Sea Kings, beyond the fact that they would embark on the ships as they customarily did for all major deployments.

Once the overt preparation process was finally put in motion with the NDHQ warning order of Thursday, 9 August, MAG awoke quickly to the fact that this was anything but a “come-as-you-are” party as far as the helicopters were concerned. Already well behind in the preparation definition, the absence of a specific mission statement from either NDHQ or MARCOM led to a further delay while MAG grappled to define a concept of operations for the aircraft. At the preparation coordination meeting the next day, on Friday, 10 August, Commodore Summers indicated that the primary role should be focused towards surface surveillance, a role far removed from the ASW mission for which the Sea Kings were equipped.<sup>8</sup> The rest of that day and Saturday were devoted to further defining the new role and identifying equipment required to change the ASW Sea Kings to meet the new tasking.

Fortuitously, General Bowen had just relinquished command of Canadian Forces Base (CFB) Shearwater, where the Sea Kings were based, and he had been associated with maritime aviation for many years. Still, it was not until Sunday that MAGHQ was able to announce its intended response to the tasking,<sup>9</sup> a full six days after the surface world had gone through the same process, and with the preparation of the ships already well underway. The primary role would indeed be surface surveillance, but the helicopters would also be expected to undertake an important secondary logistics function known as “HDS,” or Helicopter Delivery Service. At the same time, the commitment to the Task Group of five aircraft from HS 423 Eagle Squadron was elaborated in the Helicopter Air Detachment (HELAIKDET) allocation: ATHABASKAN would sail with a standard destroyer helicopter carrying (DDH) 280 HELAIKDET of two aircraft; PROTECTEUR would embark an “augmented” area of responsibility (AOR) detachment of three Sea Kings (vice the normal two), with an “enhanced” maintenance detachment for better support for an extended period away from the home base (the smaller TERRA NOVA was not built to embark helicopters). Although Commodore Summers already had an air officer on his flagship staff, the profile of the air component would be assured by embarking the commanding officer of HS 423, Lieutenant-Colonel Larry McWha, as an Assistant Chief Staff Officer.

As the role of the helicopters was being defined, the process of identifying needed modifications proceeded in tandem. It unfolded in almost exactly the opposite fashion as for the ships, which had been conducted for all practical purposes by NDHQ. Instead, staff officers from MAGHQ, in consultation with senior officers of 423 Squadron, hastily prepared an estimate of needed improvements to the aircraft. For some years, naval exercises had simulated surface search techniques, but little existed in the way of formal doctrine. As well, many of the self-protective deficiencies of the Sea King were well known, but the rectifications had not been identified. The necessary new equipment acquisitions had been deferred to be incorporated in the new shipborne aircraft (NSA) Sea King replacement programme.

NSA was supposed to be the naval air complement to the CPF and TRUMP programmes. Even in its ultimately scaled-down version, it represented a quantum advance in the capabilities of shipborne helicopters for the Canadian Navy. Besides improvements in ASW, the airframe of the projected EH101 aircraft allowed for significant surface surveillance capabilities, as well as a measure of self-defence. The statement of requirements for the NSA Project now provided several of the solutions to the immediate problems, but many more were the result of intense brainstorming sessions.

By Sunday morning, the small group of officers had put together a detailed list of the equipment anticipated to be necessary for the conduct of operations in the militarily and meteorologically hostile environment of the Gulf. The report identified eleven major systems to be fitted to the aircraft (see Table 1):<sup>10</sup> Five for the new surface surveillance role, comprising a forward-looking infrared surveillance device (FLIR), stabilized binoculars, a light machine gun, and improved navigation (GPS) and communications (Havequick) outfits; and, six required for self-protection (referred to as aircraft survivability equipment, or ASE), ranging from chaff and infrared countermeasures dispensers to radar and laser warning receivers. (Note that in the latter category, the only system not listed in the table is the AWR-47 MAWS [Missile Approach Warning System], which will be

discussed later.) The scope of the modifications was so extensive that the aircraft were given the unofficial designation CH124C; officially, they retained their CH124A status.<sup>11</sup>

SYSTEM/WEAPON	FROM	USE	DESCRIPTION
FLIR 2000 (Forward Looking Infrared)	NEW	ASUW	A thermal imaging system to enhance night surveillance capability.
STABILIZED BINOCULARS (FUJINON Model S1040)	NEW	ASUW	Gyro-stabilized binoculars used to identify surface contacts at extended ranges.
GPS (Global Positioning System)	NEW	ASUW	A worldwide day/night all-weather navigation system which uses satellite information to calculate accurate positions.
HAVEQUICK	NEW	COMM	UHF secure voice radio.
ALQ-144/M130 (Infrared Countermeasures)	NEW / STOCK	ASE	Protects against infrared heat-seeking missiles; in conjunction with the M130 flare dispense system, decoys incoming infrared missiles away from the helicopter.
APR-39 (Radar Warning Receiver)	STOCK	ASE	A passive omni-directional radar receiver used to warn aircrew of radar controlled missile threats.
ALE-37 (CHAFF Dispensing System)	STOCK	ASE	Dispenses CHAFF to deceive incoming radar guided missiles.
LWR (Laser Warning Receiver)	NEW	ASE	Detects and alerts aircrew of laser energy being directed at the helicopter.
NVG (Night Vision Goggles)	NEW	ASUW	An image intensification device which amplifies ambient light to allow visual detection and identification at night.
C-9 LMG (Light Machine Gun)	STOCK	ASUW/ ASE	Provides a self-defence capability.

Table 1: Sea King Equipment Upgrades for Operation FRICTION

If the refitting of the Sea Kings was simplified by the fact that only one aircraft type (as opposed to three unique ships) streamlined the design and installation process, it was complicated by the stringent requirements of flight safety.<sup>12</sup> Essentially, nothing being installed on the ships would make them sink, but electromagnetic interference (EMI) with certain delicate aircraft controls could literally make a helicopter fall out of the sky. However, MAG did not possess the resources to undertake extensive aircraft modifications; Shearwater's BAMEO (Base Aircraft Maintenance Engineering Officer) organization was geared to the maintenance of the in-service helicopters and there was no on-site engineering and production equivalent of the Dockyard's Naval Engineering Unit and ship repair unit. Instead, all aircraft design production was coordinated through the engineering staffs of NDHQ and evaluated by the Aerospace Engineering Test Establishment (AETE). As such, whereas DGMEM played essentially a supporting role to the ship refits, DGAEM became actively involved at this point, taking direct control of the implementation process.<sup>13</sup> It is important to note that once again this was the opposite of DGMEM's involvement, where DGMEM had spear-headed the identification of the new ship equipment and then supported its implementation, and DGAEM had not been part of the initial aircraft equipment staff work.

At any rate, on 13 August, an on-site installation control team was established under the lead of officers from NDHQ's Directorate of Maritime Aircraft Systems Engineering,<sup>14</sup> and included additional teams of aeronautical engineers from the Aerospace Maintenance Development Unit (AMDU) from CFB Trenton, and the Aerospace Engineering Test Establishment (AETE) at CFB



Cold Lake. The aim of this group was to avoid any circumvention of the existing tried and proven installation and test procedures. Instead, they determined that the normal procedures could be modified to the extent of compressing the timeframe by integrating the two activities.<sup>15</sup> Essential to this was the early decision to refit a total of six aircraft.<sup>16</sup> The sixth would actually be the first completed, the idea being that the new systems would be fitted and tested in this “prototype” first to resolve any installation problems and then retrofitted in the remaining five aircraft. A further benefit of this was that the sixth aircraft, which remained in Canada, was available for later detailed testing, such as radar cross-section (RCS) measurement, and trialing of new tactical developments, advantages which were not available to the ships.<sup>17</sup>

Although Shearwater’s effort initially lagged behind that of the dockyard by a full two days, it very quickly reached the same level of intensity. Even while the lists of new equipment were being put together, the air maintenance section at Shearwater was busy removing such obvious surplus equipment as the dipping sonar. Meanwhile, the procurement staffs in Ottawa set about assembling the required systems. Some were in stock, literally scavenged from Hornet and Kiowa aircraft, but the bulk had to be purchased new. The MARCOM coordination meeting on the afternoon of 15 August was crucial. By that time, it was clear that the scope of the ship preparations had been underestimated; as well, General Bowen admitted that most of his items were still coded “red.”<sup>18</sup> He estimated that one aircraft would be ready for the planned departure on the 21st, and the ground crews would “[d]o the rest on the way.”<sup>19</sup> With the ships facing similar problems, it was decided that there could be no compromise on the installation of the new defensive equipment. The work period would be extended and sailing delayed by at least three days.

With the arrival of the installation control team, the changeover got into full swing. Test flights of some of the individual systems began on the afternoon of 16 August,<sup>20</sup> and the installation control team activity ceased with completion of the prototype aircraft on the 20th.<sup>21</sup> Of the originally intended installations, only the AWR-47 MAWS proved technically unmanageable, with the aircraft being “fitted for but not with... [pending] further prototype investigation,” which was never completed.<sup>22</sup> The early concern over EMI was proven out when the ALQ-144 infrared jammer “was found to create aircraft heading errors of up to 130 degrees!”<sup>23</sup> Its operational employment was restricted for some time before the Defence Research Establishment in Victoria proposed a workable solution in September.

Still, MAGHQ was able to boast on the 21st, the originally planned sailing date, that its installations were complete, and that “[e]ighteen months of peacetime work has been accomplished in eight days.”<sup>24</sup> With the delayed departure date working to MAG’s further advantage, the final maintenance checks and acceptance test flights were now completed and the last aircraft was signed over to HS 423 on the 23rd.<sup>25</sup> Only minor housekeeping work and familiarization checks remained for the ground crews and aircrews to undertake on the way to the Gulf.

Having obtained a suitably upgraded organic air capability, the Canadian task group came close to having to do without it. This situation arose in late October, over the issue of replacement of the task group. The decision reached by NDHQ was that the cost of refitting three more ships and five additional helicopters would be prohibitive, and crews would be rotated instead.<sup>26</sup> This had profound operational implications, quite aside from the obvious withdrawal of each of the ships from patrol in sequence while the changeovers were affected. Unlike the air task group in Doha, which frequently rotated CF18s from the Canadian bases in Germany, 423 Squadron had no practical way to transport replacement aircraft to the Gulf without a relieving task group. On top of that, back in August, even as the upgrades were being undertaken at Shearwater, MAGHQ had predicted that, with the projected flying rate (proven in actual operations), “[a]ircraft technical requirements in terms of maintainability/sustainability [would be] problematic... [and] there will be a requirement for one in-theatre periodic inspection per aircraft during a possible six-month deployment.”<sup>27</sup> Although direction had been requested from DMAEM, none had arrived.

Now, the problem of diminishing aircraft flying hours reached a crisis, and the investment made in the augmentation of the air maintenance detachment aboard PROTECTEUR reaped its dividend. In the short term, the afloat technicians had proven equal to the task of routine maintenance, keeping all of the aging and temperamental Sea Kings on the ready roster for an astounding 98 per cent availability,<sup>28</sup> but the necessity for periodic inspections presented a longer-term problem. A regular 20-day-long maintenance routine was required for flight safety reasons on all aircraft every 500 flying hours, and this was a major undertaking involving specialist technical support. Significantly, one had never before been conducted away from home base, let alone on a ship at sea. Together, the five task group helicopters were averaging 12 hours flying per day, or over 350 hours per month. The pace had been determined in part by the intention that the task group would return to Halifax in the early months of 1991. At the beginning of November, the total hours remaining were just over 1,250, sufficient to carry through to mid-February at the present rate, which in wartime was expected to rise.

Knowing now that there would be no replacement of the ships or their embarked aircraft until the summer of 1991 at the earliest, the initial reaction of Lieutenant-Colonel McWha was to order a drastic reduction in the hours flown by the air detachments. Henceforth, they were to fly only when necessary and otherwise remain at alert status, but that was only postponing the inevitable. Other than waiving the periodic inspection requirement, there was no alternative to in-theatre inspections. The situation was forced on 5 November when an airframe crack was discovered on one of the aircraft, “grounding” it aboard PROTECTEUR until a specialist metal technician from Shearwater could arrive to effect the repairs. Urgent communications passed from the task group ships at sea to the Canadian theatre headquarters in Manamah and thence to Shearwater and Ottawa, resulting in the decision to take this opportunity simultaneously to begin the 20-day routine on the stricken helicopter immediately.<sup>29</sup>

The only outstanding issue was where to undertake it. Both the US and Royal Navies also operated Sea Kings in the Gulf, but they were attached mostly to shore units, and there were sufficient differences between the models that making use of their facilities was not a viable option. In fact, PROTECTEUR’s facilities surpassed anything readily available elsewhere in the Gulf for the Sea Kings, and the embarked maintenance team was quickly set to the task. With their effective confinement onboard because of the patrol schedule, the first inspection took only 15 days, and subsequent ones were reduced to 12 days.<sup>30</sup> A sequence was worked out to have the remaining aircraft completed by February, which, with judicious scheduling and barring the outbreak of hostilities, would leave the five aircraft sufficient flying hours to resume the accustomed rate and support task group operations well into 1992.<sup>31</sup>

In the event, those plans, too, had to be changed. War did break out after the expiration of the UN deadline for Iraq to withdraw from Kuwait by 15 January 1991, and the exigencies of active operations forced NDHQ to re-think the rotation issue. HMCS HURON, the West Coast DDH 280, was refitted in Halifax and embarked the original prototype Sea King for despatch to the Gulf. Meeting the returning task group in Gibraltar, she picked up one of those aircraft to round out her HELAIRDET pair.

So, what are we to make from the pictures cast here? Both situations—the come-from-behind upgrading of the Sea Kings and then the shipboard undertaking of their in-theatre periodic inspections—arose and were allowed to develop to a crisis point essentially from the natural conservatism of peace-time staffing practices. From one perspective, their resolutions each seem perfect illustrations of the triumph of our good old Canadian “can-do” spirit. And so they were. But is this a good thing? From an opposite perspective, one might just as easily see a service which hangs by a thread as precarious as the fortuitous combination of the right individuals at critical instants.

Is this really a sound foundation from which to launch future operations? Our people, and with a little care, even our aging equipment, are top-notch and respond well when called upon. Can we rely

on the hope that enough of those people will be in place, or that the state of our equipment will be conducive to an appropriate response when the next crisis arrives unannounced?

We must establish and work from sound principles that will withstand the rigours of crisis response. Will maritime rotary-wing aviation receive any better attention under the present reorganization of the Air and Maritime Staffs? If it makes sense in war, why should it not make sense in peace? Whatever the issue, it deserves more than last-minute, ad hoc treatment.

.....

### Notes

1. Unless otherwise indicated, all primary source material is held in the collection of the Directorate of History and Heritage (DHH) at National Defence Headquarters in Ottawa. Although not yet declassified for general reference, the author had full access as one of the official historians, and citations are provided. Portions of this paper appear in slightly revised form in Jean H. Morin and Richard H. Gimblett, *Operation FRICTION: The Canadian Forces in the Persian Gulf, 1990–1991* [titre français, *Golfe Persique: Le rôle joué par les Forces canadiennes. Opération Friction, 1990–1991*] (Toronto: Dundurn Press, 1997), and are presented with permission. The views expressed herein are those of the author and do not necessarily reflect those of the Department of National Defence or the Canadian Forces.

2. Canada, Office of the Prime Minister, “Speaking Notes for Prime Minister Brian Mulroney Press Conference, National Press Theatre, August 10, 1990.”

3. Ibid.

4. War Diary (WD) NDHQ, “Operation FRICTION Brief, Central Region MARE Conference,” 31 October 1990, 4; and Operation FRICTION miscellaneous files, MARCOMHQ / Deputy Chief of Staff (DCOS) READ / senior staff officer (SSO) Committee of Staff Representatives (CSR), “Operation FRICTION Action File: Minutes of COS OPS Coordination Meetings,” August 9 and 10, 1990.

5. Brigadier-General Bowen, telephone interview with author, October 22, 1991. See also, Peter Charlton and Michael Whitby, “Certified Serviceable,” in *Swordfish to Sea King: The Technical Story of Canadian Naval Aviation by Those Who Made It So*, eds. Peter Charlton and Michael Whitby (Gloucester, ON: CNATH Book Project, 1995), 411.

6. WD NDHQ, “Operation SCIMITAR/FRICTION - Lessons Learned,” 3350-OP FRICTION ([Air] [Command] Comd), June 19, 1991, 6, 10, comments that this situation did not improve with the later introduction of the J-Staff: “Neither J3 Coord Air nor the J3 Coord Mar included any Maritime Air expertise. This caused several CH124 initiatives to be questioned or challenged without a valid basis.... This occurred in spite of the availability of DMA staff to provide input.” Ibid.

7. Ibid., 2, 10.

8. Minutes, COS OPS Coord Meeting, August 10, 1990; confirmed in MARCOMHQ COS OPS 069 112206Z August 1990, “CTF 302 Tasking Order.”

9. MAGHQ COMD 12002 122032Z August 1990, “OP FRICTION SITREP 001.”

10. HS 423 SHEARWATER HS160 120700Z August 1990, “OP FRICTION - Operational Equip Rqmt.”

11. LOGCON OTTAWA DMAEM 232275 021622Z October 1990, “OP FRICTION Aircraft Designation.”

12. See Captain M. M. Korwin-Szymanowski, “AETE Support of Operations in the Persian Gulf,” Flight Comment 1992, no. 1, 22–24.

13. Treasury Board of Canada Secretariat (Stephen Tsang coordinator), “Operation FRICTION: Refitting Three War Ships for the Persian Gulf - A Success Story in Materiel Management,” September 1991, 8.

14. Ibid.

15. Ibid.; AETE Cold Lake AETE CO 649 141535Z August 1990, “Acceptance Comments PD 90/22 - OP FRICTION Installation Control Team Support.”

16. MAGHQ COMD 12002 122032Z August 1990, “OP FRICTION SITREP 001.”

17. Detailed RCS measurements of the modified CH124 were conducted from Osborne Head in the 29 August–07 September period, where the author was then on staff as Range Operations Officer and had a coordinating function. See NDHQ DMA 116 242003Z August 1990, “Visit Clearance Request.”

18. As a means of tracking the progress of the installations, all three headquarters (NDHQ, MARCOMHQ and MAGHQ) adopted a format in which each major item was listed and then updated daily with an identifying code of “green” (low risk, and no known impediment), “yellow” (medium risk), or “red” (high risk). See MARCOM / DCOS READ file, “Operation FRICTION Background,” for the “System Status Report, Operation FRICTION” as presented by Commander Summers to the NDHQ high-level Daily Executive Meeting, 15 August 1990.

19. Minutes, COS OPS Coord Meeting, 15 August 1990.

20. MAGHQ COMD 139 162110Z August 1990, "OP FRICTION SITREP 005."
21. MAGHQ COMD 146 202005Z August 1990, "OP FRICTION SITREP 009."
22. MAGHQ COMD 142 181932Z August 1990, "OP FRICTION SITREP 007."
23. Korwin-Szymanowski, 24.
24. MAGHQ DCOMD 227 211045Z August 1990, "Operation FRICTION - CH124A Modifications, Personal Equipment and Pre-Deployment Briefings."
25. MAGHQ COMD 153 222006Z August 1990, "OP FRICTION SITREP 011."
26. MARCOMHQ, "OP FRICTION Phase Two Tasking Order," 17 October 1990.
27. MAGHQ COMD 13001 132049Z August 1990, "OP FRICTION SITREP 002."
28. Charlton, 427–28.
29. CTG 302.3 051720Z November 1990, "CH12417 Periodic Inspection."
30. WD PROTECTEUR, 17 November 1990; and WD CTG 302.3, General Correspondence, Serial No. 091: "CH12417 Operation FRICTION Periodic Report," 3350-1-1 (AOR 509) (B2), 21 December 1990. See also, Charlton, 424.
31. CTG 302.3 052125Z November 1990, "CH 12417 Periodic Inspection," and CTG 302.3 071521Z November 1990, "CH-124C Flying Hours - A/C Stagger - Helo Ops."

### **Richard Gimblett**

*Dr. Richard Gimblett is the Command Historian of the Canadian Navy, and Research Fellow at Dalhousie University Centre for Foreign Policy Studies (CFPS). His previous uniformed service (1975–2001) included ships of various classes on both coasts. Following participation in operations in the Persian Gulf during the war of 1991, he co-authored the official account of Canada's role in the Gulf War, published under the title Operation FRICTION: The Canadian Forces in the Persian Gulf, 1990–1991 (Toronto: Dundurn, 1997). His last in-uniform appointment was to the Directorate of Maritime Strategy, as lead writer of Leadmark: The Navy's Strategy for 2020. He has contributed to the forthcoming Volume I (1867–1939) and Volume III (1945–1968) of the Official History of the Royal Canadian Navy, and his recent writings on contemporary Southwest Asia naval operations and networked operations and transformation have received national recognition. He is the editor of the recently published The Naval Service of Canada, 1910–2010: The Centennial Story (Toronto: Dundurn, 2009). His various affiliations include: Past President of the Canadian Nautical Research Society, Past President of the Ottawa Branch of the Naval Officers Association of Canada, Adjunct Professor of History at Queen's University, and Visiting Faculty of the Canadian Forces College.*

## List of Abbreviations

AAFS	aerial artillery fire support
AAW	anti-air warfare
ADIZ	air defence identification zone
ADNET	anti-drug computer network
AEOF	Allied Expeditionary Air Force
AETE	Aerospace Engineering Test Establishment
AF/XOO	Director of Operations, United States Air Force
AFB	Air Force Base (United States)
AFHQ	Air Force Headquarters
AI	air interdiction
AMDU	Aerospace Maintenance Development Unit
AOR	area of responsibility
APC	armoured personnel carrier
ARTY-R	artillery reconnaissance / artillery spotting
ASUW	anti-surface warfare
ASW	anti-submarine warfare
ATF	advanced training flight
AWAC	Airborne Warning and Control System
BAMEO	Base Aircraft Maintenance Engineering Officer
BCATP	British Commonwealth Air Training Plan
BOAC	British Overseas Airways Corporation
CAHS	Canadian Aviation Historical Society
CANCOMFLEET	Canadian Fleet Commander
CAS	close air support
CBALS	Carrier Borne Army Liaison Section
CBO	Allied Combined Bomber Offensive
CDS	Chief of the Defence Staff
CF	Canadian Forces
CFB	Canadian Forces Base
CFE	Canadian Forces Europe
CGS	Chief of the General Staff
CINCNORAD	Commander-in-Chief NORAD
CJATC	Canadian Joint Air Training Centre
CMDO	Chief of Maritime Doctrine and Operations
CO	commanding officer
CONUS	continental United States
COS AIR	Chief of Staff Air
CPF	Canadian Patrol Frigate



## List of Abbreviations

CPR	Canadian Pacific Railway
DDH	helicopter carrying destroyer
det	detachment
DEW Line	distant early warning radar system
DGAEM	Director General Aerospace Engineering and Maintenance
DGMEM	Director General Maritime Engineering and Maintenance
DMA	Director Maritime Aviation
DMEM	Director Maritime Engineering and Maintenance
DMFD	Director of Maritime Force Development
DMZ	demilitarized zone
DND	Department of National Defence (Canada)
DoD	Department of Defence (United States)
EAC	Eastern Air Command
EMI	electromagnetic interference
FAA	Federal Aviation Administration
FAC	forward air control
FGCNAIR	Fighter Group Canada NORAD Region
FLIR	forward looking infrared surveillance
FONF	Flag Officer, Newfoundland Force
FRY	Federal Republic of Yugoslavia
GPS	global positioning unit
HE	high explosive
HELAIKDET	Helicopter Air Detachment
HMCS	Her/His Majesty's Canadian Ship
HMS	Her/His Majesty's Ship
HVAR	high velocity aerial rockets
HWE	Home War Establishment
ICT	installation control team
IFF	identification friend or foe
JAN-CAN	Joint Army-Navy Canadian
JAS	Joint Air School
JSS	Joint Surveillance System
MAG	Maritime Air Group
MARCOM	Maritime Command
MAWS	missile approach warning system
MOT	Ministry of Transportation (Canada)
NATO	North Atlantic Treaty Organization
NDHQ	National Defence Headquarters
NORAD	North American Aerospace Defence Command

NORTIC	NORAD Tactical Intelligence Cell
NRMA	National Resources Mobilization Act
NSA	new shipborne aircraft
OCA	offensive counter-air
ORS	Operations Research Section
PGM	precision guided munitions
PM	Prime Minister
RAF	Royal Air Force
RCAC	Royal Canadian Armoured Corps
RCAF	Royal Canadian Air Force
RCASC	Royal Artillery Army Service Corps
RCMP	Royal Canadian Mounted Police
RCN	Royal Canadian Navy
RCNAS	Royal Canadian Naval Air Service
RCS	radar cross-section
ROCC	Regional Operations Control Centre
RP	rocket projectile
RSB	radio sonobuoy
SAGE	semi-automatic ground environment
SS	<i>Schutzstaffel</i> (Protection Squadron)
TAF	tactical air force
TCA	Trans-Canada Airlines
UK	United Kingdom
US	United States
USAAF	United States Army Air Force
USAF	United States Air Force
USCS	United States Customs Service
USELEMNORAD	United States Element NORAD
USN	United States Navy
VE Day	Victory in Europe (May 8, 1945)
VHF	very high frequency
WAC	Western Air Command
WWI	First World War
WWII	Second World War



