Journal of Military and Strategic Studies

VOLUME 23, ISSUE 1

The Calculus of Procurement

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The history of the RCAF is full of amazing accomplishments and heroic actions but lesser known to the Canadian public there is another facet, one marked by repeated turbulent attempts to acquire new aircraft and supporting capabilities in sufficient numbers when needed. In this paper, we look at the history of aircraft procurement during the first seven decades of Canada's air force and demonstrate, as seen through the eyes of military practitioners, the disconnect between defence policy and defence procurement.

My first foray into the history and importance of aircraft procurement in Canada came around 1995. While looking for an MA thesis topic that might be of use to the Air Force, I asked Dr. Steve Harris at the Directorate of History and Heritage in Ottawa if he had any suggestions. In reply, he asked me to confirm that I had spent some time working in procurement while serving at National Defence Headquarters. Not really liking the possible implications of my answer I nevertheless said yes …and then Dr Harris opined that I might be able to use this experience to examine the RCAF's procurement experience. He did not suggest more than this, but the proverbial snowball began to build up speed and there I was, aiming to understand how and why the RCAF had bought, or not bought, needed aircraft in its past. I ended up focused on fighter procurement in the early Cold War.[1] I knew something of the late 80s 'major crowns' ('major crown projects' are initiatives to purchase systems (in this case aircraft) valued at

[1] That thesis later became a book *Cold War Fighters: Canadian Aircraft Procurement, 1945-54* (Vancouver, UBC Press, 2011).

ISSN : 1488-559X

over $100 million to meet government needs[2]), but I was after all doing a history thesis so anything more recent would in the mid 90s have offered very few open sources. I should also add that as far as past procurements went, I certainly did not want to look at the AVRO Arrow as it was, and perhaps still is too emotive a topic.

Before I could start a detailed examination of the circumstances that led Canada to manufacture hundreds of Sabres for allies as well as the RCAF and to both design and manufacture the unique and world-class Canuck, I wanted to see what Canadian aircraft production had looked like in the decades between the Silver Dart's flight in 1909 and the immediate post Second World War years, a span of just under four decades. My primary focus was really on the connections between the RCAF and Canadian aircraft builders during that war and I titled the subsequent paper *Cornucopia or Concession*? Simply stated, my impression was that while the experience of those years had certainly seen amazing production numbers, I could also see that the RCAF was left *cap in hand* with little ability to obtain particular aircraft manufactured in Canada for its operational needs.[3]

My most recent experience in writing about aircraft procurement hit bookshelves in the fall of 2023.[4] A few years ago I was asked to write a chapter about the Air Force and industry for a collection focused on the military-industrial complex (MIC) in Canada. I said OK and then set out to take a decent look at what the MIC concept actually entailed; to that point, I had a rough idea but I wanted to have better than a rough idea. After some pondering about the connection between the RCAF and industry I came to the preliminary conclusion that as far as the RCAF has been concerned there really has never been a MIC in the sense first posited by Dwight Eisenhower[5] and subsequently viewed with distrust by many researchers and the fourth estate.

The essence of the MIC concept seems to me to be that military services and manufacturers of defence systems are more or less in cahoots. The military identifies the

[2] Government of Canada. "Major Crown Projects" https://buyandsell.gc.ca/policy-and-guidelines/supply-manual/section/9/5, accessed 19 August 2023.
[3] Randall Wakelam, "Cornucopia or Concession," unpublished MA paper, 1995.
[4] Randall Wakelam, "The Royal Canadian Air Force and the Military Industrial Complex: a Figment of the Imagination," in Alex Souchen and Matthew Wiseman, *Silent Partners: The Origins and Influence of Canada's Military Industrial Complex* (Vancouver, UBC Press, 2023), pp. 185-202.
[5] Souchen and Wiseman, pp. 5-7.

Cadillacs it claims to need and the industry then sets price tags that are the highest they can charge. Of course, both claim that these equipments are essential to preserve the security of the state, regardless of costs. For militaries to want the best weaponry available does not seem unreasonable and for industry to want to turn a profit is equally understandable. What concerned Eisenhower and other critics was that there seemed and still seems the potential, often apparently realized, for needs and costs to spiral out of control, and that is not a good thing. After all national security does also encompass economic security.

Why had I concluded that there was no RCAF-industry MIC? The simple answer seemed to be that with the exception of a brief period framed by the first decade or so of the Cold War, the RCAF has almost always had to accept the fiscal and policy decisions imposed by the government and the subsequent limitations on both procurement and indeed everything else about military capabilities. In a democracy, this primacy of government is perfectly normal and indeed is understood and accepted by the Services. But the disconnect between the equipment needs identified by those in uniform, to meet government security and defence policy, and the procurement decisions of those same political masters can be frustrating and frankly demoralizing.

At this point, to be transparent, I should mention that when interviewed in 2013 on CBC Radio's 'Cross Country Checkup' concerning the furor over the Conservative government's costing of the F-35 I opined that working on procurement files could be a soul-destroying experience. A simple operational need had become a political Quidditch match.[6]

My aim then in the following paragraphs is to briefly review some of the history of military aircraft procurement in this country and from these experiences attempt to distill any noteworthy trends that might be worthy of consideration both now and in the future.

Pour commencer au commencement, when the Silver Dart was demonstrated to senior militia officers in Petawawa in 1909 the response to this marketing effort was negative. These officers were not interested in this new-fangled flying gizmo. Arguably the

[6] Interviewed on "Should the priority of military spending be to create jobs and skills in Canada?" *Cross Country Checkup*, CBC Radio 1, 24 February 2013.

technology was new and fragile, but this was 1909 and by this point, aeroplanes were in military service with a number of European nations. Britain was moving towards forming the Royal Flying Corps in 1912 and went on to send four squadrons of modern aircraft to France when war was declared two years later.[7] Canada's response to the outbreak of the Great War was to purchase one US-manufactured float plane and send it along with two flyers and one mechanic to Britain where the Canadian Aviation Corps failed, literally, to get off the ground.[8]

It was soon apparent that at the level of young flyers and groundcrew Canadian servicemen were keen on military aviation. Official figures suggest that over 22,000 Canadians had served in some capacity in the RFC, RNAS, RAF or RFC/RAF Canada, but these flyers and technicians had served in British organizations.[9] Despite this clear indication of Canadian involvement in air operations, the Canadian government, even after Sam Hughes had been fired as minister of militia, remained disinclined to form a Canadian flying branch. The acceptance of a Canadian-based, UK-run, flying training organization, RFC Canada, seemed a very muted acknowledgment of the important contribution of Canadian flyers, despite the reputations of the Bishops, Barkers and Collishaws. Only in the final months of the war would the government acquiesce to the formation of land and naval flying elements.[10]

If the war was over and the politicians had only recently accepted the place of an air service, what would they say in light of the first peace dividend of the century? Members of the newly established Air Board reckoned rightly that if Canada was to have a peacetime flying service, then that service would need to be seen as useful for the needs of the government and Canadians writ large.[11] And so began a period commonly thought of as the 'bush pilots in uniform' years where the RCAF conducted the majority of its

[7] See for example John H. Morrow, Jr, "The First World War, 1914-1919," in John Andreas Olsen, *A History of Air Warfare* (Potomac Books, Dulles Virginia, 2010), pp. 3-8.
[8] S.F. Wise *Canadian Airmen and the First World War: The Official History of the Royal Canadian Air Force, Volume I* (Toronto, University of Toronto Press, 1980), pp. 27, 47.
[9] Wise, *Canadian Airmen*, pp. 633-4
[10] Wise, *Canadian Airmen,* pp, 579-620.
[11] W.A.B. Douglas, *The Creation of a National Air Force: The Official History of the Royal Canadian Air Force, Volume II* (Toronto, University of Toronto Press, 1986) pp. 41-6.

flying in support of other government departments and operated aircraft that truly were 'commercial off the shelf'.[12]

The gift of 114 surplus war machines, including 14 seaplanes and flying boats, 62 AVRO trainers, and a number of two-seaters meant that there was no immediate need for domestic production. By 1922, however, Air Board officials had realized that there was a definite need for new types, better suited to the civil work, which was being undertaken by the Canadian Air Force. The stopgap solution was to buy surplus flying boats from the United States Navy, but the Air Board was after Canadian manufacturing capabilities.[13]

One possible supplier was Canadian Vickers Limited, a subsidiary of the Vickers company in the UK which would become well known in later years as the builder of the Vickers-Supermarine Spitfire. Established in Montreal to build naval vessels, Canadian Vickers offered to supply aircraft meeting Canadian specifications if the firm was given executive rights. The answer was no. As noted in the official history the Board's response was to politely decline: "The drawbacks of limiting competition outweighed potential benefits. Moreover, [it was] emphasized, that any capable Canadian manufacturer would be given preference." From this episode, historian Alex Douglas rightly concluded that: "the principle of promoting domestic manufacturing was one [to] which both the board and later the RCAF gave continuing priority."[14] If there was one exception it came as a result of the need to get into places where there were no airfields. Here Canadian Vickers was able to supply the RCAF (and civilian operators) with suitable flying boats, the two most widely used being the Vedette of which 45 were manufactured for the RCAF and the larger Varuna with eight going to the Air Force.

These initial purchases as well as the focus on paramilitary activities of a peace dividend were not new to Canadian defence policy. The desire to avoid spending on defence has been a common theme in Canadian security and defence policy and it is closely related to a second notion that Canada was (and some would argue still is) secure both geographically and strategically. Geographically wars of European and Asian dominance have never really posed a threat to the sovereignty of Canada. One has only

[12] Douglas, *A National Air Force, p. 90.*
[13] Douglas, *A National Air Force*, pp. 46-48.
[14] Douglas, *A National Air Force*,p. 96.

to think of Senator Raoul Dandurand's comments in a 1927 League of Nations meeting where he stated that Canada was "a fireproof house, far from the sources of conflagration."[15] Strategically, since 1940 at least, because the superpower to our south pretty much guarantees security.

Even when the United States was in the past a real potential threat to Canadian sovereignty there has been a remarkable parsimony on matters of defence spending, these dating back to the 19th century. As political scientist Kim Nossal points out in his analysis of defence procurement, in 1875 MP David Mills rose in parliament to remind members that: "In a country situated, as we are, not likely to be involved in a war, and having a large demand upon our resources for public improvements, it [is] highly desirable to have our military affairs conducted as cheaply as possible."[16] When over the balance of the century such threats seemed real threats various provincial and federal legislatures were slow to authorize increases in force structure or the acquisition of equipment to equip such forces. As Britain withdrew its garrison from Canada during the Crimean War, the Canadian response was to approve a defence budget of just 25,000 Pounds, under 10 percent of what the British had been spending.[17] After the Great War, the demobilization of Canada's army left little more than what Jack Granatstein has called a corporal's guard to keep Canadians safe. Similar avoidance of military spending was evident in the state of the RCN and the RCAF.[18]

Trying to find a way to maintain some sort of flying service was, as mentioned above, the work of the Air Board initially and subsequently the small air staff within National Defence. However, the Air Force was *the third service* and did not find sufficient political constituency to gain full independence. In truth, such real independence was only manifest in the UK; virtually all other Commonwealth and Western air forces were

[15] Desmond Morton, *A Military History of Canada* (Edmonton, Hurtig, 1999), p. 176.
[16] Kim Richard Nossal, *Charlie Foxtrot: Fixing Defence Procurement in Canada* (Toronto, Dundurn, 2016), pp. 107-8.
[17] J.L. Granatstein Canada's Army: Waging War and Keeping the Peace (Toronto, University of Toronto Press, 2002), p. 18.
[18] Morton, *A Military History*, pp. 170-2. See also C.P Stacey, Arms Men and Governments, The War Policies of Canada, 1939-1945 (Toronto, University of Toronto Press, 1970), pp. pp. 105-7.

subordinate to their nations' land forces.[19] In Canada, this meant that the RCAF was administratively subsumed within the Canadian Militia, the army. There was a Director of the RCAF, but only in 1938, with the likelihood of war in the near future, did RCAF independence become a reality with the creation of a Chief of the Air Staff (CAS) and an Air Staff.[20]

There were, it should be recognized, officers within the RCAF who understood the concepts of air warfare. Prior to the summer of 1939, 22 squadron leaders had graduated from the RAF staff college and a further five more senior officers were also graduates of the Imperial Defence College. But there was little in Canada that could be called an operational air force. Only in 1938 did the RCAF start to acquire a small number of combat-capable *Service* aircraft. Thus, by the summer of 1939, there were only 270 aircraft in the RCAF inventory and of those 111 were reasonably viable military types.[21]

The extent to which Canada might be able to produce complex combat aircraft had been studied by a British air ministry mission which surveyed Canadian aircraft production capability in 1939. While it was noted that Canadian-based branch plants of British manufacturing firms were turning out reasonable numbers of light commercial aircraft the mission could see no actual capacity, either in facilities or people, to allow for the rapid filling of what was called a *training order* of 300 Wellington bombers. Among the limitations of Canadian plants was the complete absence of an engine manufacturing capability. Any aircraft built in Canada would require engines, most likely from the UK, before they could get off the ground. The conclusion of the team was that it would take the Canadian industry 24 months to fulfill the training order.[22] But in September 1939 there was no such grace period.

With the outbreak of conflict and the need to acquire hundreds and then thousands of aircraft, both for the dozens of British Commonwealth Air Training Plan schools as well as operational squadrons, it was almost immediately apparent that the

[19] The relationships between air services and their senior armies and navies are described in the various chapters of Randall Wakelam, David Varey and Emanuele Sica, *Educating Air Forces: Global Perspectives on Airpower Learning* (Lexington Kentucky, University Press of Kentucky, 2020).
[20] Douglas, *A National Air Force*, p. 63.
[21] E.J. Stedman, *From Box Kite to Jet: The Memoirs of an Aeronautical Engineer* [Canadian War Museum, paper number one] [Ottawa: National Museums of Canada, 1972], p. 171.
[22] H Duncan Hall, *North American Supply* (London, Longman's, 1955), pp. 28-31.

RCAF, with its almost non-existent procurement experience, could not manage the processes needed for these massive procurements. Former industrialist and senior liberal cabinet minister C.D. Howe was given the task of establishing a Department of Munitions and Supplies which would do the buying for the three services. Howe, perhaps more than the air marshals, would hold control over procurement decisions for the next decade.[23]

One of the most telling episodes during the war came when the RCAF was in urgent need of fighters to equip its Home War Establishment. Could not, asked the Air Force, some of the Hurricanes being manufactured in Canada by Canadian Car and Foundry be assigned to domestic operational needs. The answer from Howe was a clear no. Any aircraft, or weapon system, built in Canada was distributed across the alliance by the Combined Munitions Assignment Board (a US-UK-run agency) in Washington. Canada, it seemed, could do no more than make its requirements known. Whether or not Howe sided with the RCAF was irrelevant, the RCAF was left with cap in hand, not unlike the meagre procurement experiences of the interwar decades.[24] These experiences could not have had an impact on the thinking of RCAF leaders.

By the midpoint of the war, Canada was building a range of necessary aircraft from simple trainers to reasonably complex twin-engine bombers and reconnaissance aircraft, as well as Hurricane fighters. It was at this point that Howe, not the CAS, opined that Canada needed to take on the production of a four-engine bomber to demonstrate the nation's potential to build, though not design, the most complex aircraft of the era.[25] From this decision Victory Aircraft was established in Malton, now the site of Pearson Airport, and production of Lancaster bombers commenced. Not far away, Downsview, de Havilland Canada was producing the fabled Mosquito. Howe also recognized that Canada needed an engine-producing capability and set about to have engineers trained in the UK on cutting-edge jet engine technology, subsequently establishing an R and D capability in Canada known as Turbo Research Limited.[26]

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[23] Stacey, *Arms, Men and Governments*, pp. 122-3
[24] Hall, *North American Supply*,p. 23.
[25] J.W. Pickersgill, *The Mackenzie King Record Vol 1, 1939-1944* (Toronto, University of Toronto Press, 1960), p. 159.
[26] Wakelam, *Cold War Fighters*, pp. 21-2.

By late 1943 a number of post-conflict committees were being formed across government. Within National Defence the Air Force developed a proposal for a balanced organization that was massive compared to the pre-war Air Force. Concurrently the ability to build aircraft in Canada was considered. Within the RCAF AVM Ernest Stedman, a well-versed aeronautical engineer, and now Chief of Research and Development, lobbied hard for a capability to produce an aircraft with combat capability. With the recent experience of the MAB assignment policy and practices, he was after a fighter. On 20 May of that year, Stedman reminded the CAS that in his initial suggestion, he had talked about combat aircraft. He held that there would be no need for large numbers of transports and that if it did not build combat aircraft, Canada would find itself once again obliged to go to its allies for warplanes.[27]

Not all senior aviators were of the same opinion. Despite Stedman's urgings, at the first meeting of the Committee on Post-War Manufacture of Aircraft, held on 7 June 1943, A/V/M Alan Ferrier, the Air Member for Aircraft Engineering, stated that the Air Council, the senior decision-making body within the RCAF, which was chaired by the Minister of National Defence for Air, was "of the opinion that Canada should not attempt to embark upon the design and development of combat aircraft in competition with other major powers."[28]

Several months passed before additional high-level attention was paid to the issue. Then, at the beginning of March 1944, Ferrier, in a precis to the Air Council, reminded the members that in early 1943 they had been of the opinion that "a sound Aircraft Industry capable of producing its own designs was an absolutely essential foundation for future Canadian air power." If the Council's premise had been correct, said Ferrier, the time had come to place actual orders for aircraft so that the industry could survive in the coming years.[29] Ferrier returned to the Council on 18 April and gained general support for

[27] LAC, RG 24, vol. 6179, RCAF file 60-1-59, Aircraft Manufacture and Development in Canada, folder 1, DGR to CAS, "Post-war Type Aircraft to be Built in Canada," 20 May 1943.
[28] LAC, RG 24, vol. 6179, RCAF file 60-1-59, Aircraft Manufacture and Development in Canada, folder 1, "Draft Minutes of First Meeting of Committee on Post-war Manufacture of Aircraft," 7 June 1943.
[29] National Defence Directorate of Hisotry and Heritage (DHH), PARC, RCAF file 840-108, vol. 7, "Supporting Data for Item No. 8, Précis The Post-war Aircraft Industry," 6 March 1944; Minutes of Air Council Meeting 5/1944, 7 March 1944, p. 4. PARC files are part of the Library and Archives Canada collection held on long-term loan by DHH.

approaching DMS with a proposal to conduct a competition for a two-engine general utility crew trainer, not unlike the existing and successful Avro Anson. The value of this competition was estimated at $1 million and would allow for two bidders to build three trial aircraft each.[30] This was not a large sum of money, yet when the proposal was presented to the Treasury Board in early May, it was set aside for three months based on an earlier Cabinet War Committee (CWC) decision to temporarily defer all postwar projects.[31]

It was not until the fall that the money was approved for the trainer. At the CWC meeting of 27 September 1944, the issue of the postwar aviation industry was again tabled. Development money for the trainer was not the only air issue on the agenda; Aircraft Lodge Number 712 of the International Association of Machinists, a union local in Montreal, had written to the Prime Minister expressing concern over possible unemployment. If the RCAF had failed to get Cabinet's attention, perhaps the voters could: the CWC "approved, in principle, the recommendation ... for the expenditure of up to $1,000,000 for design and construction of prototypes" for the trainer.[32] Postwar national stability and economic health would become increasingly important, as Howe's April 1945 White Paper on Employment and Income would show, but the impetus for postwar activity in military aircraft design and manufacture came from the RCAF.[33]

Although this decision represented a 'million ' move towards designing an aircraft for the Air Force, such an aircraft was not by any stretch of the imagination a combat aircraft. Still concerned, Stedman did not let the matter rest and prepared a memo that was reviewed by the CWC on 3 May 1944. The document laid out the problems that the RCAF had experienced up to that point in the war as a result of not having domestic aircraft design or manufacturing capability to meet Air Force needs. He argued that this could not

[30] DHH), PARC, RCAF file 840-108, vol. 7, Minutes of Air Council Meeting 7/1944, 18 April 1944, describes the twin trainer concept.

[31] DHH, PARC, RCAF file 840-108, vol. 7.

[32] Library and Archives Canada (LAC), RG 2, 7C, reel C4876, vol. 16, Minutes of Cabinet War Committee, 27 September 1944, p. 2; Cabinet War Committee Document 868, "Memorandum to Cabinet War Committee re: Aircraft Industry in Canada," prepared by PCO, n.d.

[33] Robert Bothwell and William Kilbourn, *C.D. Howe: A Biography* (Toronto: McClelland and Stewart, 1979), pp. 191-95. The authors indicate that Howe was more interested in the aviation industry than in the needs of the air force. Aviation "would expand and it would be an important feature of his reconstruction program, a splendid example of 'intensive action' under his direction."

be allowed to persist but cautioned that the government's commitment would be considerable and long-term. He went on to point out that Canada was losing talented aeronautical personnel to other countries where they could find opportunities to work on advanced aircraft. If the government was going to support the aeronautical manufacturers, it should do so in a way that would keep these people at home. He pointed to the new field of jet propulsion and recommended that research be started on a propulsion unit for service requirements. The CWC noted these points and agreed to re-examine the matter in three months.[34]

On the other hand, Howe and the aircraft division of DMS believed that the nation would benefit more from a transport aircraft capable of providing for cross-country passenger and freight work.[35]

With the coming of peace, Stedman and the RCAF did get the go-ahead to develop a prototype jet fighter and this would become the CF100. There was no competition; instead, the work was assigned to the newly created AVRO Canada (built on the foundation of the previous Victory aircraft which had been building the AVRO Lancasters) which was also given the task of designing a jet transport. This would become the AVRO Jetliner. Destined to fly only days after the de Havilland Comet in the UK, the Jetliner was soon cancelled for lack of suitable engines.[36]

While discussions about designing and building aircraft had been taking place a bigger question, what sort of air force would Canada need, had been going on in parallel. In 1943 the government, like allied nations, had begun to think about a post-war world. Within a broader pan-government process the RCAF established a post hostilities committee to map out a force structure that would meet the perceptions of what a balanced air force should look like. The initial proposal – Plan A – called for a force capable of all major roles delivered by a mix of Regular and Auxiliary squadrons – 46 flying units and 30,000 thousand aviators.[37] Army and navy proposals tabled at the same time were equally comprehensive and big. All were seen as unnecessary by the

[34] LAC, RG 2, 7C, reel C4876, vol. 15, Minutes of Cabinet War Committee, 3 May 1944, p. 2; Cabinet War Committee Document 765, "The Post-war Aircraft Industry," n.d.
[35] Wakelam *Cold War Fighters*, pp. 19-20.
[36] Wakelam, *Cold War Fighters*, pp. 60-1.
[37] Wakelam, *Cold War Fighters* p 29; Plan A 1945.

government and after two more scaled-down proposals were tabled before the cabinet approved Plan E for a flying service with just 8 Regular squadrons and only 12,000 personnel.[38]

Despite heady aspirations to design and build aircraft in Canada, as was the case in 1919, post-war aircraft requirements were to be met largely by using credits from Britain. Spitfires and Mosquitoes were initially on offer but these plans were almost overnight transformed: the diminutive Vampire jet fighter was to be provided by the UK. Eighty-three could be had and this aligned very nicely with the requirement for 84. But also morphing was the requirement for a more robust capability as Cold War clouds formed. Staff within AFHQ and Air Defence Command coordinated their thinking with US counterparts, and the cabinet was kept aware of the growing menace. RCAF leaders and politicians were not immune to the risks of being unprepared. As the need to defend Canada from air attack evolved, it was C.D. Howe, now Minister of Defence Production, who led efforts to acquire P 51 Mustangs and soon after the production rights for the F 86 Sabre. These aircraft would serve for a short period and provide defence of major urban-industrial areas.

Sabre production went to Canadair, which had been created, again by the direction of DMS, out of Canadian Vickers, where initially the aircraft were assembled from kits arriving from the US manufacturer, North American Aircraft. Soon, however, jigs and tools for complete manufacture were produced in Montreal and full-scale production began. Canadian Sabres immediately started to see modifications and would be recognized for their smooth flight controls thanks to changes to the hydraulics systems, but the big change came with the introduction of the Orenda engine initially intended only for the CF 100s.

Canadair's competence in manufacturing was not repeated at AVRO. There, in general, work fell behind schedule for two main reasons. First, there was the complexity of designing an aircraft from scratch. While the design team was lauded, it made mistakes and these caused Howe to question whether or not to cancel the programme and seek other aircraft from the US or UK. His concerns were not without merit. Senior AVRO leadership admitted to problems among themselves and the design changes

[38] Wakelam, *Cold War Fighters* p 45; Plan E 1947.

effected in the pre-production aircraft were not successful and led to the aircraft earning its nickname: the Clunk.[39]

It was not just the AVRO team that caused problems. RCAF requirements staff kept thinking about the possibilities of turning the Clunk into a 1950s multi-role fighter; new statements of requirement for ground attack, reconnaissance, and dual trainer versions were produced even as the basic air defence model of the aircraft had yet to come off the production line. Specifications for various on-board systems were similarly slow to emerge.[40]

The same actors were by 1953 also looking at a replacement for the Canucks and Sabres: the Arrow. Much has been written about how the Diefenbaker government's 1959 decision to cancel this futurist aircraft was an unimaginable political folly, but the actual folly seemed to be well recognized by the preceding liberal government if not the RCAF.

The cost of the Arrow program was an overwhelming concern, not only for the Cabinet but also for the public and even the RCAF. It was because of public concern over Soviet intentions that Canada's defence policy and its aircraft programme were scrutinized in the press. As might be expected, the cancellation was controversial and there was strong criticism of the government's decision. For instance, a *Vancouver Province* article on 8 January 1952 criticized the aircraft programme by pointing out its steep price tag, with F-86s costing $500,000 each and CF-100s $1,000,000. If Ottawa was thinking of a supersonic fighter, then why not buy them used? True, the current crisis had led to the decision for domestic production, but there was still the question of just how far the nation should carry this capability.[41]

Significantly, on learning that the Americans were looking at similar requirements to those planned for the Arrow, the CAS, Air Marshal (AM) Roy Slemon, was apparently not happy: "… the decision was made to proceed with the C105 project [when] it was assured no other country was planning on building an aircraft to meet the RCAF operational requirement. When governmental approval was granted for the C105, the

[39] Wakelam, *Cold War Fighters*, pp. 119-121.
[40] Wakelam, *Cold War Fighters*, pp. 76-7.
[41] LAC, MG 32 B5, Vol 94, Aircraft Clippings folder. Ross Munro, "Why Millions for Super Planes?" *Vancouver Province*, 8 January 1952,

CAS assured the Minister that if there was a possibility of procuring a new type to fill the RCAF requirements from other sources, the project would be curtailed."[42] Arguably with these factors in play as early as 1954 the Liberal government should not have hesitated to cancel the development of the Arrow. As the decade rolled on and the work progressed, problems with onboard systems, much as had occurred with the Clunk, pushed design costs and eventual unit prices even higher.[43]

There was, finally no appetite for the Arrow, and emerging almost simultaneously there was an even greater threat. With the launch of the Russian satellite *Sputnik* in 1957 the likelihood of ICBMs became a reality and the relative threat from bombers dropped far down in threat assessments. The answer to the missile threat was seen to be an investment in surface-to-air missiles, but the acquisition of two squadrons of Bomarc missiles protecting the Windsor-Quebec corridor was surely insufficient for the actual air defence needs of a country facing a growing ballistic missile threat. How RCAF leaders and their political masters determined that this was sufficient seems unexplainable. Was the Bomarc seen as all the government could afford or was willing to spend?

By the late 1950s, the bomber threat had not, as many had thought, disappeared, and those CF-100s still assigned to NORAD were deemed obsolescent by 1960 and had to be replaced. The replacements were what we might call *gently used* USAF F-101 Voodoo air defence fighters, which were manufactured in the US by McDonnell.[44] A decade later, these aircraft were exchanged with the USAF for yet another batch of less-used Voodoos.[45] Two rounds of accepting used aircraft in small numbers did not point to the existence of anything approaching a Canadian-built fighter capability; if anything, the pattern of purchases harkened back to the interwar years and the acceptance of whatever

[42]DHH 73/1223, Minutes of Air Members Meeting 194, 7 April 1954. See also Ray Stouffer *Swords, Clunks and Widowmakers*: *The Tumultous Life of the RCAF's Original 1 Canadian Air Division*, p, 108. Accessed 6 September 2023 http://publications.gc.ca/collections/collection_2016/mdn-dnd/D2-355-2015-eng.pdf

[43] See Russell Isinger and Donald C. Story, "Hubris: The CF-105 Avro Arrow and the End of the Golden Age of the Royal Canadain Air Force", in *On the Wings of War and Peace: The RCAF During the Early Cold War*, eds. Randall Wakelam, William March and Peter Rayls (Toronto, University of Toronto Press, 2023), pp. 107-127.

[44] John Miller, "1200 mph, 2,000-Mile Range: First of US Supersonic Voodoos Turned Over to RCAF at Uplands." *The Globe and Mail* 25 July 1961, p. 13.

[45] Clyde Sanger, "Voodoos to be Traded-in for U.S. Models, Defense Minister tells House committee" *The Globe and Mail*, 11 March 1970, p. 31.

reasonable solution might be available.

Similarly, the F-86s in Europe had reached the end of their service effectiveness. Moreover, as Canada now accepted a new nuclear strike role for the 1960s the Sabres had to be replaced and this was done by acquiring the American Lockheed F-104 Starfighter. While, like the Voodoo, initially designed as an air defence interceptor, the F-104 was deemed suitable for its new attack role. More importantly, the F-104, while not the favoured choice of the RCAF, was accepted by the Minister of Defence Production, Raymond O'Hurley, who was able to negotiate a better industrial offset package with the parent company, Lockheed, than that offered by the other contender, with licence production going to Canadair.[46] On 1 August 1959, a deal was announced for the manufacture of 200 aircraft, with the production of 66 additional sets of major components also added to the contract.[47] In fairness, Canada was not alone in adopting the Starfighter: Norway, Germany, Italy and other NATO nations all flew the aircraft for many years. That considerable work went to Canadair meant that that enterprise could stay viable. The members of Aircraft Lodge Number 712 were no doubt content.

A third small purchase from the US came in the latter part of the 1960s with the acquisition of the North American Freedom Fighter, the F-5, which, built in the same fashion as its older cousin, the F-86, under licence by Canadair, was to equip two squadrons of tactical fighters assigned to NATO rapid deployment roles. This was not a good aircraft, but in this case, as in the other decisions in the previous years, it was a politician, the Minister of National Defence, Paul Hellyer, who influenced the purchase.[48] As Air Force historian Ray Stouffer recounts:

> On December 8, 1964, the Cabinet decided "that the Government was not in a position to reach a conclusion concerning future aircraft needs of the RCAF, [however] that it was the present view of the Government that the

[46] Ray Stouffer, *Swords, Clunks and Widowmakers: The Tumultuous Life of the RCAF's Original 1 Canadian Air Division* (Ottawa: National Defence, 2015), pp. 105-11. Accessed 6 September 2023 http://publications.gc.ca/collections/collection_2016/mdn-dnd/D2-355-2015 -eng.pdf.

[47] "Canadair CF 104 Starfighter," accessed 5 September 2020, http://www.canadianstarfighterassociation.org/story.htm

[48] Ray Stouffer, "Cold War Air Power Choices for the RCAF: Paul Hellyer and the Selection of the CF-5 Freedom Fighter" *Canadian Military Journal,* pp. 7, 3, 63-73. Stouffer's presentation of the facts provides a fascinating and perhaps alarming examination of the tortuous and highly politicized nature of defence procurement, particularly concerning aircraft.

> F-4 did not fulfil force requirements." The next day, Prime Minister Pearson informed his British counterpart, Harold Wilson, that the deal for the joint production of the F-4 was off. Unfortunately for Canadian airmen, this action ended the chances for the RCAF to buy what would turn out to be one of the most successful and versatile cold-war combat aircraft ever produced in the West. It also opened the door for the eventual acquisition of the CF-5.[49]

All three of these fighter fleets were replaced in the early 1980s by the F-18. The historical record suggests that procurement was done as perhaps all others should have been with a rigorous analysis of requirements and an unbiased determination of the best aircraft to meet the needs of the Air Force. Certainly, given the fact that allies flew much of the same aircraft for many decades, there is some accuracy in that conclusion.

The story of fighter acquisition can be all-consuming, but the RCAF also operated other major fleets throughout the Cold War. The aircraft used were assortments of locally developed platforms, based on US or UK designs, and more or less offthe-the-shelf US models. From a historiographical perspective, it is significant that we have a reasonably complete understanding of the issues and decisions behind various fighter procurements; it goes with the public's interest in these *go-fast* aircraft. The remainder of the Force's aircraft, with perhaps the replacement of the Sea King which has been examined by Aaron Plamondon, have received lesser attention and more work is certainly recommended.[50]

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Turning then to look at transport and other multi-engine fleets, it is important to understand that locally developed platforms had from 1945 been an important product philosophy for business stability at Canadair. When work on the CF 100 and AVRO Jetliner went to Toronto, Canadair, formed by Howe in 1944 from Canadian Vickers, turned initially and successfully to refurbishing C-46, C-47 and C-54 transports. Soon after the war, when the RCAF and Canadian airlines expressed the need for a means of

[49] Stouffer, *Swords, Clunks and Widowmakers, p.* 145

[50] Arron Plamondon, *The Politics of Procurement: Military Acquisition in Canada and the* Sea King *Helicopter* (Vancouver, UBC Press, 2010).
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long-range transport, not unlike Howe's vision of this very thing for Canadian needs, Canadair saw the possibility of melding the fuselage of the US-produced DC-4, the nose of the newer DC-6 and Merlin engines from the UK. Thus, was born in 1946 the North Star, an aircraft which would prove very noisy but also highly successful in the RCAF's contribution to airlift to Korea and subsequent UN operations in Africa and the Far East. It should also be recognized that of the 71 produced more than half went to Trans Canada Airlines (today's Air Canada) (20) and British Overseas Airways Corporation (22).[51]

The other four-engine aircraft operated after the war, and indeed well into the next decade in a mapping role, was the venerable Lancaster which was now pressed into service for long-range reconnaissance and maritime patrol. Even before the end of the 1940s, it was apparent to the air staff that this trusted bomber was not well suited to anti-submarine warfare and the CAS, Air Marshal Wilf Curtis, went before the cabinet in late 1949 to seek approval for a Canadian designed and built replacement; this would become the Argus. Approval apparently came quickly and has been attributed to Curtis' ability to work with key cabinet members.[52] The aircraft was to be capable of unique operational capabilities. The RCAF was looking for an aircraft with the range and endurance required to close the mid-Atlantic gap between Iceland and Newfoundland and remain over that piece of ocean for several hours period, while also carrying sufficient sensors and weapons to find and engage submarines. In essence, the RCAF sought an ASW aircraft with a range beyond that of any then-available aircraft from Britain or the US.

Coincidentally, perhaps, in the closing weeks of 1949 discussions were taking place at Canadair about making a pitch to the government that would propose a modified North Star transport for the maritime role. When this concept was put forward the RCAF was able to decline given the limitations of that aircraft. A subsequent search for suitable candidates led to two proposals, one from Lockheed and a second from Bristol Aircraft, the model 175. The Lockheed machine lacked adequate low-altitude flight

[51] Larry Milberry, *The Canadair North Star*. Toronto: CANAV Books, 1982., pp. 213–214. See also Ron Pickler and Larry Milberry, *Canadair: The First 50 Years*. Toronto: CANAV Books, 1995.

[52] Earnest Cable, "Maritime Air" in *On the Wings of War and Peace: The RCAF During the Early Cold War*, eds. Randall Wakelam, William March and Peter Rayls (Toronto, University of Toronto Press, 2023), p. 337. Ron Pickler and Larry Milberry, *Canadair: The First Fifty Years* (Toronto: CANAV Books, 1995),p. 120. See also. Cabinet Defence Committee Document D 50/53 dated November 26, 1953.

characteristics, but the Bristol proposal seemed to offer efficiencies, as the standard transport version of the Bristol 175 design could also replace the North Stars.[53]

Just how Bristol and Canadair could meet the RCAF's needs was discussed in 1952 when RCAF, Department of Defence Production (the successor to Munitions and Supply), Bristol and Canadair personnel met to map out the broad lines. In essence, Canadair would produce a new fuselage with necessary sensors, weapons systems and crew accommodation while Bristol would deliver the remaining parts – the wings and tail section. Canadair would then meld everything into the final aircraft. The concept was presented to the cabinet at the close of 1953 and the construction of one prototype was approved. A subsequent study outlining the joint navy-air force concept for ASW was prepared in early 1954 and based on this the need for the Argus was confirmed. With the results of the study in hand cabinet approved the purchase of 13 aircraft in late February 1954 and the first aircraft was delivered to the RCAF in December 1956.[54] A subsequent order for an additional 20 aircraft was already in place and the 33rd aircraft was delivered in July 1960. This fleet, with capabilities initially unmatched by allied aircraft, would remain in service until the closing weeks of 1980.[55]

With initial Argus deliveries still years away in 1951, similar quick approval was granted by the cabinet for a gap filler aircraft that, while having a lesser range than the Lancaster, was purpose-built for ASW. This was the PV-2 Neptune, already in production for the US Navy. The CAS received the go-ahead from cabinet and within three years the order for 25 aircraft was in place. Deliveries would be completed within 6 months; coming from the USN production line they arrived with RCAF roundels and serials but were painted in USN blue.[56]

Returning to the issue of transport needs, with Argus production underway, in the late 1950s Canadair embarked on a similar remodelling of the Bristol Britannia as a long-range transport for both civilian operators as well as the RCAF which named the aircraft the Yukon. The Canadair history notes that: "the first Yukon reached flight status amid

[53] Pickler and Milberry, *Canadair: the First Fifty*, p. 120.
[54] Pickler and Milberry, *Canadair: the First Fifty,* pp. 120-21.
[55] Pickler and Milberry, *Canadair: the First Fifty,* p. 132.
[56] See for example. Earnest Cable, p. 335. See also Terry Leversedge, "The Lockheed P2V-7 Neptune in Royal Canadian Air Force Service," *Kestrel Aerospace Profiles Lockheed CP-122 Neptune*, accessed 15 Sep 2023 https://www.seaforces.org/marint/Canadian-Navy/AVIATION/CP-122-Neptune.htm

a confusion of late engineering changes, the unorthodox introduction of changes, negotiation of post-flight modifications and temporary acceptance of deficiencies to be corrected later." "If there was anything approaching disaster status, it was Rolls-Royce's inability to meet engine delivery schedules…."[57] An observer might reasonably opine that the problems which had vexed AVRO less than a decade earlier were not limited to the Malton-based company.

The ensuing Yukon did what was wanted but the purchase was questioned at the time by those who wondered why the RCAF would want a turboprop-powered aircraft when allies and the world were moving towards jet transports. As noted by a future commanding officer of the 437 Squadron (the unit that operated the Yukons):

> The air staff view was that since we were already operating the Comet jet transport and Boeing and Douglas were about to launch the 707 and DC-8 respectively, the obvious course for a new logistics transport should be a fast, high capacity, jet-powered aircraft…. A political decision had been made that another version of the Bristol Britannia … would be built at Canadair, thus solving the political and aerospace industries problem while relegating the military to making do with an aircraft that was destined to be obsolete before the first aircraft rolled off the production line.[58]

Worse, the Yukons, essentially commercial airliners, were not capable of tactical airlift into austere locations or of transporting oversized cargo due to the fuselage diameter and cargo door configuration. Perhaps not surprisingly the 11 Yukons were replaced by five Boeing 707s in 1971 after just 11 years of service.[59]

To deal with tactical transport during these two decades the RCAF relied on two USAF aircraft which met Canadian needs. These were the C119 Boxcar and subsequently the C130 Hercules. The Boxcars had been acquired to replace the post-war Dakotas which

[57] Pickler and Milberry, *Canadair: the First Fifty*, p. 136.

[58] Lieutenant General David R. Adamson (retd), "The Yukon Saga," *Air Force Magazine*, 33, no. 3, (Fall 2009). Cited by Bertram Frandsen "Air Transport Command: Versatile and Ready in Cold War and Hot War" in *On the Wings of War and Peace: The RCAF During the Early Cold War*, eds. Randall Wakelam, William March and Peter Rayls (Toronto, University of Toronto Press, 2023), p. 385.

[59] Pickler and Milberry, p. 141.

had, to be honest, proven capable of moving limited forces into the north in support of army training for potential operations against a Soviet incursion. The Boxcars were, however, modern in every sense and had a much-improved oversized cargo capability. The plan was to purchase 48 aircraft but as the army's needs declined (along with their interest in northern operations) the order was reduced to 35 transports.[60]

As useful as the Boxcars were, shrinking budgets and the requirement for transport capable to intercontinental ranges meant that the air staff needed something better. The C 130 Hercules seemed ideal and four B models could be had in the early 60s for the relatively low piece of $14M. While there was no question about the utility of the aircraft, it appears that it was the economy that was a key driver behind the decision.[61]

More Hercules were to follow. The 1964 defence policy focused on rapidly deployable forces and these by their nature required airlift to get to hot spots. The MND, Paul Hellyer, claimed that he pushed the Air Force towards modernizing its transport fleet.[62] With that push, despite the purported relative disinterest by RCAF in support of the army, 24 E model Hercules aswere purchased along with 15 DHC Buffalo aircraft, the latter for a truly tactical lift. The Buffalos were the turboprop version of the Caribou, a procurement which will be discussed next.

There is a third tranche to the transport story and that is the work done by De Havilland Canada in producing a number of very successful STOL aircraft. Intriguingly, only small numbers of these were bought by the RCAF despite their excellent capabilities, but perhaps we should not be surprised as the RCAF was not heavily involved in the small war's operations that the US Army (the main customer) and the RAF were engaged in throughout the -post-war decades. Indeed it would seem that the small numbers acquired by the RCAF suggest purchases driven as much by politics as operational need.

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[60] Fransden "Air Transport Command", p. 383. See also Richard Mayne, "Keep Them Flying: The C-119 Flying Boxcar, Its Replacement and the Development of the RCAF's Air Transport Capability (Part 1)," *Canadian Aviation Historical Journal* 54, no. 1, (Spring 2016), pp. 18–22.

[61] Frandsen "Air Transport Command",p. 386. See also Jon B. McLin, Canada's Changing Defense Policy, 1957–1963: The Problem of a Middle Power in Alliance, (Baltimore: Johns Hopkins Press, 1967), 200–1.

[62] Frandsen, "Air Transport Command," p. 388. See also Paul Hellyer, *Damn the Torpedoes: My Fight to Unify Canada's Armed Forces*, (Toronto: McClelland and Stewart, Inc., 1990).

Of the over 450 Otters manufactured by de Havilland approximately three dozen were purchased by the RCAF, the first coming arriving soon after the type was certified in 1951. The aircraft proved useful for its intended light transport work, particularly in the north and also for peace support operations. But in 1960, when the Auxiliary Air Force was in need of both a viable role and a simple easily maintained aircraft, the Otters were passed to the reserve squadrons as they took on a somewhat ill-defined role in the nation's national survival framework.[63]

The international success of the Otter led to the development of a larger aircraft, the DHC 4 Caribou and over 170 were ordered by the US Army at the end of the 1950s.[64] The aircraft aswas exactly what that army required for intra-theatre mobility. Throughout the latter part of that decade the Canadian army, and specifically the Royal Canadian Army Service Corps (RCASC), had been studying the same question as it related to operating on a dispersed nuclear battlefield and wanted to purchase small numbers of both the Caribou and transport helicopters (ultimately the Boeing Vertol Model 107) to field test their thinking. Despite RCAF's misgivings about the army operating fixed-wing aircraft of this size and complexity the air staff finally agreed to allow the army to have its air fleets only to have the army drop the concept and need for the Caribous after the contract had been signed. As it would happen the aircraft could and did fill a void in RCAF capability as UN operations in Africa ramped up.[65]

While the army shifted away from the Caribou it still recognized the need for air transport on the battlefield. The US Army and Marines were already well down this path, operating a number of different transport helicopters built by Sikorsky and Boeing. The Model 107 was coming into use by the Marines and the US Army was in the process of acquiring hundreds of Boeing Model 114 Chinooks. As mentioned above the Model 107 had been the Canadian Army's desired machine and in fact, the Army was moving in this very direction. On 20 August 1962 Mr. EB Armstrong, the Deputy Minister of

[63] Mathias Joost, "The Air Reserves: A Functional Second Line of Defence," in *On the Wings of War and Peace: The RCAF During the Early Cold War*, eds. Randall Wakelam, William March and Peter Rayls (Toronto, University of Toronto Press, 2023), pp. 243-7.
[64] Fred Hotson, *The de Havilland Caribou Story*, (Toronto, CANV Books, 1983), pp. 146-58.
[65] Dean Black, "From Army Cooperation to Army Co-optation: Canada's Struggles with Aviation Support to the Land Forces, in Cold War and Hot War" in *On the Wings of War and Peace: The RCAF During the Early Cold War*, eds. Randall Wakelam, William March and Peter Rayls (Toronto, University of Toronto Press, 2023), p. 363; see also Frandsen "Air Transp[ort Command", pp. 384-5.

National Defence, wrote to the Secretary of the Treasury Board asking for authority to procure 12 cargo helicopters for the Army (and another six for RCAF SAR operations). He made reference to the fact the Treasury Board had actually approved procurement in January of the same year. The type in question, the Vertol 107, was being acquired by the hundreds by the USAF and Marine Corps. Armstrong pointed out some good news: the Marine Corps variant of the aircraft was actually more capable than that proposed by the Canadian Army and the manufacturer was prepared to sell it to the Canadians at the Marine Corps' price. But there was bad news too: because of differences in exchange rates these aircraft would now cost approximately $680,000 more than had been originally budgeted.[66] Money, as always was an issue, but the purchase was completed quickly and the aircraft were in service by 1965. Only a decade later all 15 remaining aircraft had been transferred to Air Force SAR units while 8 Chinooks had been purchased as part of a large acquisition of rotorcraft for support to Mobile Command as the army was now called.[67]

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If this is the historical record what do we make of it? Albert Einstein apparently opined that: Insanity is doing the same thing over and over and expecting different results."[68] If, not always but often enough, attempts to acquire some necessary platform in sufficient numbers to give the Air Force a sound operational capability have failed or have been mired in process and politics then what can be done? Is the RCAF, as an institution, insane? My sense is that so long as the procurement process is controlled largely by the policies and processes of departments other than DND those in the department and the RCAF must find ways to better understand and operate within the

[66] Randall Wakelam "Creating An Air Arm for the Canadian Army," *Canadian Army Journal*, vol 15, no 2, Autumn 2013, pp. 67-90. The citation is based on a Canadian Army document, HQ 7811-0 TD 1313 Memorandum "Cargo Helicopters RCAF and Army" DM DND to Secretary Treasury Board 20 Aug 62 (provided to the author by LCol (retd) Dean Black). See also T.B. 589042-1 Memorandum Secretary Treasury Board to DM DND 27 Aug p. 62 (provided to the author by LCol (retd) Dean Black).

[67] Larry Milberry. *Sixty Years – The RCAF and Air Command 1924–1984*, McGraw Hill Ryerson, 1984, pp. 472.

[68] Frank Wilczek, "Einstein's Parable of Quantum Insanity," *Quanta Magazine*, 23 September 2015, accessed 15 August 2023, https://www.scientificamerican.com/article/einstein-s-parable-of-quantum-insanity/#:~:text="Insanity%20is%20doing%20the%20same,usually%20attributed%20to%20Albert%20Einstein.
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decision processes of those organizations. Senior aviators like Earnest Stedman and Wilf Curtis seem to have managed this but how do we make this sort of skilled negotiation the norm?

How do we do this? My thinking is that we need to create a cadre of RCAF officers and senior NCOs who understand the strategic environment in so far as government priorities are concerned and also to understand the procurement process. These procurement experts need to be able to manoeuvre in these spaces to move needed equipment requirements to completion as expeditiously as possible. Rapid procurement has been possible in the past, so how do we replicate those successes?

The status quo provides personnel assigned to procurement positions on the Air Staff with a rudimentary understanding of the process *checklist*. But is that enough? Are they *safe for solo*?

There was a time, until very recently when the RCAF had a bespoke advanced education programme that would give an in-depth exposure to emerging technologies and procurement ways and means to the students attending. This was the Aerospace Studies Programme (formerly the Aerospace Systems Course), a 10-month residential course designed to:

> provide graduates with a broad spectrum of expertise, thus enabling them to cope with tasks such as:
>
> - conducting aerospace systems analysis to define and recommend new or modified equipment requirements
> - participating in the management of aerospace research and development projects to ensure user requirements are properly translated into feasible technical parameters
> - participating in the management of major aerospace capital acquisition programmes
> - participating in the development, evaluation, qualification, and flight testing of aerospace systems

- defining and implementing training requirements arising from new or modified aerospace systems[69]

According to its web page, in 2019 the course had an optimal loading of 12 students (captains and majors) per year. But the course was actually discontinued in 2021. Before this termination the Air Force was finding a disproportionate number of graduates were remaining at Barker College to become instructors and not so many were in fact going to the projects.[70]

These realities compare none too favourably with the Army's Applied Military Science (AMS) programme where there are typically 24 students each year, of whom 16 are captains and eight experienced warrant officers and master warrant officers. One's first reaction to the difference in student numbers (if hypothetically the ASP was still running) might be to ask why, if the RCAF faces similar, or in my view greater challenges in acquiring necessary platforms, did it produce only roughly half the number of procurement specialists when compared to the army?

The answer to that question has to be left dangling; however, there are two significant philosophical statements on the AMS splash page. First, we read that: "The success of AMS in preparing students to meet the challenges of developing the future CAF is clearly evident by the number of high-profile graduates from this program who are currently serving in key command and staff positions."[71] Implicit here is that once imbued with these procurement competencies graduates go on to more advanced appointments than those typical of the junior officer graduates. One wonders if the army is implicitly or explicitly signalling the creation of a talent pool of procurement specialists who cycle in and out of procurement staff positions as they advance in rank.

This stratagem was in fact recommended about a decade ago by LGen Mike Jeffrey who was asked to look at the PME needs of the general officer corps. In his analysis, Jeffrey determined that about two-thirds of the then general and flag officer (GOFO)

[69] Government of Canada, "Aerospace Systems Course" accessed 10 August 2023, https://www.canada.ca/en/air-force/services/training-education/royal-canadian-air-force-international-training-programs/aerospace-systems-course.html.
[70] Email, Commander 2 Canadian Air Division to the author 10 August 2023.
[71] Canada Department of National Defence Royal Military College "Applied Military Science." accessed 10 Aug 23, https://www.rmc-cmr.ca/en/applied-military-science/department-applied-military-science-ams.

positions were to be found in institutional activities such as personnel, finance, infrastructure and, yes, procurement. Jeffrey wrote that was far too late in a GOFO's career to appoint them to one of these positions if they had not had any experience in the field previously. Certainly, they could learn quickly but would not likely be as effective as had they worked their way up through a particular function.[72] Imagine appointing an aviator with a maritime helicopter background as CO of a fighter squadron; it might work but then again it might not.

Such realities are recognized in two fairly recent student papers from the Canadian Forces College. In 2018 one Army student wrote:

> The lack of training within the PM framework available to military personnel newly posted to ADM (Mat) can be linked to a lack of emphasis at the DP 2 for PM training. This led ADM (Mat) to develop a project management boot camp that involves a series of PM courses completed consecutively over 16 days. The training includes basic PM training and statement of work drafting in order to prepare individuals to become certified a DND PM level 1.19 The DND PM level 1 is the most junior level of PM qualifications within PMCD. To become DND PM level 2 or 3 certified requires a significant amount of training and experience acquired over a number of years and aligned more with the DP 3. PMCD level 2 or 3 training requirements would be excessive for DP 2 officers.[73]

His conclusions and recommendations focused on the need to better identify and include project management competencies in the overall officer development curricula.[74]

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[72] Michael K. Jeffrey, *CF Executive Development Programme - A Concept for Developmental Period 5: The CF Officer Professional Development System*. (Toronto, ON: Canadian Forces College, 2008).

[73] Major Tim Caines "Project Management: Niche Requirement Or Essential Officer Skillset?" Canadian Forces College (CFC) Service Paper, October 2018, 4. Accessed 15 August 2023 https://www.cfc.forces.gc.ca/259/290/308/192/caines.pdf . He cites Canada, Department of National Defence,"Boot Camps – A fast track to Project Management Expertise," Accessed 8 October 2018, https://lp-pa.forces.gc.ca/portal/pages/view/1788046/boot-camps-a-fast-track-to-project-management-expertise; and, Canada, Department of National Defence, A-PD-002-000/AG-000, *Standard for Project Managers Competencies*, (Ottawa: ADM (Mat), 2016), pp. 2-3.

[74] Caines, p. 6.

A second student, also Army, observed that

> Much of the literature attributes the delays to the highly politicized and bureaucratic nature of the process itself, but as David Perry, a senior analyst with the Canadian Global Affairs Institute points out, ''a mismatch between the procurement workload and the capacity of the procurement system to maintain it is also to blame. Consequently, the Department is set to ''[g]row and professionalize the defence procurement workforce in order to strengthen the capacity to manage the acquisition and support of today's complex military capabilities.''[75]

But this student points out another problem with how business was being done then and is perhaps still being done:

> Too much focus is given to individuals who demonstrate the potential for command that it reduces the talent pool of project managers by narrowing its search to proven tactical leaders only. As a result, Assistant Deputy Minister (Materiel) (ADM(Mat)) and other level 1 organizations such as Vice Chief of Defence Staff and Chief Military Personnel (CMP) sometimes receive inexperienced and ill-prepared officers to manage this very important institution.[76]

The realities of procurement in Ottawa go beyond identifying the technologies that meet the operational need. As the historical experience indicates there is probably more fog and friction in getting an operationally sound recommendation through pan-government committees and finally through cabinet than there is in getting internal CAF acceptance of new requirements. As former Defence Minister Peter Mackay stated recently:

> In my experience, there has been a distinct lack of coordination and communication between the departments responsible for military

[75] Robert Levac "Professionalization Of DND's Procurement Workforce: The Canadian Army Succession Plan Isn't Helping," CFC EXERCISE *SOLO FLIGHT*, May 2019,p. 2. Accessed 15 August 2023 https://www.cfc.forces.gc.ca/259/290/308/305/levac.pdf

[76] Levac, p. 2.

> procurement. Industry Canada, Public Works and Procurement, and National Defence — all overseen by the Treasury Board — often work at cross purposes and in silos. These woes have long plagued Canada's approach to defence spending, from boots to battleships. It would not be a stretch to call Canada's defence procurement system among the worst in the West, having bedevilled successive governments for years.[77]

If this is the experience of the recent minister, caught up, we should remember, in the F-35 melee of the last decade, then how might we prepare officers for this reality? Arguably a good dose of historical experience plus training in the practicalities of present-day policies and practices would be a good starting place.

The historical experience is valuable, I would say because it will expose those coming to the work with a sense of the factors in play during past procurements, factors which have not really changed. Understanding these realities would, I believe, help these individuals to develop a sense of the factors that they control and the factors that are beyond their control, and perhaps more importantly where and how these variables have been dealt with and where they have not.

Both now and in the future, current realities can and will likely vary to some extent even if the general factors remain. This being the case then introductory or refresher training in current practice is invaluable. In the late 80s, it was the Chief of Engineering and Maintenance, within the Associate Deputy Minister Materiel world, who was responsible for a three-week course on the intricacies of the processes. Similar courses exist today, but are these sufficient?

Beyond what amounts to just-in-time training there needs to be a place for broader and deeper education on procurement. While it is impossible to provide that education to all RCAF officers, arguably those going through the CAF's own university, RMC, should have access to, or even be encouraged to, courses in procurement history, government security, defence, procurement policy, and procurement processes. Some RMC history profs have mused about introducing a course on military procurement but

[77] Peter MacKay. "The Urgent Need to Fix Canada's Military — and How to Do It," *The National Post*, 14 August 2023, Accessed 15 Aug 2023 https://nationalpost.com/opinion/the-urgent-need-to-fix-canadas-military-and-how-to-do-it

this notion has not so far taken form. In terms of politics or economics courses here too there is nothing extant that specifically addresses the topic. Two politics courses which focus broadly on science and technology do contain some discussion on procurement. Neither course is part of the RMC mandatory *core curriculum* so student exposure is very limited. An economics course, ECE244 Defence Economics, is a distance learning course not open to RMC officer cadets, but does cover the themes suggested above and might offer a good grounding for personnel joining procurement staff. [78]

There are two undergrad business administration courses that look at certain aspects of procurement. A fourth-year course, BAE442 Project Management, "examines approaches to the management of major projects within and between organizations. Topics covered include, but are not limited to, requirement definition, project selection, organization, planning, scheduling, budgeting control and termination. Skills necessary for successful project management such as the ability to negotiate and the ability to identify and manage risk is also considered." A second course BAE 444 Supply Chain Management deals more with supply chains but also touches on the processes involved in procurement.[79] One RMC MBA course, MBA 593 Project Management, covers:

> project management from a "management" perspective, this course examines the discipline from a defence perspective. Topics covered include requirement definition, project selection, organization, planning, scheduling, budgeting, control and termination. The course discusses the role of the project manager and his/her interaction with the defence management system. Specific project management methods and techniques, including computer software, negotiation approaches, risk and quality management and procurement procedures are investigated. Completed and ongoing projects are studied.[80]

While all of these business courses provide focused learning on many of the processes of procurement, they do not seemingly examine the wider framework. Moreover, as part

[78] Emails between the author and Professors David Last and Professor Ugurhan Berkok, RMC Kingston, August 2023.

[79] Business Administration Courses RMC Undergraduate Calendar 2023-24, accessed 15 September 2023, https://www.rmc-cmr.ca/en/registrars-office/business-administration-undergraduate-courses

[80] Master of Business Administration courses, RMC Graduate Studies calendar 2023-2024, accessed 15 September 2023, https://www.rmc-cmr.ca/en/registrars-office/master-business-administration

of an integrated business administration curriculum, they have prerequisites which make them generally unavailable to students in other programmes.

If we return to the army's AMS 'tech staff programme' for a moment, it was mentioned above that there were two important philosophical ideas worth noting. The second deals with the NCO corps. AMS documentation recognizes: "… that the importance of AMS to the future of the CAF extends beyond its ability to train the Officer Corps. As [Warrant Officers] start to take on greater roles within the development process they will need more advanced skill sets to remain relevant members of the Defence Team."[81] It seems perfectly sensible that the army would entrust certain functions and tasks related to equipment replacement to the professionals who work most closely with weapons systems and one has to ask if such an approach might not be equally appropriate for the air force. This is certainly something that is already done by Air Force engineering and maintenance staff.

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Where does this leave us? The experiences of the past tell us that at certain points senior Air Force leadership did seem to have the acumen to define and move procurement needs through government decision processes relatively quickly and effectively while at the same time having industry, often Canadian, respond with the aircraft types and capabilities that met operational needs. And then there were other occasions where the government was more or less deaf to military leadership and where the industry was simply unable to design and build a Canadian solution. If we accept that these successes and failures are part and parcel of the realities of procurement. – of the calculus of procurement, then anything we can do to school (no pun intended) those charged with equipping the RCAF with the sagacity to see turbulence and to navigate around it will surely allow aviators of the future to minimize the risks of procurement shortfalls.

[81] Royal Military College "Applied Military Science." 10 Aug 23.
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