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Arrows, Bears and Secrets

The Role of Intelligence in Decisions on the CF-105 Program

ALAN BARNES

Abstract: Newly available information has made it possible for the first time to examine the role of intelligence in decisions on the CF-105 Arrow. These records show that Canadian intelligence assessments of the Soviet bomber threat differed from US estimates. In the late 1950s Canadian analysts stressed the imminent shift from bombers to ballistic missiles as the main danger to North America. The Diefenbaker government's decision to cancel the Arrow program in 1959 was significantly influenced by this view of the changing strategic threat. In examining the role of intelligence, the article addresses a number of earlier myths, and provides a more complete picture of the decisions concerning this iconic Canadian aircraft.

The cancellation of the CF-105 Avro Arrow by the Diefenbaker government in February 1959 set off one of the longest-running controversies in Canadian history. The sad fate of the state-of-the-art jet fighter, which had come to symbolise Canada's high-tech future in aircraft manufacturing, is still a cause of nationalistic anguish decades later. It is clear from the archival record that the fundamental driver for the decision was the unsustainable escalation in the cost of the aircraft, which placed an overwhelming burden on the Canadian defence budget.[1] However, in its public statements

[1] The considerable literature on the Arrow is of greatly varying quality. The account most firmly based on the archival record is still Russell Steven Isinger, "The Avro Canada CF-105 Arrow Programme: Decisions and Determinants" (MA diss., University of Saskatchewan, 1997).

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The iconic Avro Arrow in flight. [RCAF photo, courtesy of the RCAF Association]

the government declared that the principal reason for cancelling the project was because the Soviet bomber threat to North America was expected to diminish in the early 1960s, thus undermining the justification for such a huge expenditure on the advanced CF-105 interceptor. In the outcry which followed, many refused to accept this reasoning. This raises a number of questions: Just how valid was the government's public rationale for the cancellation of the program? What did Canadian intelligence say about the Soviet bomber threat? More broadly, how did intelligence factor into the thinking of the politicians, military officers and government officials who played a role in the fate of the CF-105?

Since 1959 the lack of reliable information on the role of intelligence in the decisions concerning the Arrow has allowed widespread myths and misperceptions to flourish. Some authors have assumed that Canada was misled by poor US intelligence, while others have argued that Washington deliberately manipulated the intelligence it gave Ottawa to induce the Diefenbaker government to cancel the CF-105. Some have suggested that Canadian intelligence officers intentionally discounted contrary information in order to support a decision that had already been made by their political masters. Still others have claimed that the Diefenbaker government simply ignored the

intelligence provided by both the Canadian and US militaries.[2] All of these claims cannot be true; it is possible that none of them are.

This article does not seek to reopen the debate over the reasons for the cancellation of the Arrow. It has a narrower focus: to examine the role of intelligence in the decisions surrounding the CF-105, from developing the original operational requirement to the final decision to cancel the program. It will look at how intelligence shaped decisions at critical points in the program and how intelligence conclusions were presented in public statements concerning the Arrow. This has become possible because of the recent release of many records dealing with Canadian strategic intelligence assessments of the Soviet threat to North America during the 1950s.[3] Now, more than sixty years after the cancellation of the Arrow, the role of intelligence in this decision can be examined in detail for the first time.

In the years between 1945 and 1950 Canada developed a capability to prepare strategic intelligence assessments on issues related to Canadian defence and foreign policy. This involved the strengthening of existing bodies and creating new analytical units. In the Department of National Defence (DND) the service intelligence groups—the Directorates of Military, Naval and Air Intelligence, or DMI, DNI and DAI—became more involved in analytical work. As well, two new units were established: the Joint Intelligence Bureau (JIB) to analyse economic and industrial developments in the Soviet Bloc, and the Directorate of Scientific Intelligence (DSI) to study Soviet scientific advances. The work of these groups was coordinated by the Joint Intelligence Committee (JIC), chaired by an official from the Department of External Affairs (DEA). It was responsible for the preparation of strategic intelligence assessments for the Chiefs of Staff Committee (CSC), which in turn reported to the Cabinet Defence Committee (CDC). To assist the JIC in this work a small group of military and civilian officers—the Joint Intelligence Staff (JIS)—was established to draft assessments based on information

[2] These various claims will be discussed in greater detail below.

[3] The records were obtained through the work of the Canadian Foreign Intelligence History Project, https://www.csids.ca/canadian-foreign-intelligence-policy-project. A number of the key records cited in this article are available on the Canada Declassified website: https://declassified.library.utoronto.ca/. The citations for those records include a unique document number in the format CDAA0000X.

from the JIC member agencies.[4] Previously, Canada had relied entirely on intelligence assessments from the United Kingdom and the United States; with these changes Ottawa now had the ability to carry out its own independent intelligence analysis.

One of the principal reasons for Canada to create this new analytic capability was so that it could play a full role in preparing the intelligence assessments on the Soviet threat to North America which would form the basis for joint Canadian-American planning for continental defence. These took the form of annual "American-Canadian Agreed Intelligence" (ACAI) assessments overseen by the Joint Intelligence Committees in Ottawa and Washington. The drafting was done by their respective strategic assessment groups: the Canadian JIS and the Joint Intelligence Group at the Pentagon. Thanks to extensive intelligence sharing arrangements, both sides were working from the same broad body of information; any differing views were therefore due to differing interpretations of the often ambiguous reporting. The early ACAI papers judged that there was only a modest Soviet threat to the continent. For example, in 1948 Canada and the US agreed that although Moscow would soon be able to launch an attack by some 200 Tu-4 (Bull) medium bombers of Soviet Long Range Aviation (LRA) carrying conventional weapons, they would be incapable of causing significant damage. But with the detonation of the USSR's first atomic bomb in 1949 and the invasion of South Korea in 1950, concerns about the Soviet threat grew dramatically. The ACAI assessment prepared in early 1951 described the expanding Soviet bomber threat in alarming terms, although Canada and the US disagreed over important details of projected bomber numbers and capabilities.[5] It was this increased concern over the Soviet bomber threat in the early 1950s that created the impetus for plans to develop a new Canadian jet interceptor, the CF-105.

The Royal Canadian Air Force (RCAF) had benefited greatly from the dramatic increase in Canadian defence spending which began in

[4] Alan Barnes, "A Confusion, not a System: The Organizational Evolution of Strategic Intelligence Assessment in Canada, 1943 to 2003," *Intelligence and National Security* 34, 4 (2019), 465-67.

[5] For a detailed description of the joint Canada-US assessments, see Alan Barnes, *Canadian Intelligence Assessments of the Soviet Threat to North America, 1946-1964*, forthcoming.

1951. This was the "golden age" of the RCAF.[6] In 1951 it received 69 per cent of the defence budget and the following year it received 54 percent.[7] Much of this funding went to strengthening continental air defence. The CF-100 Canuck, a jet interceptor developed and manufactured in Canada, was just entering service, but there were already concerns that it might soon be outclassed by newer Soviet bombers operating at higher altitudes and faster speeds. In November 1952 the RCAF issued its operational requirements for the CF-105.[8] The available records, however, are unclear about the exact nature of the threat that the RCAF expected the CF-105 to face. A later report on the CF-105 program summarised the original operational requirement as being based on the need to counter "enemy bombers capable of operating under any weather and visibility conditions at high subsonic speeds at altitudes up to 55,000 feet and carrying atomic weapons."[9] The USSR was expected to have between 400 and 500 such aircraft available to attack North American targets.

This view of the potential threat was not entirely consistent with the Canada-US ACAI appreciations of 1952. These papers considered the possible Soviet threat over the next five years—rather than the ten year outlook of the RCAF used when defining the requirement for the CF-105—so a direct comparison cannot be made. Nevertheless, the ACAI assessment judged that the Soviet heavy bombers in operational units by 1957 would have a maximum speed of around 2/3 the speed of sound, and an operational ceiling of 45,000 feet. There were slight differences in the Canadian and American views on the likely size of the Soviet LRA in 1957: 500 Bull medium bombers and 200 (Canada) to 250 (US) heavy bombers, with either jet or turboprop engines.[10] In what would turn out to

[6] This idea is discussed at length in Bertram C. Frandsen, "The Rise and Fall of Canada's Cold War Air Force, 1948-1968" (PhD diss., Wilfrid Laurier University, 2015).

[7] Joseph T. Jockel, "The United States and Canadian Efforts at Continental Air Defence, 1945-1957" (PhD diss., Johns Hopkins University, Baltimore, 1978), 126.

[8] "Report on the Development of the CF-105 Weapons System," 19 August 1958, 73-1223 Box 112 File 2500A. DND Directorate of History and Heritage (hereafter DHH).

[9] "Plans Analysis and Requirements Group, Final Report," Appendix A to "Report by the Working Group to the Interdepartmental Committee for the Reappraisal of the CF105 Development Program," 4 November 1955, 75/1223 Box 112 File 2500D, DHH.

[10] Canada-US Assessment ACAI 24, "Soviet Capabilities and Probable Courses of Action against North America, 1 July 1957," 15 October 1952, 112.009 (D35), DHH. CDAA00001

be a prescient warning, the Canadian position paper for the 1952 ACAI drafting conference judged that Moscow could have long range ballistic missiles in production by 1957; if the USSR decided to place a high priority on developing missiles, its long range bomber program could be considerably curtailed.[11]

It appears that no intelligence assessment was produced specifically to assist in the development of the operational requirement for the CF-105 project. Instead, decisions were made on the basis of a range of other factors. Principal among these was the RCAF's calculation of likely technological developments over the next decade. This estimate was based on the state of Western aircraft design and manufacturing methods, coupled with the assumption that the USSR would be able to achieve similar progress. As well, there was a need to build in a margin of error to ensure that the capabilities of the planned aircraft would not be outmatched by any surprising Soviet technological advance. Likely important too were a number of less tangible factors. The success of the CF-100 program engendered confidence in Canada's advanced aircraft manufacturing capabilities. Canadian pilots had established very high professional standards and they expected to be equipped with the most up-to-date aircraft possible. The high priority accorded to the RCAF in defence spending created an expectation of continuing large budgets for the project. Taken together, these factors had a greater influence on the development of the operational requirements for the CF-105 program than a calculated assessment of the likely Soviet bomber threat. It was perfectly valid for the RCAF to make a decision on this basis—intelligence is rarely the key factor in any decision of such magnitude—but doing so had important implications. The RCAF established very ambitious performance requirements for its new interceptor which pushed the limits of what was technologically feasible at that time. Operational Requirement 1/1-63, "Supersonic All-Weather Interceptor Aircraft," called for an aircraft with a speed of Mach 2 and a service ceiling of 50,000 feet.[12] These demanding

[11] JIC assessment 56 (52), "The Soviet Threat to North America, Mid-1957," 1 August 1952, RG25 Vol. 7917 File 50028-U-40 Part 10, Library and Archives Canada (hereafter LAC). CDAA00002

[12] Palmiro Campagna, *Storms of Controversy: The Secret Avro Arrow Files Revealed.* 4th ed. (Toronto: Dundurn Press, 2010), 35; and James Dow, *The Arrow.* 2nd ed. (Toronto: James Lorimer, 1997), 86.

Air Marshal Roy Slemon, Chief of the Air Staff, 1953-1957. [RCAF photo, courtesy of the RCAF Association]

specifications contributed to the escalating costs and frequent delays in the CF-105 program.

In January 1953 Air Marshal Roy Slemon became Chief of the Air Staff (CAS). He was a powerful defender of RCAF interests and

a strong advocate of the CF-105.[13] The CF-105 was first discussed by the Cabinet Defence Committee in late 1953. Slemon drafted the DND memorandum for the meeting, which "made no reference whatever either to the strategic situation in North America or to Canada's strategic priorities. It spoke only about the need to provide an 'effective defense' against the anticipated, next generation of Soviet turbojet bombers."[14] Slemon's memorandum declared that:

> [t]urbo-jet bombers, particularly in view of Russia's unexpectedly rapid strides in producing highly destructive [i.e. nuclear] bombs, pose a great future threat to this continent. Such bombers are now in the development and prototype stage in the United Kingdom and in the United States and it is reasonable to assume that they are in a comparable stage of development in Russia. If this is so, then this continent could be attacked by this type of bomber from 1958 onward.[15]

This description of the threat was broadly in line with the ACAI appreciation that was published a short time later, which assessed that a heavy jet bomber, later identified as the M-4 (Bison), with a speed of 450 knots and an operational ceiling of 40,000 feet, might go into production in mid 1956, in which case about 100 would likely be in operational units by 1958. A medium jet bomber, later identified as the Tu-16 (Badger), with a speed of 500 knots and a ceiling of 40,000 feet, was expected to go into production shortly and would be operational by 1958.[16] On 3 December 1953 the CDC recommended approval of the CF-105 development program.[17]

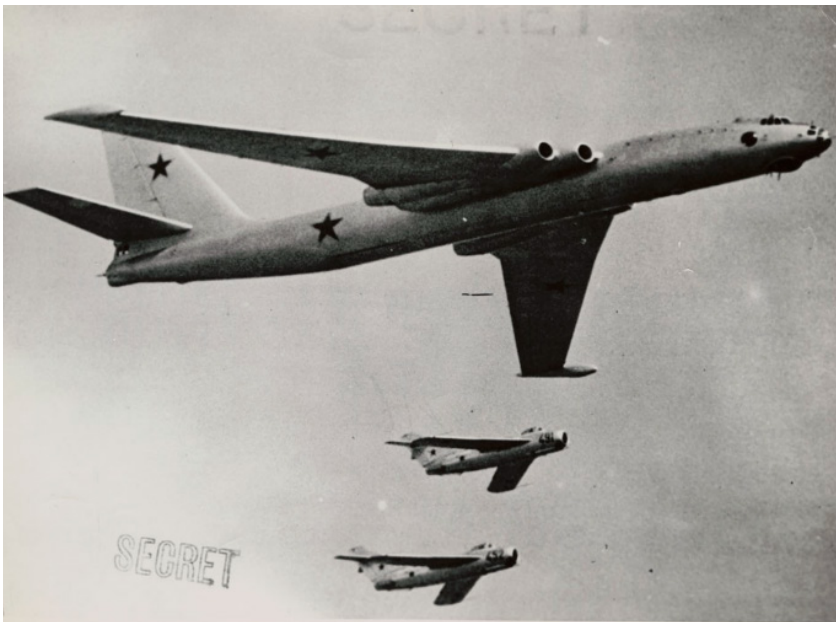
[13] Sandy Babcock, "Air Marshal Roy Slemon: The RCAF's Original." Chap. 12 in *Warrior Chiefs: Perspectives on Senior Canadian Military Leaders,* edited by Bernd Horn and Stephen Harris (Toronto: Dundurn Press, 2001), 272.

[14] Donald C. Story, and Russell Isinger. "The Origins of the Cancellation of Canada's Avro CF-105 Arrow Fighter Program: A Failure of Strategy," *The Journal of Strategic Studies* 30, 6 (2007), 1040.

[15] DND memorandum to CDC, "Supersonic All-Weather Interceptor Aircraft – CF105 for the RCAF," 30 November 1953, 73-1223 Box 112 File 2500A, DHH.

[16] Canada-US assessment ACAI 31, "Soviet Capabilities and Probable Courses of Action Against North America in a Major War Commencing in Mid-1958," 18 February 1954, 112.009 (D150), DHH. CDAA00003

[17] CDC minutes [extract], "Supersonic all-Weather Interceptor aircraft – CF 105," 2 December 1953, 73-1223 Box 11 File 2500D, DHH.



Myasischev M-4 (Bison) long-range bomber escorted by two MiG-17 (Fresco) fighters. [Library and Archives Canada Item ID 5316532]

Within a few months of this decision, the USSR displayed a new jet bomber at the 1954 May Day parade in Moscow, surprising the Western public and heightening concerns about the Soviet threat. The aircraft that caused such a stir was the Bison, a long-range jet bomber. At an airshow the following year, a flypast of twenty-eight Bison seemed to indicate that the bomber had entered serial production, two years earlier than predicted in the February 1954 ACAI appreciation. In fact, only eighteen prototype aircraft participated in the airshow, flying past several times to give the impression of larger numbers. Nevertheless, this display, along with the appearance of a new Soviet long-range turboprop bomber, the Tu-95 (Bear), raised fears that the Soviet Union would soon outnumber the United States in intercontinental bombers, thus sparking the "Bomber Gap" controversy that figured prominently in US politics.[18]

For the RCAF, these developments demanded the acceleration of the CF-105 program. The RCAF Air Defence Command warned that

[18] John Prados, *The Soviet Estimate: U.S. Intelligence Analysis and Russian Military Strength* (New York: Dial Press, 1982), 41-43.

the main threat now consisted of Soviet jet bombers carrying hydrogen bombs which could launch a "sudden high-performance attack with a comparably small force, with a good possibility of eliminating the North American forces for retaliation and razing at least some of the major centers of government, populations and industry in one blow."[19] In February 1955, Slemon presented to the CDC a proposal to speed up the CF-105 program, arguing that the change in the Soviet bomber threat created greater urgency to develop the new fighter.[20] The DND memorandum prepared for the CDC declared that "the unexpectedly early emergence of Russian long-range jet bombers and nuclear weapons has greatly accentuated the threat to North America, both in point of time and scale of attack" thus demonstrating the need to hasten the CF-105 program.[21] On 3 March 1955, the CDC obliged by approving an order for forty aircraft.[22]

This decision was made without benefit of an intelligence assessment to examine whether the strategic situation had changed appreciably. Instead, it appears to have been largely driven by the greater public attention given to the Soviet bomber threat as the Bomber Gap controversy raged in the United States. This had created the political conditions in Ottawa favourable for advancing the RCAF's most ambitious project. But unknown to Canadians, the intelligence assessments of the Soviet bomber threat had not changed significantly from earlier appreciations. The ACAI assessments had already flagged the fact that the new Bison and Badger bombers were under development and would be entering service in the near future; the dramatic public displays of Soviet bombers in 1954 and 1955 did not prompt a major shift in the analysis. We now know that the heavy jet bomber being developed at this time (later designated the Bison A) had a history of accidents and its range fell considerably short of an intercontinental capability. Shortly after becoming operational these aircraft were withdrawn from service and

[19] "The RCAF Position in Relation to Continental Air Defence," January 1955, quoted in Sean M. Maloney, *Learning to Love the Bomb: Canada's Cold War Strategy and Nuclear Weapons, 1951-1968.* (Washington D.C.: Potomac Books, 2007), 59.
[20] CSC minutes, 11 February 1955, 73-1223 Box 112 File 2500D, DHH; and Isinger, "The Origins of the Cancellation," 41.
[21] DND memorandum to CDC, "Preproduction Program for Supersonic Fighter Aircraft (CF105)," 1 March 1955, 73-1223 Box 112 File 2500D, DHH.
[22] CDC minutes [extract], "Preproduction Programme for Supersonic Fighter Aircraft (CF105)," 3 March 1955, 73-1223 Box 112 File 2500D, DHH.

Prime Minister Louis St. Laurent, 1953. [Library and Archives Canada PA-215429]

eventually converted to aerial tankers. Because of these problems the aircraft was substantially redesigned in 1956. The new model, designated the 3M (Bison B), had somewhat better performance, but

was still not fully adequate for an intercontinental role.[23] The most successful Soviet long-range bomber was the Bear, although its early development was also hampered by accidents and it did not begin serial production until 1955. Though slower, its turboprop engines provided greater range than its jet counterparts.[24]

It would not be long before the escalating expense of the CF-105 program would prompt second thoughts by Louis St. Laurent's Liberal government. In September 1955, Ralph Campney, the Minister of National Defence, sent a memorandum to his CDC colleagues describing recent developments affecting the CF-105—foremost of these being the rapidly mounting cost—and recommending a complete re-appraisal of the program.[25] The CDC concurred: DND was directed to convene a high-level inter-departmental committee to carry out the review.

The review took only a week, so it could hardly be considered a fundamental re-examination of the program or a full-scale analysis of its technical and financial aspects. Instead it was a detailed recapitulation of the currently available information and thinking on the project. It is noteworthy that the review included an intelligence estimate of the potential Soviet threat. Group Captain Ross Ingalls, the Director of Air Intelligence, served on one of the working groups reporting to the review committee. The final report noted: "The air threat during the period 1957-60 has not altered significantly in respect to the performance of Russian bombers but Russian bomber production has exceeded expectations. The predicted threat after 1960 is significantly greater in both altitude and speed of manned bombers."[26] The intelligence annex to the report provided additional

[23] Yefim Gordon, *Soviet Strategic Aviation in the Cold War* (Manchester: Hikoko Publications, 2013), 225-30; and Steven J. Zaloga, *The Kremlin's Nuclear Sword: The Rise and Fall of Russia's Strategic Nuclear Forces, 1945-2000* (Washington: Smithsonian Institution Press, 2002), 24-26.

[24] Gordon, *Soviet Strategic Aviation,* 33, 73, 230-34; and Zaloga, *The Kremlin's Nuclear Sword,* 26-28.

[25] DND memorandum to CDC, "CF 105 Development Programme," 26 September 1955, 73/1223 Box 112 File 2500D, DHH.

[26] "Plans Analysis and Requirements Group, Final Report," Appendix A to "Report by the Working Group to the Interdepartmental Committee for the Reappraisal of the CF105 Development Program," 4 November 1955, 75/1223 Box 112 File 2500D, DHH.

details, which, while not contradicting this statement, could be read as moderating it somewhat. The annex, which examined the threat to North America up to 1966, described two "hypothetical" future Soviet aircraft, a jet bomber capable of launching a cruise missile and supersonic jet bomber. By the mid 1960s, "an estimated 600 jet bomber/missile combination types and possibly 200 hypothetical supersonic long range jet bombers" could be launched on an attack against North America.[27] The intelligence annex then qualified these statements by saying that although the USSR had the theoretical capacity to develop these hypothetical aircraft, there was no direct evidence it was doing so. Nevertheless, much of the operational analysis in the remainder of the report supporting the requirement for the CF-105 was based on the need to counter the projected capabilities of these theoretical aircraft, dubbed the "Hustler" and "Hornet." One further brief statement in the intelligence annex might easily have been overlooked: "If the Soviets are successful in their missile programs the manned bomber may be progressively phased out through the introduction of missiles."[28] This point was to become a crucial conclusion in later Canadian assessments. It does not appear that the JIC as a whole was involved in preparing the intelligence annex and other JIC members may have challenged some of its conclusions. Ingalls himself had only recently become DAI when this review was carried out and, as will be described below, in subsequent years he was to take a critical view of the alarmist US assessment of the bomber threat to North America.

On 1 November 1955, Slemon provided the CSC with a preview of his briefing to ministers summarising the findings of the review. He described the threat in dramatic terms: "There had been a marked increase in Russia's offensive capability against North America" due to its possession of the hydrogen bomb combined with its bomber fleet. He described a potential Soviet attack of 1,000 long-range bombers, which he claimed were capable of reaching the continent not only from the north but also from the south [he did not point out that this would require flying circuitous missions over the Atlantic or

[27] "Soviet Air Threat to North America – Jan 1961-Jan 1966," Annex 2 to "Report by the Working Group to the Interdepartmental Committee for the Reappraisal of the CF105 Development Program," 75/1223 Box 112 File 2500D, DHH.

[28] "Soviet Air Threat to North America," Annex 2 to "Report by the Working Group to the Interdepartmental Committee for the Reappraisal of the CF105 Development Program," 75/1223 Box 112 File 2500D, DHH.

Pacific].[29] His briefing echoed the views of the US Air Force (USAF), but did not reflect the review's description of the threat and went well beyond the JIC's assessments. On hearing Slemon's presentation, the Chiefs decided that the briefing to ministers should not "be too specific [...] as regards the type of threat to be met."[30] The reason for this decision is not clear: whether it was felt that a detailed threat assessment would be too arcane for ministers or whether the Chiefs believed that Slemon's description was overdone. The CDC discussed the report of the inter-departmental review committee at two meetings in November with no clear outcome, but it does not appear that ministers were convinced by Slemon's presentation. In early December 1955, the Cabinet decided to reduce the previous order forty CF-105s and instead authorised the purchase of just eleven developmental aircraft.[31]

By the mid 1950s there was a growing divergence in Canadian and American estimates of the Soviet bomber threat to North America. As early as 1952 the joint ACAI assessments had been affected by national differences of view and approach. The Director of Air Intelligence at that time remarked that the disagreement over the Soviet bomber force was "a fundamental point of difference which affects the whole [ACAI] estimate."[32] The JIC explained to the CSC that the disagreements with the US "arise from differences of interpretation and not from differences of fact." The result was that "[o]n almost every point the Canadian choice was for lower levels of production, smaller operational forces and lower capabilities, while the U.S. choice was towards the higher values."[33] In subsequent ACAI assessments during the 1950s various mechanisms were employed to deal with these differences: masking the disagreement by using vague language, stating the estimate as a range rather than a precise figure, or including separate US and Canadian views.

[29] CSC minutes, 1 November 1955, 73/1223 Box 61 File 1308, DHH.
[30] CSC minutes, 1 November 1955, 73/1223 Box 61 File 1308, DHH.
[31] Cabinet conclusion, "CF-105 Programme," 7 December 1955, 73/1223 Box 112 File 2500C, DHH.
[32] JIC minutes, 29 February 1952, RG24 C-11663 File 1216-J2-2 Part 4, LAC.
[33] JIC Secretary to CSC Secretary, "Revision of the ACAI Papers," 1 April 1952, RG25 Vol. 7917 File 50028-U-40 Part 9, LAC. CDAA00004

Ross Baxter Ingalls. [Aircrew Remembered]

In April 1954, DAI laid out its views on the nature of the bomber threat in a detailed forty-page report. The verdict was stark: "[t]he existing threat to North America […] is not great" and could not disrupt the North American war effort.[34] The paper described the many constraints affecting Moscow's bomber force, including the limited range of the Bull bomber, the only Soviet strategic bomber then in production, and the USSR's comparatively small stock of atomic bombs. DAI assessed that in the most likely scenario only about thirty-five Soviet bombers would reach targets in northwestern North America on two-way missions. If the USSR was prepared to lose all of its aircraft on one-way missions, approximately 160 bombers could reach targets in about 60 per cent of North America. These calculations did not include likely losses to Canadian and US defences. DAI concluded by saying that although LRA capabilities were increasing, "it is not believed that the Soviets will have the air capability to seriously disrupt the war efforts of North America until 1956/57."[35]

By April 1957 the problems with the ACAI assessments were causing ever greater concern to the JIC. Group Captain Ingalls was

[34] DAI assessment, "Forms and Scales of Soviet Air Attacks against North America, 1 July 1953 to 1 July 1954," 9 April 1953, 112.009 (D10), DHH. CDAA00005

[35] "Forms and Scales of Soviet Air Attacks against North America, 1 July 1953 to 1 July 1954," 9 April 1953, 112.009 (D10), DHH. CDAA00005.

one of the harshest critics. He declared that "the threat spelled out in ACAI does not have a great deal of credence."[36] The ACAI estimates examined only Soviet theoretical gross capabilities to attack North America and did not account for the physical limitations of such attacks, other priorities for these forces, or the likely effect of allied defensive actions. The Joint Intelligence Bureau, which was responsible for monitoring Soviet bomber production, also challenged the US position. A 1957 JIB report noted that the Canadian estimate of Soviet bomber production was consistently lower than the American calculation. It observed that the US was reluctant to change its view even when presented with new information: "[t]here is an inherent built in inflexibility in USAF official estimates which reflects the USAF party line. Even though current evidence indicates that both USAF and ourselves have been over-estimating Soviet production of heavy bombers, there is a strong delayed re-action in USAF to changing official estimates."[37] The ACAI appreciations produced in this period continued to present an "agreed" Canada-US assessment of the Soviet bomber threat, but this facade of consensus masked increasing differences.

The year 1957 marked a number of important milestones for the CF-105, now officially dubbed the "Arrow." In February the Liberal government approved the continuation of the program, but limited it to eight developmental aircraft.[38] There was a growing recognition among ministers that the escalating cost of the CF-105 was becoming unsustainable, but there was no interest in cancelling the program just before an election. To the surprise of many, the June 1957 federal election brought a Conservative minority government under John Diefenbaker to power. In late October the Cabinet approved the continuation of the CF-105 program for another year and authorised an order for twenty-nine pre-production aircraft.[39] This decision came shortly after the first public appearance of the Arrow on 4

[36] JIC minutes, 17 April1957, RG146 Vol. 6040 File IA 10-4-8-57, LAC.
[37] JIB report, "Heavy Bomber Production – USSR," 4 February 1957, RG24 Vol. 20857 File 7-26-28 Part 1, LAC. CDAA00006
[38] CDC record of decision, "Air Defence: CF105 Aircraft Programme," 7 February 1957, 73/1223 Box 112 File 2500D, DHH.
[39] Cabinet conclusion, "Continuation of CF 105 Programme," 29 October 1957, 73/1223 Box 112 File 2500D, DHH.

Unveiling of the CF-105 at Downsview Airport, 4 October 1957. [RCAF photo, courtesy of the RCAF Association]

October, which greatly heightened public interest in the aircraft as an example of advanced Canadian engineering. But ominously for the future of the project, on the same day the Soviet Union launched Sputnik, the first earth satellite, an impressive demonstration of Moscow's growing ability to produce inter-continental ballistic missiles (ICBMs) capable of striking North America.

Initially, the RCAF discounted the significance of the Sputnik launch. In a briefing to the CDC, Slemon declared: "Notwithstanding the fact that the USSR has successfully fired an ICBM, the present threat now and for some years to come will continue to be represented by the Soviet long-range bomber force."[40] The Minister of National Defence, George Pearkes, echoed this view, telling Parliament in November that "in the foreseeable future, if any threat from the air develops against this country the manned bomber will be at least an

[40] CAS brief to CDC, undated [c. late October 1957], 73/1223 Box 112 File 2500C, DHH.

General Charles Foulkes, Chairman, Chiefs of Staff. [Library and Archives Canada ZK-1689]

important part of that threat."[41] The following month he repeated this view: "The best advice that I have [...] is that for many years to

[41] Hansard, 7 November 1957, 851.

come there will be manned bombers," and therefore a corresponding need for interceptors like the CF-105.[42]

Others were more concerned about the looming Soviet missile threat. At a meeting of the CSC in October, General Foulkes, the Chairman, Chiefs of Staff, called for a fundamental re-examination of Moscow's ability to attack North America before any further decisions were made regarding the CF-105 program. In the ensuing discussion, the CSC agreed that while there was a possibility of Soviet manned bomber attack until about 1965, "after 1961 the guided missile threat [...] can be expected to increase and the threat of manned bomber attack may diminish proportionately."[43] The Chiefs then directed the JIC and the Joint Planning Committee (JPC) to prepare a full study of the bomber and missile threat to North America over the next decade. This assessment would play a significant role in subsequent decisions on the Arrow and it is therefore worth examining in some detail.

Work on the new assessment of the Soviet threat began immediately. However, the stipulation by the CSC that both the JIC and the JPC should be involved in preparing the report was highly unusual. Normally, the JIC had sole responsibility for preparing intelligence assessments. The role of the JPC was to develop military plans and provide operational policy advice to the CSC; it was a principal user of JIC intelligence. But because of the significance of this assessment for the future of the CF-105 program, on this occasion the planners were given a direct role in shaping the report's conclusions. Nevertheless, it was JIS analysts who took prime responsibility for writing the report. The JIS prepared several drafts in November and early December. Some of the conclusions were sure to raise the hackles of the RCAF—for example, that by 1967 the Soviet threat to North America "will change from almost complete reliance on manned bombers to almost complete reliance on the long-range ballistic missile."[44] The early drafts were discussed separately by the JIC and the JPC. During

[42] Reginald H. Roy, *For Most Conspicuous Bravery: A Biography of Major-General George R. Pearkes, V.C., Through Two World Wars* (Vancouver: UBC Press, 1977), 316.
[43] CSC minutes, 25 October 1957, 2002/17 Box 71 File 4, DHH.
[44] JIC assessment JIC 256 (57)/JPC 101 (57), JIS Draft 5, "Conclusions," 26 November 1957, RG24 Vol. 20856 File 7-26-9 Pocket, LAC.

the JPC discussions, the RCAF representative sought to curtail any downgrading of the threat posed by Soviet bombers.[45] A report by a DEA official who participated in one of the key JPC meetings provides an insight into the contentious nature of the discussion. The Air Force member tabled US and UK intelligence reports which he argued undermined the conclusions of the Canadian paper and proposed adding a number of "footnotes" highlighting the RCAF's disagreements or including a general dissenting note as an appendix. The other members argued that if new intelligence was available, the JIC should consider it first. The DEA officer commented that "[i]t became clear that [the RCAF member] was opposed to the paper as presently written, irrespective of any changes that might be made in intelligence estimates," and added "[t]he Air Force will, therefore, oppose any policy which tends to suggest that the CF105 is not an urgent or necessary requirement."[46] The JPC was unable to resolve these differences.

The next step was a series of equally contentious combined meetings of the JIC and JPC. The main objections continued to come from the RCAF planners who put forward substantially revised conclusions with the aim of emphasising the continuing threat from Soviet bombers.[47] Despite these efforts, the RCAF was unable to garner support for most of its proposed changes. Notably, the JIS's conclusions were strongly supported by the Director of Air Intelligence. Instead of bending the intelligence to bolster RCAF policy interests, Ingalls and his staff sought to provide their best assessment of the available information. This was in marked contrast to contemporary estimates by the USAF intelligence division which strongly supported the budgetary goals of the US Air Force.

The revised appreciation that emerged from these meetings was discussed by the CSC in the first week of 1958. The paper retained a key conclusion from earlier drafts: "there will be little justification for the Soviet Union to continue refinement and improvement of the manned bomber threat or its continued expansion in numbers after

[45] JPC minutes, 3 December 1957, RG24 Vol. 20856 File 7-26-9 Pocket, LAC.
[46] GAH Pearson to Tremblay, "The Threat to North America, 1958-67," 4 December 1957, RG25 Vol. 7924 File 50028-V-1-40 Part 1, LAC.
[47] RCAF Chief of Plans and Intelligence, "Draft Conclusions," 18 December 1957, RG24 Vol. 20854 File 7-26-9 Part 4, LAC.

Air Marshal Hugh Lester Campbell, Chief of the Air Staff, 1957-1962. [RCAF photo, courtesy of the RCAF Association]

1960."[48] The principal critic was Air Marshal H.L. Campbell, who had taken over as CAS from Slemon in August 1957. He challenged the conclusion that the USSR would not expand its strategic bomber

[48] JIC assessment JIC 256/5 (57)/JPC 101/5 (57), "The Threat to North America, 1958-1967," 3 January 1959, RG24 Vol. 20854 File 7-26-9 Part 4, LAC. CDAA00007

fleet at the same time it was building up a force of ICBMs. Foulkes responded that this "was in fact the crux of the whole matter," and added "[o]n this point the Canadian view was apparently the opposite of that held by the USAF."[49] He pointed out that CSC members must decide whether they concurred with the paper's judgments. After further debate, assisted by members of the JIC who were present to answer questions, the CSC proposed some minor amendments and asked the JIC to review the paper in light of a recently received US National Intelligence Estimate.[50] Within a week the JIS had produced a detailed comparison of the US and Canadian analysis of Soviet bomber and missile capabilities.[51] They noted that there was nothing in the new US NIE to justify altering the Canadian paper's conclusions. A new version of the paper incorporating the Chiefs' amendments was presented to the CSC on 20 January 1958. The assessment never received the formal approval of the Chiefs—the differences of view were simply too great to reach a consensus—but it was nevertheless circulated as a final paper following the CSC meeting.[52]

The assessment, entitled "The Threat to North America, 1958-1967" was published in its final form on 20 January.[53] Its conclusions underlined the changing nature of the Soviet threat. The paper observed that the Soviet ballistic missiles which were on the verge of being developed were likely to be markedly superior to the foreseeable defences, and concluded that "[m]issiles will progressively replace aircraft as the main threat to North America." This meant that "there will be little justification for the Soviet Union to improve the manned bomber threat by the introduction of new types of bombers after 1960 or to expand the number of bombers given in this estimate after 1960." The paper described three phases in the likely evolution

[49] CSC minutes, 8 January 1958, 2002/17 Box 71 File 5, DHH.

[50] This was US NIE 11-4-57, "Main Trends in Soviet Capabilities and Policies 1957-1962," 12 November 1957, Doc. DOC_0000267692, CIA Electronic FOIA Reading Room.

[51] JIC assessment 264/1 (58), "Comparison of Soviet Military Capabilities," 14 January 1958, 2002/17 Box 91 File 11, DHH. CDAA00008

[52] CSC minutes, 20 January 1958, 2002/17 Box 71 File 5, DHH.

[53] JIC assessment 256/6 (58)(Final)(Revised) / JPC 101/6 (58)(Final)(Revised), "The Threat to North America, 1958-1967," 20 January 1958, RG24 Vol. 20854 File 7-26-9 Part 4, LAC. CDAA00009. As the report number indicates, this assessment was formally considered a joint JIC/JPC document, but it was almost entirely the work of the JIC and it will be referred to as a JIC paper in the discussion below.

of the Soviet threat over the next decade. During the first, from 1958 to the end of 1960, the main threat would continue to be from bombers. The period from 1961 to about 1965 would be a time of transition: the threat from Soviet ballistic missiles would sharply increase, although there would be a declining need for bombers and submarine-launched missiles to supplement ICBM attacks. In the third phase beginning about 1965, the primary threat would be from improved Soviet ICBMs, with bombers and missile submarines in a reserve role.

The assessment pointed to the declining rate of production of Soviet heavy bombers and concluded that it was "probable that the Soviet Union is not building up a large heavy bomber force [...] because these programmes are being overtaken by the development of missile systems." This idea was central to the paper's forecast of Soviet heavy bomber numbers over the next decade. It judged that the LRA would have a total of about 100 heavy bombers and tankers by mid 1958, that this number would peak at about 195 in 1960-61 and then decline to around 100 by 1966. These numbers were considerably lower than the most recent US estimates. Subsequent developments in the USSR demonstrated the broad accuracy of the Canadian forecast of Soviet heavy bomber numbers and capabilities. We now know that the LRA had about ninety-five heavy bombers and tankers in 1958 and this force reached a maximum strength of just under 200 in 1965, before declining to a plateau of about 175 which it maintained into the early 1980s.[54] In assessing future bomber developments, the Canadian paper speculated that the USSR might build a long-range supersonic aircraft to carry out strategic reconnaissance, but it judged that there would be no requirement for this aircraft to be a weapon carrier if the Soviet ballistic missile program expanded as expected. We now know that as Soviet research and production capacity was shifted from aircraft to missiles, the development of new bomber types came

[54] Timur Kadyshev, "Strategic Aviation." Chap. 6 in *Russian Strategic Nuclear Forces*, edited by Pavel Podvig (London: MIT Press 2001), 350. Kadyshev only provides numbers for LRA heavy bombers—which totalled 85 in 1958, 173 in 1965, and 152 from 1968 to 1983—so the total number of heavy bombers and tankers has to be estimated. We know that 25 Bison As were converted to tankers by 1960, and those numbers are reflected in the text above. Stephen Zaloga gives slightly lower numbers for LRA heavy bomber strengths, and only includes figures from 1960 onwards, but the annual fluctuations in bomber numbers track Kadyshev closely (Zaloga, *The Kremlin's Nuclear Sword,* 247).

to a virtual halt.[55] It did not acquire a new long-range bomber until the Tu-160 (Blackjack) entered service in 1987.[56] This meant that the Bison B would remain in service until the mid 1980s and the Bear well into the Twenty First Century.[57]

Regarding the emerging ballistic missile threat, the paper assessed that the USSR was capable of producing an ICBM based on the same technology used for Sputnik. It estimated that a Soviet ICBM with a range of 3,500 to 5,000 nautical miles would become operational in 1960. After that, about 200 missiles were expected to be produced per year. The threat of submarine-launched missiles by 1960 was seen as being primarily from cruise missiles with a range of 1,000 nautical miles. The JIC had as yet seen little evidence of Soviet development of a submarine-launched ballistic missile, but judged that the USSR was capable of doing so and suggested it could produce such a missile with a 1,200 nautical miles range by 1964. We now know that the paper's projections over-estimated Soviet ballistic missile capabilities during this period. The R-7 (SS-6 Sapwood) entered service in 1960 but the required launch sites proved extremely expensive to construct; only six missiles were ever deployed. The R-16 (SS-7 Saddler) was more successful. It became operational in 1961 and by 1965 197 had been deployed.[58] The USSR did not introduce its first submarine-launched medium range ballistic missile, the R-27 (SS-N-6 Serb) with a range of 1,350 nautical miles, until 1968.[59]

The JIC's January 1958 assessment was correct in foreseeing Moscow's shift from bombers to missiles over the subsequent decade. Following the Sputnik launch, Soviet leader Khrushchev came to see missiles as a panacea for a range of defence problems and as a cheaper alternative to conventional weapons. With the Soviet bomber force now looking irrelevant and obsolete, it was relegated to a secondary position in Soviet military thinking.[60] In 1959 Moscow created the Strategic Rocket Forces as a separate branch of the

[55] Kadyshev, "Strategic Aviation," 345.
[56] Kadyshev, "Strategic Aviation," 386, 394-8; and Gordon, *Soviet Strategic Aviation*, 244-48.
[57] Zaloga, *The Kremlin's Nuclear Sword,* 120; and Kadyshev, "Strategic Aviation," 343.
[58] Pavel Podvig, ed. *Russian Strategic Nuclear Forces* (London: MIT Press, 2001), 121-23, 126-27, 136; and Zaloga, *The Kremlin's Nuclear Sword,* 47-50, 61-68, 241.
[59] Podvig, *Russian Strategic Nuclear Forces,* 319-22; and Zaloga, *The Kremlin's Nuclear Sword,* 239, 244.
[60] Zaloga, *The Kremlin's Nuclear Sword,* 55-56, 61, 75.

military to operate its land-based ballistic missiles. Khrushchev's initial intention was to eventually disband the LRA and in the early 1960s the status and role of this force was reduced. Ultimately, however, Khrushchev was thwarted by the internal fallout of his failed gamble to station ballistic missiles in Cuba in 1962. With his leadership position badly undermined, the military was able to push back against his military reforms, including his plan to disband the LRA. The Soviet strategic bomber force therefore survived, but in a weakened state. The Strategic Rocket Forces continued to grow in importance and to receive priority in funding. Other resources went to the expanding force of ballistic missile submarines.[61] In his history of strategic bombing, Kenneth Werrell compares the different approaches taken by the United States and the Soviet Union in developing their nuclear delivery forces. Whereas Washington created a balanced strategic "triad" consisting of manned bombers, land-based ICBMs, and submarine-launched ballistic missiles, "the Soviet Union essentially phased out bombers to rely on a dyad consisting of the other two" weapons systems.[62]

Why did Canadian and US assessments differ when analysts in both countries were working from essentially the same information? In particular, why did the Directorate of Air Intelligence take a measured view of the threat when it presumably would have been in the RCAF's interest to portray the danger of Soviet air attack in more extreme terms? This is a complex matter that involves such factors as the varying assumptions held by analysts and the differing institutional pressures that influenced the analytical groups in each country.[63] Nevertheless, the key difference was that DAI officers based their analysis on their best reading of the available intelligence and then weighed the evidence in light of less alarmist assumptions

[61] The changes in the LRA's status and role in the 1960s are described in Kadyshev, "Strategic Aviation," 345, 350-53; Zaloga, *The Kremlin's Nuclear Sword,* 75-76; and Gordon, *Soviet Strategic Aviation,* 127, 188-91.

[62] Kenneth P. Werrell, *Death from the Heavens: A History of Strategic Bombing* (Annapolis, Maryland: Naval Institute Press, 2009), 213. A Canadian intelligence assessment of 1975 makes this same point: "In effect, the Soviet Union may be said to have developed and maintained a 'di-ad' (rather than a triad) with a modest incremental bomber capability for intercontinental strike operations." (Director General Intelligence assessment "The Soviet Manned Bomber Threat to North America, 1975-1985," 17 September 1975, 81/98 DHH).

[63] This question is addressed in greater detail in Barnes, *Canadian Intelligence Assessments.*

than those prevalent in Washington. The role of the Directors of Air Intelligence in supporting the work of their officers was crucial. Between 1952 and 1959, Group Captains D.M. Edwards and R.B. Ingalls held this position.[64] Without their determined and continued backing, the conclusions of the Directorate would likely have conformed much more closely to those of the USAF. Senior RCAF officers were not happy with the DAI view of the Soviet bomber threat and sought to modify it, as illustrated by the efforts of the RCAF planners and the CAS to change the judgments of the JIC's January 1958 assessment. However, the consensus nature of decisions in the CSC meant that no single service could impose its views. In the face of strong resistance from the JIC and a lack of support from the other members of the CSC, the RCAF was unsuccessful in forcing significant changes to the assessment. In a discussion with Air Marshal Campbell on the role of intelligence, JIC chair Bill Crean, the head of DEA's intelligence division, insisted that JIC assessments should go "straight to the top" without changes by the planners or senior commanders. Campbell disagreed, arguing that "there were senior officers whose judgement might sometimes be better."[65] But on the critical issue of the Soviet threat to North America, the JIC succeeded in protecting its assessment from undue policy influence.

The federal election of March 1958 returned Diefenbaker's Conservatives to power. The fate of the Arrow program remained one of the major issues facing the government. At National Defence, there was still no consensus among the Chiefs of Staff over the future nature of the Soviet threat. In late May they met with General E.E. Partridge, the commander of the North American Air Defence Command (NORAD), who stated that "the manned bomber would pose a continued, and perhaps increasing, threat for at least ten years" and warned "at any time the Soviet Long Range Air Force (SLRAF) could, by means of a carefully planned attack with relatively few aircraft, critically affect the [US] ability to retaliate."[66]

[64] Edwards served as DAI from January 1952 to August 1955, at which point Ingalls assumed the position and served until mid-1959.
[65] Crean note to file, "Conversation with Air Marshal Campbell, Chief of the Air Staff," 20 December 1957, File 29-1-1 Part 2, GAC Special Archives.
[66] CSC minutes, 10 June 1958, 2002/17 Box 71 File 5, DHH.

The American general was persuasive. Following the meeting with Partridge, the Chiefs went on to discuss a JPC planning document, "Review of Air Defence Against the Manned Bomber," which was based on the JIC forecast of the impending shift from bombers to missiles as the primary Soviet nuclear delivery means. Foulkes "pointed out that [Partridge's] views [...] would indicate that the threat from the manned bomber was still of significance and would remain so for a longer period than our latest estimate suggested."[67] Air Marshal Campbell argued forcefully for stronger defences against manned bombers, without which "the Russians would be easily able to mount an attack of catastrophic proportions."[68] The Chiefs agreed to support an RCAF submission to the CDC recommending the continuation of the CF-105 program.

This view of the continuing Soviet bomber threat would dominate the advice presented to senior officials and politicians for several more weeks during the summer of 1958. It was the opposite of the JIC assessment, which stressed the growing missile threat and the declining danger posed by Soviet bombers. The RCAF prepared several draft memoranda for the CDC in June and July which flagged the bomber threat in various ways: "The Chiefs of Staff confirm that the manned bomber threat against this continent is such as to warrant proceeding with the [CF-105] program ...";[69] and "A recent re-assessment of the threat to North America during the period 1960-67 indicates that manned bomber aircraft will continue to pose a major threat [...] This [...] has recently been confirmed by NORAD."[70] The RCAF memoranda recommended the completion of thirty-seven pre-production aircraft and commencement of full-scale production of the Arrow. The same points were made in briefing notes and presentations for senior government officials, which argued that even with the imminent build-up of Soviet ICBMs, "the USSR will be forced to keep bombers in their inventory for some years to come."[71]

[67] CSC minutes, 10 June 1958, 2002/17 Box 71 File 5, DHH.
[68] CSC minutes, 10 June 1958, 2002/17 Box 71 File 5, DHH.
[69] Draft memorandum to CDC, "CF105 (Arrow) Aircraft Programme," 10 June 1958, 73/1223 Box 112 File 2500C, DHH.
[70] Draft memorandum to CDC, "Air Defence – CF105 (Arrow) Aircraft Programme," 28 July 1958, 73/1223 Box 1 File 10, DHH. None of the memoranda prepared by the RCAF at this time appear to have been sent to the CDC.
[71] "Aide Memoire for Chairman Chiefs of Staff for Meeting of Panel on Economic Aspects of Defence Questions," 29 July1958, 73/1223 Box 1 File 10, DHH.

A briefing note for Pearkes similarly emphasised the continuing bomber threat and disparaged likely Soviet missile capabilities.[72] These documents frequently cited the recent Canadian assessment to support their arguments, even though this was a fundamentally distorted reading of the JIC's conclusions.

But the tide had begun to turn among the Chiefs. At a special meeting of the CSC on 15 July, Foulkes and the Chiefs of the General and Naval Staffs concluded that the continuation of the CF-105 program would rule out major equipment purchases for the army and navy. Even some RCAF officers were becoming ambivalent about the Arrow, since it would leave no funds for re-equipping the Canadian fighter squadrons assigned to NATO in Europe. The CSC therefore decided to present Pearkes with a number of options for the air defence program. Lacking a consensus, the Chiefs made no specific recommendation to the government, but the arguments for cancelling the CF-105 were clear and compelling.[73]

By this time, George Pearkes was reaching similar conclusions regarding the implications of continuing the Arrow program. He noted that about one-half the defence budget was spent on air defence;[74] devoting more resources to the CF-105 would further distort defence priorities. In his biography of Pearkes, Reginald Roy describes the minister's thinking at the time:

> Trying to peer into the 1960's, Pearkes felt "that the bomber was rapidly becoming obsolete and that we shouldn't invest this large proportion of the defence vote into a weapon which was useless against the ICBM. Moreover, not only did it seem that the Russians were deeply committed to ICBM's, but intelligence reports also indicated [...] that their production of jet bombers appeared to be lessening."[75]

Roy also notes that "Pearkes had to consider and weigh the intelligence he was getting from British and especially American sources."[76] The minister continued to be exposed to the more alarmist views of American intelligence—particularly USAF intelligence—on

[72] "Aide Memoire for the Minister," 14 August 1958, 73/1223 Box 1 File 11, DHH.
[73] Isinger, "The Origins of the Cancellation," 81-2.
[74] Roy, *For Most Conspicuous,* 316.
[75] Roy, *For Most Conspicuous,* 318.
[76] Roy, *For Most Conspicuous,* 318.

the Soviet bomber threat. During a visit to Washington in early August to see about selling the Arrow to the US, he received a USAF intelligence briefing which concluded that "regardless of [the] introduction of [the] Russian ICBM threat (100 in 1962) a substantial bomber threat would continue for at least ten years."[77] Pearkes also received a letter from Air Marshal Campbell who sought to use allied assessments to support his arguments for the continuation of the CF-105 program. Campbell declared that "I could go on at some length and re-reason the requirement, pointing out the threat as I understand it from the various Intelligence Agencies."[78] It is clear that the "agencies" he was referring to did not include the Canadian JIC, which, as Andrew Richter comments, "remained steadfast in its own conclusion" regarding the declining bomber threat.[79] It would soon be clear that Pearkes was not convinced by the US estimates, but rather by the JIC analysis.

In a memorandum to the CDC in early August, Pearkes seemed at first to accept the position that the CSC had espoused: "A recent re-assessment of the threat to North America during the period 1960-67 indicates that manned bomber aircraft will continue to pose a threat during this period, though ICBMs will progressively replace them as the primary threat."[80] However, after describing the current status of the CF-105 program and the likely costs involved in continuing it, he declared that the Chiefs of Staff had doubts that the high cost of the Arrow could be justified in light of the changing threat. The minister therefore recommended that the CF-105 program be cancelled. At the meeting of the CDC on 15 August Pearkes explained that his recommendation was "influenced by a number of factors besides the very heavy financial burden. There had been a very rapid development of missiles over the past year in [...] the Soviet Union. There had also been a sharp decrease in the production by the Soviet Union of manned bombers."[81] As Richter

[77] CJSW to Foulkes, "MND visit to Washington," 7 August 1958, 73/1223 Box 1 File 11, DHH.
[78] Campbell to Pearkes, 21 August 1958, 73/1223 Box 1 File 11, DHH.
[79] Andrew Richter, *Avoiding Armageddon: Canadian Military Strategy and Nuclear Weapons*, 1950-1963 (Vancouver: UBC Press, 2002), 53.
[80] DND memorandum to CDC, "Air Defence Requirements," 8 August 1958, Vol. 25 1957-58 Part 2 Doc. 72, Documents on Canadian External Relations (hereafter DCER).
[81] CDC minutes, 15 August 1958, DCER Vol. 25 1957-58 Part 2 Doc. 75, DCER. See also Isinger, "The Origins of the Cancellation," 84-85.

underscores, "the minister made a special point to emphasize that the major impetus for the decision was not cost considerations but an intelligence *consensus* that a recent slowdown in Soviet bomber production indicated a decisive shift toward missile production."[82]

No decision was taken at the CDC meeting on 15 August, but it provoked a flurry of activity in DND. JIC members were also caught up in the turmoil. The JIS was tasked to compare Canadian and American estimates on Soviet bomber and missile capabilities prepared between 1950 and 1958. It concluded that from 1955 onwards the two countries' assessments had increasingly diverged, with the Canadian estimates of Soviet bomber numbers being consistently lower than those of the US. The JIS explained that steadily accumulating evidence had strengthened the hypothesis that the USSR did not intend to build up a large strategic bomber force but would instead concentrate on developing its missile capacity.[83] The JIC stood by its paper of January and saw no need to prepare a new assessment.

DND compiled for ministers a substantial 100-page report on the history of the CF-105 program. Much of the report was taken up with a financial analysis and a timeline of major decisions, but it also summarised the evolving view of the Soviet threat to North America:

> The changing strategical scene has contributed considerably to the complexity of the project. [It] was conceived [when] the Soviet military threat was rapidly increasing. The development was speeded up in 1955 because of the increased bomber threat to North America by the Soviet thermonuclear bomb development, and further evidence [...] that the Bear, the Bison and the Badger were in quantity production. However, in 1956 there was some evidence that the Russians were developing ballistic missiles [and] there was no further evidence [...] that the Soviet Union was in fact developing supersonic jet bombers or increasing [its] inventory of long range bombers. The advent of Sputnik in 1957 confirmed the assumption that the USSR had made considerable progress in the [...] production of missiles and it became obvious that the

[82] Richter, *Avoiding Armageddon,* 53-54. Richter's italics.

[83] JIC report 298 (58), "Estimates of Soviet Threat to North America from Aircraft and Missiles – Canadian and United States Positions," 4 September 1958, RG24 Vol. 20854 File 7-26-9 Part 6, LAC. CDAA00010

Avro Arrow RL 202, 1958. [RCAF photo, courtesy of the RCAF Association]

> future main threat to North America may come from ballistic missiles in the period 1960-1967.[84]

In the report's description of the major considerations affecting future decisions on the program, the first factor listed was "The Changing Threat," which concluded that: "It is now considered that the major threat in the 1960's will be from ballistic missiles, and the manned bomber threat will be a subordinate threat which is expected to decrease in importance after 1962-63."[85] This description of the changing threat—which reflected the judgments in the JIC's January assessment—was the first clear acknowledgment by DND that the Soviet shift from bombers to ballistic missiles as the main means of attack against North America would have significant implications for the CF-105 program.

[84] "Report on Development of CF105 Weapon System," 19 August 1958, 73/1223 Box 112 File 2500A, DHH.
[85] "Report on Development of CF105 Weapon System," 19 August 1958, 73/1223 Box 112 File 2500A, DHH.

In late August and September a series of meetings of the CDC and full Cabinet considered the CF-105 problem. A key element in the memoranda prepared for these meetings and in the briefings by Pearkes to his ministerial colleagues, was that the Soviet threat was shifting from bombers to missiles, thereby calling into question the cost-effectiveness of the CF-105. In a memorandum to the CDC on 22 August, Pearkes declared: "It is now considered that the major threat in the 1960's will be from ballistic missiles, and the manned bomber will be a subordinate threat which is expected to decrease in importance after 1962-63,"[86] wording that was almost identical to that of the JIC assessment of January. A week later, he told a meeting of Cabinet: "The evidence available indicated that the U.S.S.R. did not intend to match the U.S. with a long range air force similar to the Strategic Air Command, or come anywhere near it."[87]

The discussion among ministers at these meetings barely touched on the Soviet threat but instead focused on the industrial and political implications of the recommendation to cancel the CF-105. Cabinet was not yet ready to take this fraught step and on 21 September ministers deferred a final decision: they agreed to cancel some elements of the program—the missile and fire control system—but to continue development work on the CF-105 airframe and engine for another six months.[88] The press release announcing the government's verdict provided only a vague rationale, but did note "the rapid development that has taken place during the past year in missiles" and added that the "preponderance of expert opinion is that by the 1960s manned aircraft, however outstanding, will be less effective in meeting the threat than previously expected."[89]

In early 1959, as the deadline for a decision on the CF-105 approached, the JIC produced an updated assessment on the Soviet threat to North America. The paper laid out the Canadian position

[86] MND to Cabinet, "Recommendations of Cabinet Defence Committee on Air Defence Requirements," 22 August 1958, Vol. 25 1957-58 Part 2 Doc. 78, DCER.
[87] Cabinet conclusions, 28 August 1958, Vol. 25 1957-58 Part 2 Doc. 80, DCER.
[88] Cabinet conclusions [extract], "Air Defence Requirements – Recommendations of Cabinet Defence Committee," 21 September 1958, 73/1223 Box 113 File 2500E, DHH.
[89] Press release, "Revision of the Canadian Air Defence Program," 23 September 1958, 73/1223 Box 1 File 11, DHH.

for the upcoming drafting session for the annual Canada-US agreed intelligence assessment. Perhaps in an effort to soften its differences with the American view of the threat, the paper couched its main conclusions in rather opaque language. But these had not changed from its January 1958 appreciation: the USSR would shift from the use of manned bombers to intercontinental ballistic missiles as soon as it could, and this shift would take place in the early 1960s.[90] But by this point decisions on the CF-105 program were unlikely to be significantly affected by a JIC assessment that reiterated its earlier judgments; military officers and civilian officials in Ottawa were already well aware of the JIC's conclusions.

Early February saw another round of Cabinet meetings to discuss the CF-105 program. There was little doubt what the outcome would be. On 5 February General Foulkes told the CDC that the Chiefs of Staff "were still of the opinion that the changing threat and the rapid advances in technology, particularly in the missile field [...] created grave doubts as to whether a limited number of aircraft of such extraordinarily high cost would provide a defence return commensurate with the expenditures."[91] The Chiefs therefore recommended that the CF-105 program be cancelled. Five days later, Pearkes reiterated his view that the threat of manned bombers was rapidly diminishing and Russia was unlikely to contemplate an attack until it had a large arsenal of ICBMs; "[a]gainst these, manned interceptors were useless."[92] On 17 February the Cabinet made its final, inevitable, decision to cancel the Arrow.[93] Now the government was faced with the challenge of explaining and justifying its action to the Canadian public.

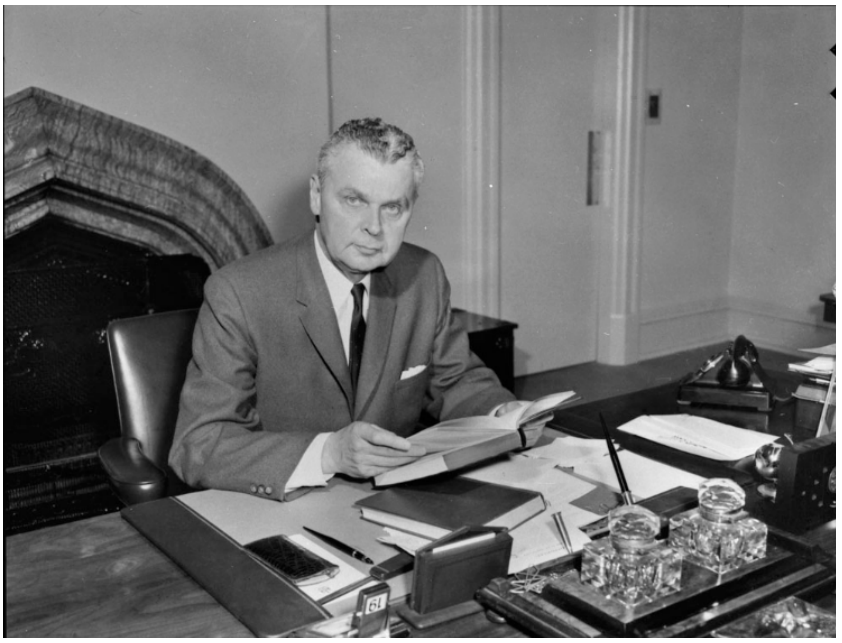
Prime Minister Diefenbaker announced the cancellation of the Arrow in the House of Commons on 20 February. He said that the main rationale for the decision was the changing strategic threat:

[90] JIC assessment 308/2 (59), "The Soviet Threat to North America, 1959-1971," 29 January 1959, RG24 Vol. 20854 File 7-26-9 Part 7, LAC. CDAA00011

[91] CDC minutes, 5 February 1959, Vol. 26 1959 Doc. 168, DCER.

[92] Cabinet conclusions, 10 February 1959, Vol. 26 1959 Doc. 169, DCER.

[93] Cabinet conclusions [extract], "Arrow (CF-105) aircraft; Decision to terminate development," 17 February 1959, 73/1223 Box 113 File 2500E, DHH.



Prime Minister John Diefenbaker, 1958. [Library and Archives Canada Item ID 3214920]

> In recent months it has come to be realized that the bomber threat against which the CF-105 was intended to provide defence has diminished [...] the numbers [of Soviet bombers] now appear to be much lower than was previously forecast. Thus the threat against which the CF-105 could be effective has not proved to be as serious as was forecast. [...] By the middle sixties the missile seems likely to be the major threat and the long range bomber relegated to supplementing the major attack by these missiles."[94]

Diefenbaker's statement made little mention of the escalating—and unsustainable—cost of the CF-105 program.[95] He likely wanted to avoid accusations by the opposition that the government was unwilling devote the necessary resources to the defence of Canada.

[94] Hansard, 20 February 1959, 1221.

[95] The earliest drafts of the Prime Minister's statement prepared by officials in DEA and the Privy Council Office focussed to a much greater extent on the escalating cost of the CF-105 and made almost no mention of the changing Soviet threat to North America. The relative emphasis placed on each of these factors shifted significantly in later drafts (Draft statements, 14-18 February 1959, File D-28-1(a)-C 1959, PCO).

In the parliamentary debate over the Arrow cancellation, the government repeatedly stressed the diminishing Soviet bomber threat to North America. Pearkes stated that the main reason for the cancellation was "the decreasing [bomber] threat and therefore the lessening need for [the CF-105]" and that the increasing cost was only a secondary consideration.[96] He added that "all the information we can get from all the sources which are available to the government indicates that the threat of the manned bomber against this county is diminishing."[97] Diefenbaker remarked that the Chiefs of Staff "had the courage, when new light was brought on a possible threat, to change their recommendations in this respect. They had the courage to advise the government that the nature of the threat had changed."[98] The opposition Liberals were not convinced. The Liberal defence critic declared that "we cannot accept the Prime Minister's statement that it is a diminished threat unless he can give us some further details as the basis of his statement."[99] The Liberals argued that this claim was contradicted by public statements made by USAF officers in testimony to US Congressional committees. The public divergence in official Canadian and American views of the Soviet bomber threat was even noted by the US industry magazine *Aviation Week*, in an article entitled "Intelligence Schism."[100]

The Chiefs of Staff were troubled by the government's focus on the diminished bomber threat as the main justification for the Arrow cancellation rather than the escalating cost. As Foulkes later wrote: "the Government preferred to stress all the other reasons for discontinuing the project and to play down the predominantly financial aspect."[101] Frank McLin argues that the Diefenbaker government was being disingenuous by attempting to represent the decision as being one "dictated by strategic factors" rather than financial considerations. Basing his account on interviews with some of the protagonists, McLin suggests that the Chiefs' advice to the government had not stressed

[96] Hansard, 23 February 1959, 1284.
[97] Hansard, 23 February 1959, 1280.
[98] Hansard, 2 March 1959, 1513.
[99] Hansard, 23 February 1959, 1271-72.
[100] "Intelligence Schism," *Aviation Week*, 2 March 1959, 26.
[101] Charles Foulkes, "The Story of the 'Avro Arrow', 1952-1962," unpublished history, c. 1968, 73/1223 Box 118 File 3005, DHH.

the changing strategic situation.[102] Isinger goes further, saying that "Diefenbaker, in his misleading September and February statements, had relied on military arguments emphasizing the diminishing Soviet bomber threat and the advent of the missile—arguments the CSC had specifically opposed—to justify the cancellation rather than economic arguments emphasizing the extraordinary costs of the Arrow program."[103] However, the documentary record shows that from August 1958, the information and advice provided to ministers by the military included clear judgments concerning the imminent shift of the Soviet threat from manned bombers to ballistic missiles. This represented a belated acceptance by the military of the conclusions from the JIC's January 1958 assessment.

Over the next five years the changing Soviet threat to North America had a significant influence on Canadian defence policy, despite the RCAF's continued efforts to press for manned interceptors. The importance of continental air defence declined. Washington increasingly recognised that there was little point in maintaining extensive defences against manned bombers when there was no prospect of countering increasingly capable Soviet ICBMs. NORAD's primary role now became warning of ballistic missile attack. There would be a continuing requirement for manned interceptors for the peacetime control and surveillance of airspace for sovereignty purposes, but these would be needed in smaller numbers and with more modest capabilities than the proposed CF-105.[104] Such capabilities would also suffice to deal with any residual Soviet bomber threat. To fulfill this role, in 1961 Canada obtained sixty-six surplus USAF F-101B Voodoo interceptors for its five air defence squadrons. A more fundamental reevaluation of continental air defence was soon to follow. US Secretary of Defence Robert McNamara recognised that anti-bomber defences would have only a marginal effect on a Soviet attack against North America. He therefore concluded that "it no longer appears to be necessary or useful to retain our large interceptor

[102] Jon B. McLin, *Canada's Changing Defense Policy, 1957-1963: The Problems of a Middle Power in Alliance* (Baltimore: Johns Hopkins Press, 1967), 75-76.
[103] Isinger, "The Origins of the Cancellation," 108.
[104] David Cox, *Canada and NORAD, 1958-1978: a Cautionary Retrospective.* Aurora Papers 1. (Ottawa: The Canadian Centre for Arms Control and Disarmament, 1985), 4, 6; and Kenneth Schaffel, "The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945–1960" (Office of Air Force History, United States Air Force, Washington, 1991), 258, 268, 272.

force at its present size," and called for substantial cuts to continental air defence.[105] By 1964, the total number of US and Canadian fighter squadrons assigned to this role was less than half that of 1956.[106] The Pearson government's 1964 defence white paper reflected this change when it stated that "the proportion of Canada's resources directed to air defence will gradually decline through the balance of the decade."[107] The number of Canadian interceptor squadrons was reduced to three, and the number of aircraft in each squadron was later cut.[108] The decline of the Soviet bomber threat and the lower priority given to air defence in the 1960s had a significant impact on the position of the RCAF. Its budget in 1964 was reduced by more than 30 per cent compared with a decade earlier, although at a time of declining defence expenditures it still received 47 per cent of overall military spending (compared with 56 per cent in 1954).[109]

The Conservative government had cited the diminishing bomber threat as one of the principal reasons for its decision to cancel the Arrow, yet provided only vague statements to support this claim. The demands of the opposition parties for a more detailed account were never answered. The habit of secrecy that cloaked discussion of any aspect of "intelligence" prevented a fuller explanation. Then and since, the government's silence on the changing assessment of the Soviet threat provided wide scope for speculation and myths. With little insight into the role of intelligence in the Arrow decision, commentators and historians were free to interpret fragmentary evidence in the way that best suited their arguments. Several theories arose.

One of the most persistent theories was that Canada's dependence on American intelligence meant that it had little choice but to

[105] McNamara to Johnson, 3 December 1964, quoted in Joseph T. Jockel, *Canada in NORAD, 1957-2007: A History* (Montreal and Toronto: McGill-Queen's University Press, 2007), 66.
[106] Schaffel, "The Emerging Shield" 259, 269-71; and Jockel, *Canada in NORAD*, 66-68. See also Cox, *Canada and NORAD,* 21-22, 36. Canada assigned five squadrons to air defence in 1962, after which the number declined to three, supplemented by two BOMARC squadrons.
[107] Minister of National Defence, "White Paper on Defence*,"* March 1964, quoted in Jockel, *Canada in NORAD*, 66.
[108] Jockel, *Canada in NORAD*, 66.
[109] Fransden, "Canada's Cold War Air Force," 227.

accept US judgments on the Soviet bomber threat at face value. Sometimes there was an added twist: Washington had deliberately distorted the intelligence in order to induce Ottawa to make decisions that served US interests. Palmiro Campagna advances both these ideas. In *Requiem for a Giant,* he points to Canada's dependence on American intelligence and notes that in 1958–59 these estimates downplayed the manned bomber threat. Canada, he concludes, "sided with American intelligence that the manned bomber threat was indeed disappearing."[110] Ultimately, "[t]he Arrow was terminated because the manned bomber threat, according to the U.S. intelligence, was diminishing."[111] In *Storms of Controversy,* Campagna sees more nefarious American motivations behind the intelligence it provided: "U.S. intelligence first created the bomber gap in the early 1950s at the Arrow's inception, actually causing an acceleration of the program, and then followed with the missile gap and diminished bomber threat, thereby encouraging the termination of the Arrow."[112] James Dow sees similar forces at play. He remarks that the intelligence on which the cancellation of the Arrow was based did not come from the RCAF but rather reflected the fact that "Canadian defence planning was being carried out almost exclusively on American intelligence at a time when the United States was scrambling to close a perceived 'missile gap.'"[113] Denis Smith, in his biography of Diefenbaker, regards American actions as more benign but no less influential in the decision on the Arrow, which "took place under the friendly guidance of the US Department of Defence and the US Air Force, within their changing calculations of the Soviet threat and the American interest."[114] In yet another interpretation, Campagna credits US intelligence with influencing the decision to cancel the Arrow, but this time rather than being a deliberate effort to manipulate Canadian policy it was all due to a mistake: "the Arrow

[110] Palmiro Campagna, *Requiem for a Giant: A.V. Roe Canada and the Avro Arrow* (Toronto: Dundurn, 2003), 116.
[111] Campagna, *Requiem for a Giant*, 122.
[112] Campagna, *Storms of Controversy*, 14.
[113] Dow, *The Arrow,* 147-48.
[114] Denis Smith, *Rogue Tory: The Life and Legend of John G. Diefenbaker* (Toronto: McFarlane, Walter & Ross, 1995), 324.

was cancelled on the basis of incorrect intelligence data received from the United States."[115]

Others, rather than blaming the Americans, claim that it was Canadian officers and politicians who distorted or misused the intelligence regarding the Soviet bomber threat. Andrew Richter acknowledges that he lacked information on why Canadian intelligence estimates of the Soviet threat differed from those of the Americans, but speculated that "[p]ossible explanations even include a willful disregard of the available evidence by Canadian intelligence officers to support a decision that had already been made: cancellation of the Arrow."[116] More common is the assumption that the politicians simply ignored the intelligence and advice they received from the military to make a decision based on political considerations. E.K. Shaw states flatly that Diefenbaker's decision to cancel the Arrow "ran counter to military intelligence in both Canada and the U.S."[117] Joseph Jockel wonders "[w]hy did Diefenbaker feel [...] compelled to offer a justification for the cancellation [the diminished Soviet bomber threat] that would put him at odds with the Canadian military?" and in answer speculates that "Diefenbaker may have especially wanted to strengthen his case [...] by arguing that not only was the cost too high, but the product of little use."[118] Campagna alleges that the government used claims of a diminished Soviet bomber threat to justify the cancellation of the Arrow as a political tactic, "perhaps because it was known that the average Canadian would be unable to dispute it in the absence of any secret intelligence information."[119] The common thread linking these varied theories is the fact that earlier authors had no insight into the Canadian intelligence assessments that influenced the government's thinking on this issue. Without this

[115] Palmiro Campagna, *The Avro Arrow: For the Record* (Toronto: Dundurn, 2019), 72. Most recently, Campagna has come to the conclusion that the Arrow was cancelled entirely on the basis of the changing Soviet bomber threat: "the Arrow was cancelled not because it was unaffordable, not because it was too rich, but because of the changing threat." (LAC podcast, "Avro Arrow: Uncovering the Myth," 4 November 2020, https://library-archives.canada.ca/eng/collection/engage-learn/podcast/Pages/65-Avro-Arrow-Part-2.aspx).

[116] Richter, *Avoiding Armageddon,* 53.

[117] E.K. Shaw, *There Never Was an Arrow,* 2d ed. (Ottawa: Steel Rail Educational Publishing, 1981), 115.

[118] Jockel, *Canada in NORAD*, 45.

[119] Campagna, *Storms of Controversy*, 144.

information, historians have previously lacked a critical part of the Arrow story.

Now that key Canadian intelligence assessments on the Soviet bomber threat are available it is possible to arrive at a more balanced view of the Arrow decision. It is clear that the earlier theories described above were wide of the mark. There is no evidence that the US distorted the intelligence it provided in order to manipulate Canadian policy. Of course, Washington sought to influence Canadian decisions on continental air defence to achieve its own policy aims. The provision of intelligence is one of the many levers—political, diplomatic, economic—Washington uses to encourage allied governments to form a common understanding of an issue and adopt compatible policies. The assessments that Canada received accurately reflected the views of US intelligence agencies at the time; they were not altered or slanted to influence Ottawa's decisions. Canadian officials placed a high value on these assessments, but also recognised the need for an independent Canadian evaluation of the available information. This was a key reason that Canada developed its own strategic intelligence assessment capacity after 1945: Ottawa needed to be in a position to assess the information it received from a Canadian perspective.

Canada was therefore not a passive recipient of intelligence from the United States which it blindly accepted—or arbitrarily rejected. True, much of the information on which the Canadian assessments were based came from US and other allied sources, but Canadian analysts working in the JIC agencies brought their own judgment to bear to evaluate this information and so reach their own conclusions about the USSR's current and likely future capabilities. Such conclusions were of course influenced by the Canadian analysts' close working relations with their American counterparts and yet on certain critical points the Canadian assessment differed markedly from that of the US. This was the result of differing interpretations of the same body of raw information. The Canadian forecast of the capabilities of Soviet Long Range Aviation in the early 1960s proved to be broadly accurate. As noted above, the lower Canadian calculation of the number of Soviet operational heavy bombers was generally closer to reality than US estimates. As well, the Canadian view of the significance of Moscow's imminent shift from bombers to missiles as the main means of attacking North America was essentially correct. By the late 1950s, with the advent of U-2 reconnaissance flights over the Soviet Union, the US estimates of Soviet bomber numbers were

also gradually reduced and the Bomber Gap ceased to be a political issue in the United States.

Canadian analysts did not distort their conclusions to support Canadian policy preferences, either those of the RCAF or the Conservative government. This was illustrated by the fact that senior RCAF officers were unhappy with the JIC's conclusions on the Soviet bomber threat and sought—largely without success—to alter them. There have been occasions where intelligence analysis was influenced by policy or bureaucratic forces; a clear example is how the analysis of the USAF intelligence division during this period was largely shaped to support USAF policy and budgetary goals.[120] But in the Canadian case, analysts' judgments appear to have been based on their best interpretation of the available information.

The Conservative government did not cynically use the diminishing Soviet bomber threat as a political smokescreen to justify cancelling the CF-105 program. Diefenbaker and his ministers certainly took steps to portray the Arrow decision in the most positive political light, but they regarded the judgments about the shift in the threat from bombers to ballistic missiles as valid and they genuinely believed that this was a sound reason to cancel the program. It is true that in its public statements the government preferred not to highlight the escalating cost of the aircraft as the principal factor in the decision, which would have made it easier for the opposition to accuse the Conservatives of being unwilling to spend the money necessary to develop this state-of-the-art aircraft to defend Canada. Therefore, in addition to being true, the diminishing bomber threat was a more convenient public rationale for the cancellation. The statements of the government were not at odds with the assessments and advice it received from its military experts, notwithstanding subsequent anonymous comments by some senior officers. The JIC's January 1958 paper clearly judged that the Soviet strategic threat to North America would soon shift from bombers to ballistic missiles. For several months the Chiefs of Staff were reluctant to accept the implications of this conclusion and so continued to focus on the continuing bomber threat and the need for the Arrow. However, by August 1958 the CSC finally recognised the

[120] See for example Lawrence Aronsen, "Seeing Red: U.S. Air Force Assessments of the Soviet Union, 1945-1949." *Intelligence and National Security* 16, 2 (2001), 103-31, and Prados, *The Soviet Estimate,* 43-50.

dire financial consequences of continuing the CF-105 program and from that point on their advice to the government was consistent in acknowledging the changing strategic situation.

Much of the subsequent public debate—and commentary by later writers—revolved around the question of whether the manned interceptor had become obsolete. The JIC did not comment on whether manned fighters would still be required for the defence of North America, since it was not the Committee's role to make such policy recommendations. In any case, this was a distraction from the question of the changing bomber threat. As NORAD policy later made explicit, manned interceptors were still required for peacetime surveillance and airspace control functions to support national sovereignty, but they were only expected to provide a limited defence against the residual bomber threat.[121] The Voodoo interceptors that Canada received in 1961 fulfilled this role.

Canadian intelligence assessments played a role in the decisions on the CF-105 program, but determining the precise degree of their influence is difficult, for two principal reasons. First, the major political and military figures involved in the CF-105 program have said little about the use of intelligence in reaching their decisions. General Foulkes, who chaired the Chiefs of Staff Committee throughout this period, later wrote an unpublished account of the Arrow program, but he made only a brief reference to the role of intelligence:

> Another factor was the revised intelligence estimate of the character and scope of a Soviet attack on North America. After the Sputnik launching of 1957, it was estimated that by 1961-62 the major threat [...] would be by missile forces; bombers would be relegated to a secondary role. If [this] was correct, it would be very difficult to justify such large anti-bomber defence costs.[122]

Others have said even less about how the intelligence swayed their thinking. It is the second difficulty, however, that is perhaps the most significant. Common to all attempts to measure the impact

[121] Cox, *Canada and NORAD,* 37.
[122] Foulkes, "Story of the 'Avro Arrow'."

of intelligence on decision-making is the fact that this is only one among the many considerations that contribute to a decision of this magnitude. Each individual involved will be influenced by the various factors in different ways, and will often not be fully aware of how their thinking is affected. After the event, hindsight and other biases will shape their recollection of how their judgment was formed. Thus, while it is not possible to determine the precise degree to which the intelligence affected the Arrow decisions, some broad generalisations can be made.

Intelligence played a minimal role in establishing the initial operational requirements for the CF-105 and in the program's early years. The officers involved in this process would have been aware of the overall assessment—in the ACAI papers and other RCAF estimates of the early 1950s—that the Soviet bomber threat was expected to increase in numbers and capabilities in ensuing years. But the ACAI assessments looked only four or five years into the future and no longer-term intelligence assessment of the likely threat over the operational lifetime of the proposed new aircraft was undertaken. Other factors had a greater influence on the original operational requirements, such as a general assessment of likely developments in aircraft design and technology in the next decade and the RCAF desire for a state-of-the-art interceptor. Likewise, the program's acceleration in 1955 was not based on a revised intelligence assessment of the Soviet threat, but rather was a consequence of the changed political circumstances in the West following Moscow's dramatic public display of the new Badger and Bison bombers in 1954 and 1955. The ACAI assessments of this period had already reported on the development of these new bombers but they did not conclude that the overall Soviet threat had altered significantly. Instead, it was the public reaction—particularly in the United States where the Bomber Gap became a political issue—that created conditions for the RCAF to convince the Liberal government to accelerate development of the Arrow.

Not until November 1955 did an intelligence assessment specifically examine the threat which the CF-105 would likely face. The Directorate of Air Intelligence—not the full JIC—produced it as part of the rushed interdepartmental review. It largely supported the RCAF view of the threat, especially in its description of two hypothetical high-performance jet bombers that Moscow was believed capable of developing. However, DAI also made reference

to the possibility that Moscow might phase out the manned bomber in favour of the ballistic missile as its principal strategic weapon. This judgment would take on increasing prominence in subsequent intelligence assessments. By the mid 1950s, the JIC was increasingly concerned about the divergence in Canadian and American views of the Soviet bomber threat, including numbers of long range bombers and their operational capabilities. But Canadian views were often submerged in the compromises and vague wording required to achieve agreement in the Canada-US ACAI appreciations.

The JIC assessment of January 1958, "The Threat to North America, 1958-1967," ultimately had the greatest impact on decisions related to the Arrow. It laid out clear judgments concerning the imminent transition from manned bombers to ballistic missiles and described the limited size and capabilities of the Soviet bomber force. But some months passed before its conclusions were accepted by the CSC. The principal opposition came from the RCAF. During the drafting of the JIC assessment, senior Air Force officers had tried—largely unsuccessfully—to modify its judgments. In the CSC discussions of the draft paper, Air Marshal Campbell objected to its conclusions. The RCAF argued that American intelligence estimates of the Soviet bomber threat were more accurate and should shape Canadian policy on this issue. The RCAF also sought to use private and public statements by USAF officers to bolster its case. The NORAD commander's comments to the CSC in May 1958 exerted considerable influence and delayed the Chiefs' acceptance of the JIC conclusions. To support their preferred policy, the RCAF marshaled all the available evidence and arguments, from whatever source. US estimates and views were often seen as being more valid than the Canadian assessment. The Canadian intelligence assessment was not given a privileged status in this debate.

It was not until August 1958 that the Chiefs of Staff—less Air Marshal Campbell—came to accept the JIC assessment of the evolving strategic threat, which reinforced their already serious concerns about the CF-105 program's escalating costs. From that point on, the military advice to Cabinet consistently stressed the JIC's estimate of the Soviet bomber threat as a primary factor in the recommendation to cancel the CF-105. It is not clear whether ministers saw the JIC assessment itself, although defence minister Pearkes likely received a copy. In any case, the paper's main conclusions were summarised in the memoranda sent to the CDC

and to the full Cabinet in August and September. The officials in External Affairs and the Privy Council Office who were involved in drafting the Prime Minister's statement to the House of Commons were aware of the JIC paper. The arguments put forward in the statement—and some of the wording—tracked closely with the JIC assessment, as did the government's references to the diminished bomber threat in the subsequent Parliamentary debate. From this it can be concluded that the Canadian intelligence assessment of the changing Soviet bomber threat to North America was an important factor in the fateful decision to cancel the Arrow.

The intelligence factor has often been described as the "missing dimension" in the historical study of defence and foreign policy decision-making; nowhere is this more true than in Canadian historiography. This examination of the role of intelligence in the decisions on the Arrow provides an example of how the inclusion of the intelligence aspect can provide a more complete picture of an important episode in Canadian history. It is a case study in how intelligence can contribute to the formulation of major decisions on defence policy. As well, it is a clear demonstration of the value of having an effective strategic intelligence assessment capability which can provide an independent evaluation from a Canadian perspective. Such an independent perspective is just as important today when Canada faces decisions concerning current threats to the security of North America and the future of NORAD.

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