feature

The U-2 and the AVRO Arrow

BY **PATRICK BRUSKIEWICH**

At 9:51 am, March 25th, 1958, some fifty years ago, the elegant CF-105 A.V. Roe Arrow took to the sky for its maiden flight (see Fig 1: the CF-105 Arrow). Just five years after its beginnings as a research project in 1953 the *Arrow* took to the skies. The *Arrow* was the pride of Canada's aerospace industry. In half a century, no other Canadian undertaking, save perhaps the development of CANDU, has matched this achievement.

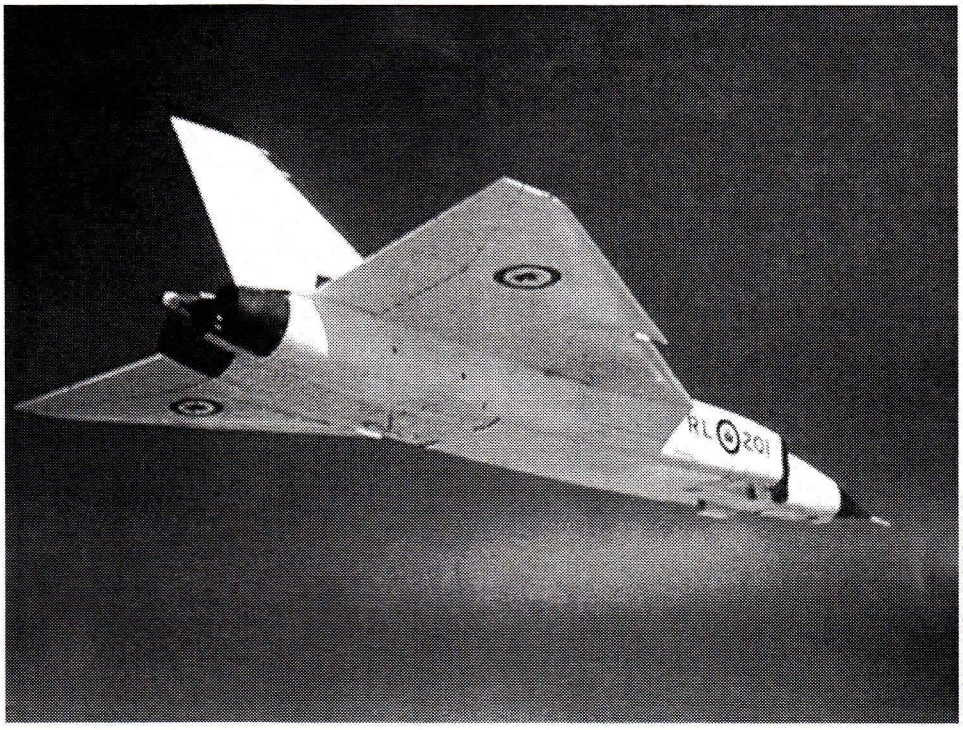
The most advanced aircraft of its kind in the world at the time, within a year of its maiden flight, due to a change in Government and its priorities, the *Arrow* program would be canceled, the prototype aircraft destroyed, the blueprints seized, classified or destroyed and the talented people who built this wonder scattered to the wind.

It has only been in recent years, and with the demise of the Soviet Union in 1991, that many of the remaining confidential documents have become available for historians to put together a candid account of the history of the *Arrow* program. Today almost all of the remaining documents relating to the *Arrow* program have been made public.

In 1997 a Canadian made for TV feature film about the *Arrow*, starring Dan Aykroyd as the powerful and partisan Crawford Gordon, was produced. The CBC film introduced another generation of Canadians to a story of the *Arrow* – all be it a far from complete history. Within the Aykroyd film is perpetuated a myth that the Americans wanted the *Arrow* program canceled because it was the only aircraft in the world able to climb to above 20,000 metres and "engage" the then super secret U – 2 surveillance aircraft.

The fact of the matter is that while the U – 2 did play a role in the cancellation of the *Arrow* program, historians have not properly touched upon the real relationship between the two aircraft over the past five decades. As well, the monumental event that coincided with the rolling out of the first *Arrow*, the launch of Sputnik 1, was far from a happenstance but may have been timed by the Politburo to give the West a not so subtle message. Aircraft like the *Arrow* were machines without a mission – rockets were the way of the future.

Much has been written of this pivotal moment in Canadian aerospace history. In the way of this article I would like to add a little bit to the *Arrow* history by saying I wouldn't be here today were it not for the *Arrow*. My parents met on a boat coming back from France, my father a young RCAF officer and aeronautical engineer serving with 2nd Fighter Wing in France, and my mother a glamorous French Canadian school teacher from Montreal on her way back from a holiday in France. Of course, in true Canadian fashion my father could not speak French and my mother could not speak English when they met.



NATIONAL ARCHIVE OF CANADA

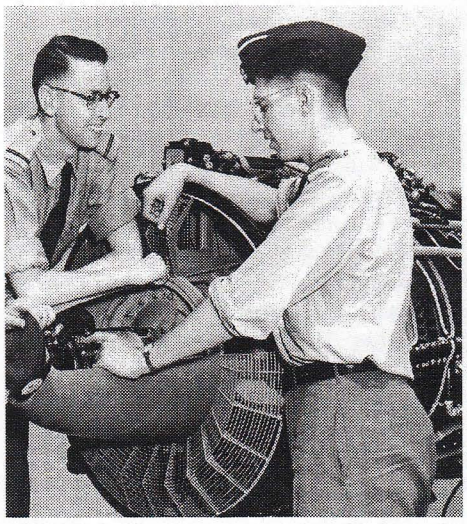
Figure 1: The CF-105 Arrow.

My father, a mechanical and aeronautical engineer, had been ordered by the Chief of the Defense staff to return from his operational duties looking after the CF-86 Canadair Sabre and CF-100 A.V. Roe Canuck jet interceptors that were part of Canada's NATO commitments in Europe, to Ottawa to help the advanced jet engine programs for the Sabre and Canuck aircraft, and to assist in a review of the operational requirements and costing of the proposed acquisition of 120 CF-105's (see Fig. 2: RCAF Officer Steve Bruskiewich with colleague, circa 1954).

On the weekends he would drive from Ottawa to Montreal to court my mother. While the *Arrow* was a stillborn, I came kicking and screaming into the world a few years after their marriage a half century ago. The *Arrow* is no longer but I am here today to write this article. I grew up understanding more of the story of the *Arrow* than all but a handful of RCAF types, A.V. Roe employees and aviation historians. It seems the U-2 and the *Arrow* were tied, one to the other, in a unique symbiosis.

A mysterious aircraft from the East

On September 17th, 1956 an incident involving fighters of the R.C.A.F. stationed in Europe and a mysterious aircraft resulted in one of the most secret events involving Canadians during the Cold War. The unidentified aircraft was first detected high over central Poland by the Canadian manned radar station at Metz. Over the space of two hours the unidentified aircraft flew a direct line due west, entering the Canadian controlled air sector in Western Europe.



EDMONTON JOURNAL

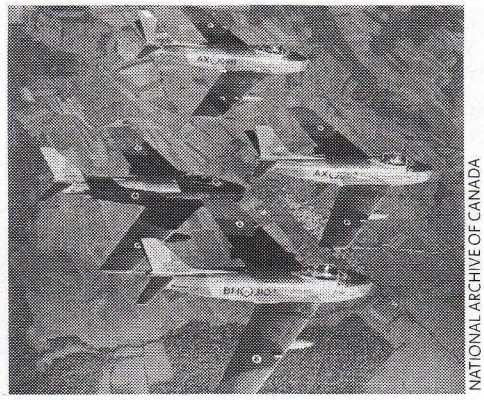
Figure 2: RCAF Officer Steve Bruskiewich (right) with colleague,1954.

Four Mark 6 CF-86 Sabre jets from the Second Canadian Fighter Wing stationed at Grostenquin France were scrambled to intercept this high flying aircraft (refer to Fig. 3: CF-86 Sabre Jet). The four jets were on "Zulu Alert" – jet fighters kept on standby, fully fueled and armed, ready to be airborne in under two minutes.

Flight Lt. Tony Hannas, a 421 squadron pilot from Leduc Alberta, was the ground controller who vectored the flight of four CF-86's, a section led by Flight Lt. John McElroy, a Canadian Ace from the Second World War. These Mark 6 Sabres had been manufactured under license at Canadair outside of Montreal and sported a Canadian made Orenda engine. They were the fastest, highest flying and best Sabre jets in Europe. The Canadian pilots flying these jets were also the "best fly boys" in NATO at the time.

When it was first detected at the Canadian manned radar station at Metz the unidentified aircraft was at an altitude 5,000 metres above the operational ceiling of the CF-86's. The four Mark 6 CF-86s were vectored to a holding position below and in line of the descending aircraft. When the mysterious aircraft entered Western European airspace the "bogey began to rapidly descend" and the four aircraft climbed to attempt a visual identification.

Two Sabre jets took up position, one at each wing tip, while Flight Lt. John McElroy and his wing man took up position astern of the mysterious aircraft. The mysterious aircraft did not sport any identifying marks or roundels, and was of a design never before seen by the pilots, silver with thin wings that span a greater distance than the aircraft was long. The aircraft was not of a type found in the quick identification booklets attached



NATIONAL ARCHIVE OF CANADA

Figure 3: Four CF-86 Sabre in Diamond Formation with Flight Lt. Hannas in the lead.

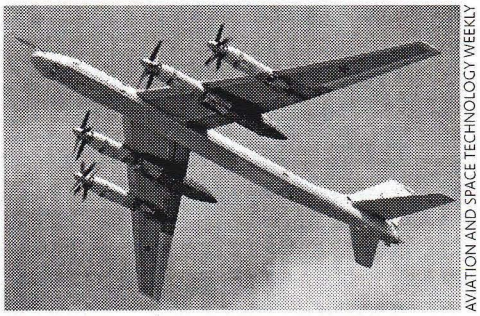
to the hip of the fighter pilots. Repeated radio queries, both from the radar station at Metz and from Flt. Lt. McElroy, went unacknowledged.

Following standard procedures Flt. Lt. McElroy activated his gun cameras and armed his guns. The arming of the guns of a Sabre jet is a double redundant process with two dummy rounds for each gun and a double switch system. When his guns were armed Flt. Lt. McElroy ordered the two Sabre jets at the wing tips of the mysterious aircraft to disengage. Before Flt. Lt. McElroy could fire live rounds the mysterious aircraft disintegrated before his very eyes. The gun cameras would confirm that no pilot ejected from the aircraft. The remnants of the aircraft was scattered over the German country side about 20 km east of Wiesbaden.

When the section of four CF-86's returned to base, the airfield had already been locked down by the U.S. Air Force. The second in command of NATO, a senior US General, would that afternoon call the Base Commanding Officer at Second Canadian Fighter Wing on the carpet, "God damn it ... you crazy Canadians have just shot down one of our own aircraft!" 1 The Canadians pilots stood accused of shooting down a U-2 aircraft returning from a secret high altitude photo-reconnaissance mission over Russia and Eastern Europe. The civilian pilot of the U-2, Howard Carey, was killed in the incident.

A post-incident inquiry by the R.C.A.F. would determine that the canvas over the gun ports on Flt. Lt. McElroy's Sabre were intact, and a counting of the rounds would show that indeed no live rounds had been fired. The film from the gun camera was taken and not returned to the R.C.A.F., but instead was lost in the "deep black" of the U-2 archives.

A secret US report would subsequently determine that the wake from the two Sabre jets at the wing tips of U-2 most likely caused the structural failure of the aircraft's wings, which were only rated to 3-g. In 1960 the head of the U-2 program Richard Bissell would confirm the U-2 to be so fragile that it would "pretty much break up in a mishap, as the plane over West Germany did in 1956."



AVIATION AND SPACE TECHNOLOGY WEEKLY

Figure 4: Tupolev Tu-95 Bear.

Francis Gary Powers in his book "Operation Overflight" had this to say of the incident:

"In September, 1956, Howard Carey, a contract pilot I had known at Watertown, was killed in a U-2 crash in Germany. There was some confusion as to what actually happened, initial speculation ranging all the way to sabotage. It was later determined, however, that while in flight Carey had been buzzed by two curious Canadian Air Force interceptors. Caught in their wake turbulence as they passed him, his U-2 had apparently simply disintegrated." 2

Beginning in July 1956, the U-2 was flown from Wiesbaden, West Germany.3 Soon after the "Canadian Incident" the US moved its U-2's to Giebelstadt. The Canadians were told "in future to keep your Mark 6's away from the U-2."

Why was the Arrow being built?

By the mid-1950's work was underway to replace the CF-86 and CF-100 jets with a new fighter interceptor, the CF-105 Arrow. The *Arrow* was a Canadian designed and built twin engine, tailless delta wing supersonic aircraft. For its time it was the most advanced, sophisticated and costly high performance jet interceptor in the world. The delta wing design allowed for the lightest wing, for a low thickness to chord ratio, while still provided the required structural strength, sufficient fuel capacity and space for undercarriage stowage.

The *Arrow* was designed for the purpose of intercepting Soviet bombers, such as the Tupolev Tu-95 Bear, a large intercontinental turboprop bomber which came into operation in the 1955 (see Fig. 4: Tupolev Tu-95 Bear). The development of the Tupolev Tu-95 Bear began in 1951, two years before the development of the *Arrow* began.

During the annual Soviet Aviation Day festivities in 1955 a handful of long range bombers were flown repeatedly over the Kremlin to deceive

Western observers and give them the mistaken impression that there many such bombers in operational use. Based on insufficient intelligence and worst case assumptions, by the spring of 1956 the US Air Force predicted that 500 intercontinental bombers would eventually be deployed by the Soviet Union. This would precipitate what became known in Washington as the "Bomber Gap" between the US and the Soviet Union. In fact there would never be more than two hundred Soviet long-range bombers built. In comparison, by the late 1950's the US would have 340 intercontinental and 1,300 intermediate range bombers in operation.

Today there are a handful of turboprop Tu-95 aircraft still in operation, armed with supersonic cruise missiles. They are still occasionally observed on long-range patrols off both Canada's east and west coast, and on occasion at the edge of Canada's north.

During the 1956 Presidential election incumbent President Dwight D. Eisenhower had to contend with accusations from his political rivals that a "Bomber Gap" had opened between the Soviet Union and the United States, and that the Soviet Union was leaping ahead of the West in Intercontinental Bombers. It all turned out to be a Soviet bluff.

Sputnik 1 and the demise of the Arrow

It did not bode well for the *Arrow* Program that Sputnik 1 was launched the very same day as the roll-out of the first completed *Arrow* on October 4th, 1957 (see Fig. 5: Launch of Sputnik 1). This may have not been a happenstance, but a conscious decision by the Soviet Politburo, to time the launch of Sputnik with the roll out of the first *Arrow*. The lack of Soviet Bombers and the launch of Sputnik would ultimately seal the fate of the *Arrow* program.

During the first forty years of its existence, the launching of Sputnik 1 was perhaps the single and most decisive political act by the Soviet Union. The success of Sputnik and the lead that the Soviet Union had in rockets and launch capacity over the United States encouraged a decision by Soviet General Secretary Khruschev in 1957 to initiate a strategic missile arms race with the US. Up until then the United States held supremacy over the USSR in the field of long-range aviation.

With little prospect of catching up with the US in terms of quality and quantity of long-range aircraft, Khruschev decided to change the focus of the competition from aviation to space technology, initiating a "Space Race" between the Superpowers.

The U-2 and the Bomber-Gap myth

From its inception the *Arrow* program was predicated on the assumption that the Soviet Union would build squadron after squadrons of intercontinental bombers capable of delivering atomic weapons to North America.

President Eisenhower, himself the former Supreme Commander in Europe during World War Two, understood the importance of good intelligence. He was both cautious and pragmatic when it came to analysis and assessment. In the middle 1950's as President Eisenhower would propose his Open Skies policy, which would have allowed the over flight of each other's territory as a confidence building measure.

Both the United States and the Soviet Union had been attacked without warning by their enemies during the Second World War, the U.S.S.R. in the summer of 1941 by Germany and the U.S. in December of that same year by Japan. Despite the fact both superpowers had such a common experience, Soviet Premier Khruschev rejected Eisenhower's Open Skies proposal in 1955 at the Geneva Summit.

Following the rejection of his Open Skies proposal, President Eisenhower approved the building of the high flying U-2 surveillance aircraft, which was built in record time and became operational in 1956 (see Fig. 6: The U-2 surveillance aircraft). Knowing that it was a matter of time before the U-2 would be shot down or crash due to an accident, Eisenhower would also seek the building of space based satellites like Corona to allow continued surveillance of the Soviet Union from low earth orbit.

The first overflight of Eastern Europe by a U-2 occurred on June 20th, 1956. The first overflight of the Soviet Union by a U-2 occurred on July 4th, 1956. Beginning in 1957, in a special arrangement with Britain, U-2's would be flown in Europe by British pilots. The high altitude photographs and other intelligence gathered by these overflights would be shared between both countries (see Fig. 7: U-2 picture of a Soviet bomber base north of Moscow taken from 20,000 metre altitude in 1957).

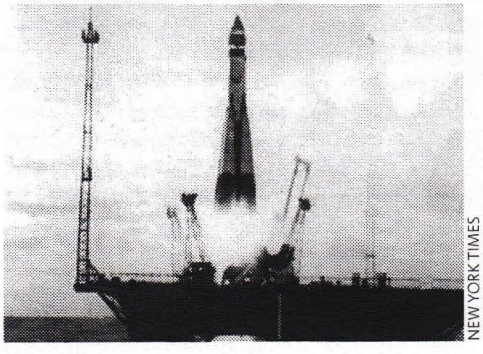
Sharing the Product

To this day the 1956 "Canadian incident" has yet to be fully presented, and is one of the mysteries of the Cold War. As a result of this incident, the Chief of the Canadian Air Staff and the Prime Minister of Canada, would have been made aware of the U-2 and its special purpose by his colleagues President Eisenhower and British Prime Minister Harold Macmillan.

To a limited degree President Eisenhower and British Prime Minister Harold Macmillan would have also "shared the product"– the assessments of the actual bomber strengths of the Soviet Union with the Canadian Prime Minister. With this information it would be obvious large numbers of *Arrows* were unnecessary for the defense of Canada.

History appears to show that the Rt. Hon. John Diefenbaker protected the confidence that his colleagues and friends President Eisenhower and British Prime Minister Harold Macmillan placed in him and took this secret to the grave.

Over flights of the Soviet Union continued until a U-2 flown by Gary Power was shot down by Soviet SAM-2 surface to air missiles on Mayday 1960. To catch this U-2 they boxed the pilot in

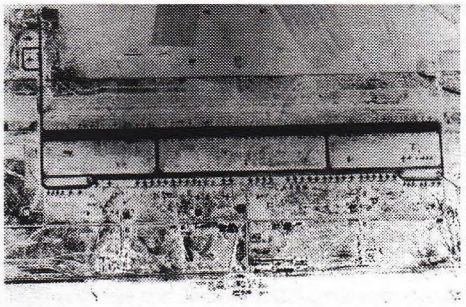


NEW YORK TIMES

Figure 5: Launch of Sputnik 1.

LOUGHEED AIRCRAFT COMPANY

Figure 6: The U-2.



US INFORMATION AGENCY

Figure 7: 1957 U-2 picture of a Soviet bomber base taken from 20,000 metre altitude.

with SAM-2 rockets and then downed the aircraft by shooting a SAM-2 straight up. Ironically, the proximity fuse used on the SAM-2 was a design stolen by the Russians off the Americans. Fortunately, by 1960 Corona satellites were beginning to return useful pictures and intelligence from low earth orbit and so further U-2 overflights of the Soviet Union became unnecessary.

One of President Eisenhower's greatest gift to his successors in the White House were the U-2 and space-based surveillance platforms that has helped successive US Presidents in their foreign policy decisions. Good intelligence builds confidence and keeps national leaders from making irrevocable and devastating mistakes in judgment. Some of the best pictures taken from a U-2 would be those of the Baikonur launch facility where Sputnik 1 was launched in October 1957 (see Fig. 8: 1957 U-2 picture of Baikonur taken from 20,000 metre altitude).

One of the most important U-2 picture ever taken was on its first flight over the Soviet Union on July 4th, 1956. It was a picture of the only heavy jet bombers the Soviet Air Force had in existence at the time, a handful of Bison bombers. This large, straight wing, four engine jet bomber was never put into full production because of technical difficulties. Only a handful of Bison were ever built and were stationed at an airfield north of Moscow. The Tu-95 Bear would become the mainstay of the Soviet Air Force (refer to Fig. 9: 1956 U-2 picture of a handful of Bison bombers at an airfield north of Moscow).

In a memo dated 17th July, 1956 to President Eisenhower, analysis of U-2 pictures taken on its first overflight of the Soviet Union showed that

"there can be no doubt of the photographic coverage obtained on 4 July, 1956 of five of the seven highest priority targets specified by the USAF. This mission was indeed timely in that it revealed no heavy jet bombers at any of the five bases covered, even though current intelligence estimates dictated the presence of regiments of such bombers at at least two of the five bases." 4

US INFORMATION AGENCY

Figure 8: 1957 U-2 picture of Baikonur taken from 20,000 metre altitude.

The U-2 and the cancellation of the Arrow

In 1957 and 1958 Prime Minister Diefenbaker and President Eisenhower would discuss a number of bilateral issues, including the *Arrow* Program. Eisenhower provided Diefenbaker with enough of a briefing on what had been determined from the U-2 overflights for there to be confidence that Soviet bombers would not play a significant threat to North America.

Shortly after a high level discussion in 1958, the Prime Minister of Canada would make the following announcement in the House of Commons on September 23rd, 1958:

"... the number of supersonic interceptor aircraft required for the RCAF air defence command will be substantially less than could have been foreseen a few years ago, if in fact such aircraft will be required at all in the 1960's in view of the rapid strides being made in missiles by both the United States and the U.S.S.R. The development of the Canadian supersonic interceptor aircraft, the CF-105 or the 'Arrow', was commenced in 1953 and even under the best of circumstances it will not be available for effective use in squadrons until late in 1961. Since the project began, revolutionary changes have taken place which have made necessary a review of the program in light of the anticipated conditions when the aircraft comes into use."[5]

In light of the information now available, including both the declassified *Arrow* papers and the history we now know of the 1950's and 1960's, outright cancellation of the program reflected the best information then available about the Soviet Air Force and its small fleet of intercontinental bombers.

I invite the National Archives of Canada, the Eisenhower Presidential Library and the appropriate archives of collegial Governments to share the complete history of how the U-2 program may have truly influenced the *Arrow* cancellation decision.

US INFORMATION AGENCY

Figure 9: 1956 U-2 picture of Bison bombers at an airfield north of Moscow.

References

[1]Information for this section of the paper comes from various independent sources, including the recollection of individuals stationed with 2nd Fighter Wing on 17th September, 1956 and from R.C.A.F. records from the National Archives of Canada. There are, unfortunately, conflicting and inaccurate accounts regarding the events surrounding the loss of the U-2 and the death of Pilot Howard Carey. The claim that Carey was on a "training mission" conflicts with reports that the U-2 was tracked arriving in West German airspace from the East. Standard operating procedures for the U-2 was to undertake all training within the airspace of the continental USA.

[2]Independent confirmation of the "Canadian Incident" is to be found in Francis Gary Power's 1970 book "*Operation Overflight*" SBN: 03-083045-1 published in May 1970 page 49-50. Francis Gary Powers was a colleague and friend of Howard Carey.

[3]The high powered Type 80 radar station at Metz manned by Canadians tracked all the U-2 flights in and out of the air base at Wiesbaden and the CIA station at Giebelstadt. The Canadian pilots of 2 and 3 Fighter Wing had a nickname for the U-2 – they called it "*the Beast*". The Mark 6 Canadair CF-86 Sabres, equipped with Orenda jet engines, could fly up to 50,000 feet at 0.92 Mach, much higher and faster than the American F-86's. Beginning in 1956 Canadian pilots from 2 and 3 Fighter Wing routinely vectored onto U-2's as they descended from their operational altitude of 70,000 ft as the pilots completed the last leg of their high altitude photo-reconnaissance missions over Eastern Europe or the Soviet Union.

[4]17 July, 1956 AQUATONE memo to U-2 Project Director Richard Bissell from Herbert I. Miller. AQUATONE was the code name for the photographic intelligence gathered by the U-2. This memo was passed on to and read by President Eisenhower.

[5]Hansard, Parliament of Canada, September 23rd, 1958

Patrick Bruskiewich is Editor In Chief of the CUPJ and is a former Naval Reserve officer. He is presently a doctoral candidate at the Department of Physics and Astronomy at UBC. He can be reached at patrickb@phas.ubc.ca.