

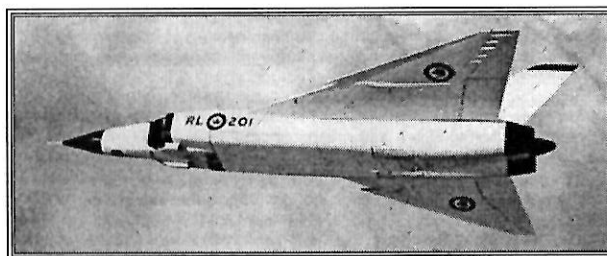


INTERCEPTOR

Avro Canada CF-105 Arrow 1958



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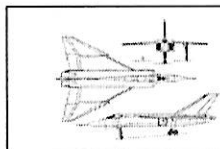
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For the Canadian aviation industry, and for Avro Canada in particular, the traumatic story of the Avro Canada CF-105 was paralleled by that of the contemporary British Aircraft Corporation TSR.2 in the UK. Both were destroyed by politicians who, in 1957, were convinced that missile technology had advanced to a stage when manned interceptor aircraft would no longer be needed. The first stages of development of a new two-seat all-weather long-range interceptor for the RCAF began in early 1953, at the time when the RCAF was busy forming its first CF-100 squadron. This was not an action that represented dissatisfaction with the capability of the CF-100, but showed an appreciation of the fact that something like a decade was needed to get a new high-performance interceptor/weapon-system into squadron service. Avro's design team tackled the new and demanding task with great enthusiasm, with the result that by April 1954 the company was involved in the manufacture of the first five Arrow 1 prototypes. The name derived from the aircraft's delta wing, set high on the fuselage. This had a sharp needle-nose, widening just aft of the cockpit, where intakes on each side of the fuselage fed air to two turbojet engines mounted side by side within the fuselage. The Arrow 1s were powered by two Pratt & Whitney J75s, but it was intended that the following Arrow 2s would have engines of indigenous design and manufacture, in the form of PS-13 Iroquois turbojets, developed by Avro's Orenda engine division, each of which promised a thrust of 12700kg with maximum reheat.

The first of the Arrow 1 prototypes made its maiden flight on 25 March 1958, and all five of this version were being used for development and testing when the entire programme was cancelled on 20 February 1959. A final bitter edict was to ensure destruction of the five Arrow 1s, one unflown Arrow 2, and four almost complete Arrow 2s. Armament of this latter version was to have comprised eight Sparrow air-to-air missiles carried in an internal weapons bay.

3-View



A three-view drawing (1680 x 1257)

Specification

CREW	2	
ENGINE	2 x turbo-jet Pratt & Whitney J75-P-3, 104.5kN	
WEIGHTS		
Take-off weight	25855 kg	57001 lb
Empty weight	22244 kg	49040 lb
DIMENSIONS		
Wingspan	15.24 m	50 ft 0 in
Length	23.72 m	78 ft 10 in
Height	6.48 m	21 ft 3 in
Wing area	113.8 m ²	1224.93 sq ft
PERFORMANCE		
Max. speed	2.3M	2.3M
ARMAMENT	8 x AA "Sparrow"	



COMPANY PROFILE

FACTS AND FIGURES

© The projected follow-on Mk 3 was to be fitted with Iroquois 3 engines, new intakes and nozzles.

© No fewer than 16 wind-tunnel models were used during the final design stages.

© The two underfuselage speed brakes could be held open during Mach 1 flights.

© The CF-105's advanced hydraulic system remained unique until the Rockwell B-1A strategic bomber was flown in 1974.

© For servicing, the Mk 2's engines could be slid out on special rails.

© A B-47 with a rear-mounted nacelle was used to test the Orenda Iroquois engine.

Comments

1-20 21-40 41-60 61-80 81-100

Murray B, murray.b@shaw.ca, 07.10.2010

Well, Sandal44, the Arrow program was classified and knowledge about it was probably compartmentalized. It would be unlikely for most employees to have a good grasp of the overall picture. Even if they did it would be unusual for a loyal employee to say anything bad about their employer. These people are simply not impartial when it comes to the Arrow.

Reliable records show that the Chiefs of Staff recommended cancellation for performance and cost reasons. The Arrow was a \$10 million aircraft with a maximum ferry range of 1254 nm (for the longer-range Arrow 2). The Voodoo was about \$2 million with a maximum ferry range exceeding 1900 nm. Since the military wanted to reach Iceland which was 1312 nm away the Arrow would not do. The maximum speed ratings of two aircraft were not all that different. The Arrow's was mach 1.9 (even though it could reach mach 1.96 for a short time just like the Bristol 188) and this was similar to the Voodoo's mach 1.8. It is odd that the Arrow just keeps on getting faster as the years go by but the Voodoo does not.

There is no link between cancelling the program and the destruction of the industry. As Diefenbaker explained in the Montreal Star Feb. 24 1959, "The Prime Minister said the company had warning of the Government decision to cancel the CF-105 Arrow supersonic interceptor and knew that \$50,000,000 in public funds had been set aside in the estimate for 1959-1960 to cover winding up expenses..." "I say that its attitude in letting out thousands of workers - technical workers and employees - on Friday was so cavalier, so unreasonable, that the only conclusion any fair-minded person can come to is that it was done for the purpose of embarrassing the government."

Why Avro would choose to destroy their own company for no apparent reason and then blame it on the Government is a mystery. What would a British company like Hawker Siddeley possibly have to gain by doing such a thing? We may never know the answer since these events happened so long ago.

As far as the Iroquois engine goes it was definitely static rated at 25,000 lbt. with reheat (Magellan R.O.I.). There was talk of a follow up engine with 30,000 lbt. with reheat but there is nothing to suggest that it had even proceeded to the planning stage. As it was there were two experimental prototype Iroquois engines of 25,000 lbt. with reheat fitted to one of the Arrows but one threw a blade and the aircraft could not be tested. The lighter weight and moderately increased thrust of the Iroquois engine should not have made any difference to the Arrow's speed rating since the limit was based on frictional heating.

tsunami, bbiggs@shaw.ca, 29.09.2010

Saw it fly once in Ottawa and I can tell you as somebody watching it from Uplands CEPE we were so proud and could not get enough of it. Was only there for a very short time.

What I can tell you is that a friend of mine who worked on it left Canada and went to NASA and apart from visiting relatives never came back. He was not alone and I always wondered how we contributed to NASA by cancelling this program.

The contribution that these experts could have made to Canadian aviation I believe would have been very significant

sandal44, sandal44@yahoo.com, 25.09.2010

From 1990 until 1993 I had the privilege of meeting two men who actually worked on the Arrow. One was a much sought after tool and die maker, the other an aircraft engineer who finished his career with Boeing. I also talked to one other man who had first hand knowledge of Zurkowski's feelings on the aircraft.

All were bitter that the information given to the public was, to say the least, slanted. Their view was that politics, not genuine facts, killed the Arrow. If it was so inferior, why were all destroyed?

I flew Sabres, 1954-1956. I watched the Arrow fly over Downsview, just before it was axed.

Also, was the Iroquois not supposed to go up to 30,000 pounds thrust (without afterburner?) I flew both the Mk II Sabre with the US engine and the Orenda powered Mk V. No comparison!! Then they upgraded the Orenda for the Mk VI. thrust up again and fuel consumption down. All this knowledge and technology killed.

Somewhere around 1968 (?) Macleans had an article which showed the contribution to NASA (and other organizations) made by those who lost their jobs with the Arrow. Canada got the Bomarc!!!

Canada lost out to shortsightedness and political expediency.

Jon Ambler, jkambler@yahoo.com, 24.09.2010

No conspiracy, records show the Air Force did not want this aircraft. The F106 was already flying operations with numbers just as good as the Arrow and availability way better. The Arrow is all part of the mythology that all nations need.

mike m, sammy5358@gmail.com, 23.09.2010

if you get past the detailing of speed, heat, etc. you will recognize that this could have really been something if you consider the updates in technology as time went by. This company could have evolved into something Canada could be proud of, providing jobs, income, etc. No conspiracy theories or party preference.....but if you consider all that could have been, Diefenbaker ruined it all pure and simple

Dave, fox=davcotech.net, 19.08.2010

Cool plane. Where can I get one ?

Mike, msowsun@yahoo.ca, 16.08.2010

Don't compare the Avro Arrow to the Vodoo!

The Avro Canada CF-105 Arrow first flew on 25 March 1958.

The McDonnell Douglas F-4 Phantom first flew 27 May 1958.

This is only a few short months later. Forget all the conspiracy theories. The Avro Arrow was canceled because it was not a viable aircraft.

The Phantom continued into production because it was a very formidable aircraft.

End of story.

Roy, rscobden@yahoo.com, 14.08.2010

The truly sad part was the loss of Canada's "cutting-edge" position in r&d of high performance aircraft.

The accumulation of knowledge that was shredded & destroyed was shameful.

Reg Saretsky, rsaretsky=shaw.ca, 16.07.2010

Leo Rudnicki & Murray b write:

+++++

Leo Rudnicki, 28.02.2010

Tax dollars? Conspiracy? We do it for free and in the open.

Murray B, murray.b=shaw.ca, 28.02.2010

Why create a zombie from the carcass of this white elephant? It would have been far better to let this one sleep and how many tax dollars have been spent on this anti-conservative propaganda over the last half-century?

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Gentlemen:

Both of you are correct, since the Arrow story is a 'mixed saga' on both sides.

During my research (for an abandoned book on Government procurement) I concluded that the program had spun out of control- however, a case could be made for a 'Bare bones, off the shelf ' Arrow program, with production to terminate by the mid sixties. The termination, was, Murray, a public relations disaster. The completed aircraft, tooling,& plans should have been mothballed.

Avro Canada s project managemenet, Leo, was out of control. Brilliant engineering with horrid execution.

I do thank you both for courteous dissent. We appear to have lost the unfortunate Barry Fortier, who appears to spend his waking hours insult trolling the internet.

Thank heaven for small mercies, as some of his Barry F debates are simply too obscene to repeat.

Reg Saretsky, rsaretsky=shaw.ca, 13.07.2010

Art Deco, 08.05.2010

Total fuel capacity 2,508 imperial gallons, 19,562 pounds.

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Art, there is only an 8,000 LB difference between operational take off weight & empty weight. Eight Sparrow missiles weigh 4,000 lbs.

Even using the Max take off weight , (68,600), you are left with 15,000 lbs for all non missile stores(pilots, oxygen, lubricants, etc- plus fuel.)

thanks Reg

Chris, aikens.christopher@gmail.com, 19.05.2010

Just for anybody who cares; they have the nose and landing gear of #206 in Toronto and the throttle piece of #201 in Wetaskiwin Alberta. And yes, flash-photography is allowed.

Art Deco, 08.05.2010

Total fuel capacity 2,508 imperial gallons, 19,562 pounds.

nanook, mayfieldtx@verizon.net, 26.03.2010

The plane at best could only carry a little less than 10,000 lbs of fuel. The range of the aircraft was very limited, so much so that the RCAF built special airfields in the NWT. Flying out of Cold Lake Alberta to engage a Russian attack was a one-way trip, there was no possibility of returning to Cold Lake, the plane would have to be put down at one of the special airfields. Yes it was an expensive endeavor, yes it had a technology leg up in many ways, yes the USAF and its politician patrons did not want it to see the light of day, yes Boeing had connections, BUT ---- the dam thing had no operational reality associated with it due to the limited range. Period. It may have been canceled for many public perceived poor reasons, but it had no useful operational range - bottom line.

Murray B, murray.b@shaw.ca, 03.03.2010

Tax dollars, Mr. Rudnicki, of course there were. For example the CBC film was partially paid for with tax dollars. Also take a look at the copyright page of an Arrow zealot's 'bible', "[blank] Publishing gratefully acknowledges the support of the Canada Council and the Ontario Arts Council in the development of writing and publishing in Canada." Museums also receive tax dollars. Over the years I expect that millions of tax dollars have been spent to broadcast anti-conservative propaganda like the Arrow myth.

Conspiracy? Sure. Here is a good working definition of "conspiracy" from http://www.askoxford.com/concise_oed/conspiracy?view=uk

"

conspiracy • noun (pl. conspiracies)

1 a secret plan by a group to do something unlawful or harmful.
2 the action of conspiring.

"

It is a matter of record that the J-75s used in the Arrow were rated at 24,000 lbs. thrust with reheat. This figure is even given in the Arrow Mk. 1 brochure. It is also a matter of record that the thrust rating of the Iroquois engine was 25,000 lbs. with reheat. Since these quantities were measured and published anyone that gives substantially different figures is altering the facts. They are 'lying weasels' as I like to call them. The aircraft's top speed was also measured and as near as I can tell the Arrow never flew faster than Mach 1.89. It may have gone faster with the Iroquois but it also might not have. At any rate, speculation by the technically challenged should never be printed as fact. The top speed of any aircraft with more powerful engines is something that an aeronautical engineer would need to calculate. It is not simple because things like skin temperature are a factor. In the case of the Arrow program, though, the speed is a "red herring" since the specification was reduced to Mach 1.5 and the Arrow easily met that requirement.

There are people that repeat political lies for free. These people have often been referred to as "useful idiots" in the press. Such people generally don't know if they are lying or not. The root source of the political propaganda, however, the 'lying weasels' must know that they are lying. They must also be fairly well funded to keep promoting their lies widely and for decades.

So, here we have a secret plan where 'lying weasels' intentionally misrepresent the facts about an aircraft to harm conservatives. These lies have been used effectively for years. Not that long ago my nephew came home from school and announced to everyone that he was never going to vote for Stephen Harper because Mr. Harper was a Conservative. His teacher had said that Conservatives had killed the wonderful Arrow program and this somehow prevented Canada from ruling the world. This lie was too much for me because schools should not be programming kids on how to vote. [Google Harper and Avro Arrow to see how the Avro myth is being used to harm conservatives today.]

Now, is a "useful idiot" a conspirator when they repeat lies even if they believe the information to be true? From the definition I gave it is not clear if all members of the group have to be in on the "secret" or just some of them.
So you do "it" openly and for free. That's nice, but what exactly do you mean by "it"?

Leo Rudnicki, 28.02.2010

Tax dollars? Conspiracy? We do it for free and in the open.

Murray B, murray.b@shaw.ca, 28.02.2010

Why create a zombie from the carcass of this white elephant? It would have been far better to let this one sleep and how many tax dollars have been spent on this anti-conservative propaganda over the last half-century?

If the Arrow was a great aircraft and a good value then cabinet was not told about it. The relevant minutes are posted at <http://www.international.gc.ca/departement/histoire-histoire/dcer/details-en.asp?intRefid=8169>

Note the total cost per aircraft is given as about \$10 million, "The R.C.A.F. now had nine all-weather squadrons and the present programme called for their re-equipment with the CF-105, requiring a production order of 169 in number. These, together with aircraft recovered from the development and pre-production order for 37, would provide sufficient aircraft for nine squadrons. The total cost would be \$2 billion spread from 1959-60 to 1963-64."

Competing aircraft ranged from \$2 million to \$3.75 million for a Delta Dart.

Note also the real reason for cancellation, "Finally, the cost of the CF-105 programme as a whole was now of such a magnitude that the Chiefs of Staff felt that, to meet the modest requirement of manned aircraft presently considered advisable, it would be more

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economical to procure a fully developed interceptor of comparable performance in the U.S."

The Chiefs of Staff recommend cancellation and advised the Arrow was "comparable" to U.S. aircraft. Cabinet is not told that the Arrow can fly higher, go faster, or further, than anything else. The aircraft set no international records except, maybe, for cost overruns.

If there was a conspiracy to kill the Arrow then it involved the military and not Diefenbaker's government.

To repeat this lie is to become part of an anti-conservative conspiracy that has been going on for decades. How many of our tax dollars have already been wasted promoting this nonsense?

Dave, gandolf07=sympatico.ca, 24.02.2010

I can't believe it. I watched 'RU smarter than a 5th grader'. The "CANADIAN Public" should start bringing the US down to reality. They are teaching their kids that the US were the first to break the sound barrier; thats such a lie its unreal. Someone should start putting the BS back at them. WE, CANADA, were the first to accomplish that; "Avero Airspace", North Bay, Otario, CANADA. After we broke the sound barrier the US government forced the Canadian Military to close it down. They didn't want anyone to be better than them. Their teaching their children this Bull Shit. How r the US kids going to handle it when they learn the history they were given was crap, only because their parents wanted to make themselves look good. When in reality they had the greed to pay someone off to keep their mouths shut and, tell their kids a LIE. Lets start teaching the next generation the truth, instead of the truth money can buy. They need to know the "REAL" history.

Dave, plugs333@hotmail.com, 05.02.2010

I just cannot beleive that they named an airport after Deifenbaker... an airport!!!!... jeezz, talk about irony.

Jason Mac Neil, jamn38@hotmail.com, 31.12.2009

Oh Glen Gill..... my my my.... how incredibly short sighted of you! Expensive eh? right! Do you have any idea how far ahead of the world Canada would have been in aerospace technology and the like had we kept the Arrow? The engine and airframe were ours to sell to everyone. And in time....we would have. And we spent more taxpayers dollars on the "Bomark" missile defense system bought from the Americans THAT WAS A COMPLETE WASTE!!!! At least with the Arrow, we would have seen a return in sales. DID you hear of anyone wanting our slightly used CF104's or Bomark missiles. Diefenbaker was a "DOLT!" And he, with that decision....wasted a GREAT deal of taxpayer money!!!! He was a "Dufous".

Glenn Gill, first_things@hotmail.com, 29.12.2009

Despite the fact that I grew up 'Air Force' I feel that scrapping the Arrow was a good thing, an expensive mistake narrowly avoided. You only have to look at that big delta slab-sided bugger to realize two things: it had 'High Altitude Interceptor' written all over it, and it must've had a radar signature like the 'Hit Me' sign from Hell. With 20-20 hindsight we now know that the Bomber Gap was a hoax, not a threat that we needed to break the bank responding to. In the end we bought the CF-104 for HAI and almost immediately scrapped the role out from underneath it, reassigning it to a low altitude role. Where it killed far too many pilots. (How do you get a '104' cheap? Buy an acre of German land and wait...)(authentic CAF humour).

We could've spent far far too much money to travel the same sad road with the Arrow.

For all those conspiracy theorists out there, kick this one around the park instead: How much did Dief know about the Bomber Gap? Did he have the straight goods (and if so, how?) Or was it just a lucky fluke, him making the right call? I think that's a much more interesting and fertile area of speculation, speaking as it does to just who knew what and when in that grand flim-flam.

1-20 21-40 41-60 61-80 81-100

Do you have any comments about this aircraft ?

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