

Arrow wasn't the only Avro traged

Worse than the death of the Avro Arrow that inspired this week's CBC mini-series was the earlier downing of Avro's passenger jet, says a former Avro engineer.

By JOCK MCGREGOR

Somehow, the CBC's brave effort to retell the legend of the Avro Arrow, in its mini-series on Sunday and Monday, managed to miss the point that there were two Avro tragedies, not one. The Arrow was the second one.

There's no denying bungling and arrogance, both on the part of Avro's management, who were often irresponsible in not containing costs, and by two Ottawa governments, who in turn were much too myopic in weighing the potential benefits to the country's technological expertise. Together, they missed opportunities to make Canada a world leader in aviation. But that focus got lost in the CBC's attempt to add human interest, emphasizing the characters instead of the technology.

Technology

So let's look at the technology I did, from the inside, beginning in 1951.

Armed with two almost new Glasgow engineering degrees, a new bride and the knowledge that I was leaving only a single job prospect in Scotland, I set sail for Canada — on spec.

During the summer I'd written to Avro Canada asking about jobs there. When I arrived, I drove to Malton, knocked on Avro's door, and was hired on the spot.

Ten months later I was a P.Eng., an Ontario Professional Engineer.

I worked for Orenda engines until I was fired like so many others on "Black Friday," Feb. 20, 1959, the day the Arrow project was cancelled. Unlike many others, I was rehired a week later. And like many others who were recalled, I got another job as soon as I could. In my case, and I was very much an exception, I found a new job without having to move to the U.S. or across the Atlantic.

The Arrow was intended to meet a Canadian Air Force specification, which originally required that it have a maximum speed of Mach 1.5 (one and a half times the speed of sound), or about 1,600 kilometres per hour. In fact, the first one, RL-201, powered by two Pratt & Whitney engines of only (!) 5,700 kilogram thrust each instead of

the 9,000 kg Orenda Iroquois engines designed for it, reached almost 2,300 km/h, or over Mach 2, while still climbing and accelerating.

We don't have to take the pilot Jan Zurakowski's word for this. It was clocked by an Air Force radar operator, on the ground at Edgar, Ont. It would have been a world speed record had it been made public.

The Iroquois engine made records too. It was the first jet engine anywhere to exceed 20,000 pound thrust or 9,000 kg on a test-bed, without afterburning. Titanium compressor blades are a given on jet engines today, to withstand temperatures higher than aluminum can cope with, but the Iroquois was the first, and the first with many other innovations.

To put all of this in perspective, the Canadian Armed Forces Squadron based in Cold Lake, Alberta, which last fall competed against the world's best in the prestigious U.S. "William Tell" competition, flies McDonnell Douglas CF-18s. It, considered to be as fast as any fighter in the world, has a top speed of Mach 1.8, or 1,900 km/h, or less than 83 per cent of the Arrow had with undersized engines.

By the way, the Cold Lake guys flew home with two trophies, the coveted "Top Gun" ones, for the best individual pilot and the best team.

So much for fighters being obsolete in 1959.

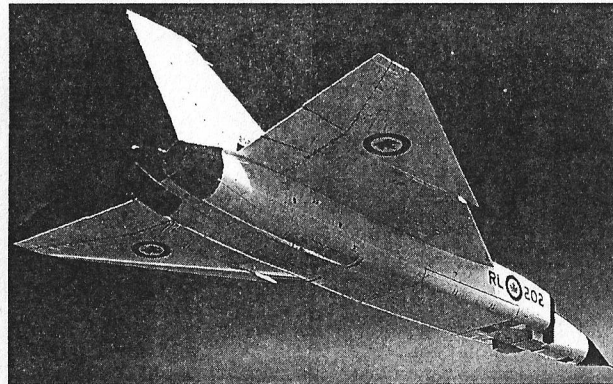
First passenger jet

The other tragedy — in my opinion the far greater one and barely mentioned in *The Arrow* — was the scrapping of the Avro Jetliner, not by the Conservative John Diefenbaker, but by the Liberal Louis St. Laurent.

The Jetliner missed being an earlier world first only because the runway available to it at Malton when it was ready to fly was under repair, and considered too short for a safe takeoff. During the several weeks of high speed taxiing and braking trials to put in time, the DeHavilland Comet prototype (in Britain) made its first flight.

Technically, at least: the Comet pilot got the wheels a little off the tarmac, then immediately cut the power. It was enough though to earn DeHavilland the credit of building the world's first passenger jet.

Two weeks later, on Aug. 10, 1949, the Avro test pilot decided enough was enough and, short runway or not, took the Jetliner off. After flying around for about an hour and climbing to 4,000 metres, or 13,000 feet, he made a un-



The Avro Arrow, scrapped Feb. 20, 1959: Avro's jetliner program also died

eventful crosswind landing on the same "short" runway.

Yet despite this success, apparently beyond all argument, the Liberal government, panicked over the perceived threat from Soviet bombers attacking across the North Pole, ordered Avro to

stop all work on the Jetliner and build fighters instead. And after flying, problem-free, across the Atlantic and about everywhere in North America, seven years later, the Jetliner met the same fate as the Arrow would three years later, being put to the torch.

By one of fate's ironies, the Comet went into production and scheduled airline service with one of the predecessors of British Airways — with another tragic outcome.

The first ones were put on the London-Cairo run, and every so often one would disappear without trace over the Mediterranean. Eventually, enough wreckage was found to identify the cause. It proved to be explosive crack propagation from the much-too-sharp corners of the fuselage windows, when the fuselage

was pressurized at high altitude. Comets were literally blowing up in flight. The Avro Jetliner had circular windows. It would not have experienced this problem.

Today, with another Liberal government throwing dollars at Bombardier, I can't help wondering what might have happened if Louis St. Laurent and C.D. Howe had been more foresighted and equally 'liberal.' Canada could well have been in the pre-eminent spot in world aviation now held by Boeing.

So, I agree, but only up to a point, with Giles Gherson and his column, "Avro myth obscures aerospace success" in Monday's *Spec*. As he appears to, I now think it dreadful that so much effort should have been used to make weapons.

Good engines

But I don't agree that Orenda couldn't make engines. During the Korean War, which Avro was forced to make engines for, there were two fighters of importance in dogfighting, the Soviet MIG-15 and the North American F-86 SabreJet. And there were two kinds of SabreJets, U.S.-made ones with Allison engines, and Canadair-built ones with Orenda engines. The MIGs could outfly the U.S. SabreJets, but the Canadian ones, with the lighter and more powerful Orenda, could outfly the MIGs.

Nor is it true that the Iroquois never flew. Certainly it never flew in the Arrow, although an Iroquois-engined Arrow, RL-206, was ready for flight on Black Friday. But the engine did fly for 125 hours in a Boeing B-47, borrowed from the U.S. so the Iroquois could fly first in a proven airframe, that being considered good engineering practice.

The Iroquois was mounted, of course, to one side of the fuselage. It was throttled all the way up, then the B-47, to keep it flying straight to throttle all of the bomber's engines back to idle to prevent the Arrow from reaching a speed that might destroy it.

I also disagree with Mr. Gherson's figure of 14,000 people ordered to work when the Arrow was cancelled. There were far more than that, more, as the CBC said. The Arrow project was much too large for Avro to complete with their own work force. Plants all around the west end of Ontario, which never before had more demanding than meeting the humdrum specs of complacent manufacturers, had to rapidly achieve precisions formerly reserved to makers of ball-bearing tough materials that were the edge of metallurgy at that time.

Most of this hard-won expertise simply vanished to the south. It's only recently been won, unfortunately much further and with much less impact on the once dubbed The Golden Triangle.

Lesson to learn

It's certainly hard not to agree that some of the experience gained in the Arrow is working to Canada's benefit now. But the great tragedy is that it needn't have taken this long. More political courage and foresight, and Canada's rewards could have been much, much more, and a general lesson.

Northern countries, such as Canada, Japan, Sweden and Switzerland, import food in the winter. They can't be paid for by exports. Canada managed so far to export minerals to pay for much of its imports. The trouble is, minerals don't last forever, eventually get mined out.

The economic lesson to be learned from this, in my humble opinion, is that national wealth is best built by slashing spending, but by educating and training everyone to his or her potential, then putting all that potential to use. This has been learned by Japan. So too did Germany. So also Sweden. Especially Switzerland. And none of these countries did what they did by depending on their own mineral resources, all have little or none.

When will Canada learn?

Jock McGregor of Hamilton is an engineer who worked on the Arrow until the project was scrapped.



'With more political courage and foresight, Canada's rewards could have been much, much more and a generation sooner.'

Jock McGregor

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