

# AVRO REMEMBERED



BY NICOLE AXWORTHY

It was almost 57 years ago that the infamous Avro Arrow made its first test flight. Otherwise known as the CF-105, the supersonic, twin-engined, all-weather jet aircraft was the crown jewel of Canadian aircraft manufacturer A.V. Roe Canada, better known as Avro, then the third-largest company in Canada. The plane was on the cutting edge of aerospace technology at the time: faster and more advanced than any other comparable aircraft, the Arrow was designed to carry air-to-air, nuclear-tipped missiles to destroy Soviet bombers.

The first flight on March 25, 1958 was a proud moment for the Canadian aerospace industry. Yet on February 20, 1959, the Canadian government ordered all work on the Arrow cancelled. The cancellation meant huge employment losses and, within two months, five planes and a sixth, within days of take-off and equipped with a more powerful engine expected to break all speed records, were ordered reduced to scrap. Thirty-one others in various stages of assembly, along with all parts, drawings, accessories, blueprints and photographs, were ordered destroyed.

But the Arrow became a Canadian legend anyway, not for just what it proved, but also for the promise it held. In honour of the 55th anniversary of the cancellation of this magnificent engineering achievement, we're looking back at the Arrow and those who were involved. From the *Engineering Dimensions* archives, we're pleased to republish portions of interviews with former professional engineer James Floyd, Avro's chief design engineer, who turned 100 in October 2014. You can read more

about Floyd and the Arrow in previous *Engineering Dimensions* articles: "An aviation chapter in Canadian history" (September/October 1988, p. 46), "Bringing down the Arrow: A 30-year retrospective" (January/February 1989, p. 33), and "Jim Floyd, P.Eng., one straight arrow" (March/April 2003, p. 39).

**Engineering Dimensions:** There was a plaque that hung behind your desk at Avro's plant that read: "If it's worthwhile but obviously impossible—do it anyway." Was there some event or reason that inspired you to become a professional engineer, especially in the aviation field?

**Floyd:** As a 14-year-old in England I was fascinated by the activities of aviation record-makers. Lindbergh's solo flight across the Atlantic and the long flights of Amelia Earhart and Kingsford Smith, all in the same year, raised my adrenaline level and I was anxious to one day become "part of the action."

My chance to turn the dream into a reality came in 1930 when I heard about a special apprentice scheme that was being introduced at the main Avro plant in North Manchester. The company was recruiting bright young schoolboys to be put through an intensive training program and at the same time continue their education to university standard.

I applied, was accepted, left school and joined as a "special apprentice." I was all set for the glamorous life of an aviator. Unfortunately it didn't turn out that way, at least for the first few months spent in the noisy machine shop covered in whale-oil lubricant, turning out thousands of small bolts for the equivalent of one dollar a week. But my next job was a little more exciting: I installed an electrical system in a new biplane from a layout handed to me by my foreman on a postcard!

Looking back, I'd have to say that Avro's special training program was the best that anyone could possibly receive. The time spent in every department of the company and the special education arrangement resulted in a better understanding of the essential interface between design and production than what would be received by graduates coming directly out of university.

In 2008, a full-size replica of the Avro Arrow was rolled out at the Canadian Air and Space Museum in Toronto.



**Engineering Dimensions:** After the C102 Jetliner (the world's first regional jet to fly), you took charge of the development of Avro's CF-100 (the only Canadian-designed fighter aircraft to see service) and finally you fathered the Arrow. This era is often referred to as Canada's "golden years" of aviation technology. What do you remember most?

**Floyd:** While that work amounted to not much more than a quarter of my professional life, it was certainly the most exciting, demanding, frustrating and formative time. There are two events that are indelibly etched in my mind. One is the first flight of the Jetliner on August 10, 1949, a hot, humid day when you could have fried an egg on the tarmac, and the other is the Arrow's first flight on the morning of March 25, 1958, a raw and overcast day, with a wintery wind hanging over the scene. Since I had been in charge of these projects from inception to takeoff, the responsibility for the results and the safety of the crews was firmly planted at my feet. That is a feeling that is almost impossible to describe, and the relief when the flights were over is equally difficult to put into words.

While the Jetliner was a particularly docile aircraft, the Arrow was incredibly complex. Despite the fact that we had "hedged our bets" with an enormous amount of ground and wind-tunnel testing, I was thinking about the 38,000 parts that had to behave as we expected them to. Luckily, they did.

**Engineering Dimensions:** There aren't many events in our history that have created a controversy like the Avro Arrow. Do you feel there is any lesson that can be learned?

**Floyd:** I was privileged to have the support of a team of incredibly talented and dedicated professional engineers and technicians at Avro Canada. After the Arrow's cancellation, many went on to groundbreaking activities all over the world. As a result, that integrated and highly trained team was lost to this country. I think that was the real tragedy of the Arrow story.

**Engineering Dimensions:** Why do you think (then Prime Minister) Diefenbaker cancelled the Arrow?

Jim Floyd, who headed the design and development of the Avro Jetliner, CF-100 and CF-105 Arrow, is one of the great figures in Canada's aviation history because he played a central role in the development of some of the greatest planes ever produced in Canada. After the cancellation of the Avro Arrow project, he established his own international aviation consulting company and made contributions to a number of state-of-the-art projects around the world, including the Concorde passenger jet. Floyd turned 100 in October 2014.

**Floyd:** Diefenbaker had the worst advice possible. His main advice came from General Pearkes, who was a brave old soldier, but he didn't know anything about airplanes at all. He'd been hoodwinked by a visit to the states where he was told that airplanes are out and missiles are in and there'll never be another manned airplane bought by any air force.

**Engineering Dimensions:** Did you suspect that the program was going to be cancelled?

**Floyd:** We suspected that there'd be some hiccup. In September 1958, we were told that the whole thing would be reviewed in March, so of course we were on tenterhooks. But the appraisal was done on February 20 and the cancellation came the same day. That was the biggest shock of the century. We were in a board meeting with John Plant (president of Avro Aircraft) trying to settle some very mundane union situation about seniority. Joe Morley (sales and service manager) came running down the corridor with a man from the DDP (Department of Defence Production) saying that he'd heard on the radio that Diefenbaker had cancelled the Arrow.

**Engineering Dimensions:** So you heard about it at the same time as the general public?

**Floyd:** Later than the general public—*they* heard it on the radio.

**Engineering Dimensions:** What message would you have for today's engineers?

**Floyd:** The best things I've learned have been about dealing with people to bring out the best in them. The old things I learned in England I rebelled against. I try to coax people rather than beat them over the head. Canadians are very flexible: treat them the right way and you can get anything out of them.

One of the things I'm trying to do with the Canadian Aerospace Heritage Foundation ([www.ahfc.org](http://www.ahfc.org)) is to help young people get the incentive to do some of the things we tried to do. Today there seems to be an apathy, a sense of too many things in the way. I'd like to give the kids some hope. Σ