The elegant Avro Arrow is now just a memory

STORY AND PHOTOGRAPHS BY TONY KEENE

CANADA'S FOR-GOT-TEN ARROW

Three decades ago, a powerful gleaming white dart split the skies over central Canada, the fulfillment of the combined dreams and skills of thousands of people working on what was the most exciting aviation project the country had ever seen.

Today, many of those people look back with pride on their achievement, and with sadness and grief over the tragic end of those dreams. The frustration over what might have been is as keen now as it was on that day in 1959, the day they call Black Friday.

The decision by the government to cancel the Arrow fighter project reduced Canada, at one blow, from the world's leader in high-performance aviation technology, to just another client of the United States. Along with almost 30,000 workers suddenly unemployed, and $340 million down the drain, the decision on 20 February 1959, forced Canada to join a long list of countries wholly dependent on the United States for aviation research and development.

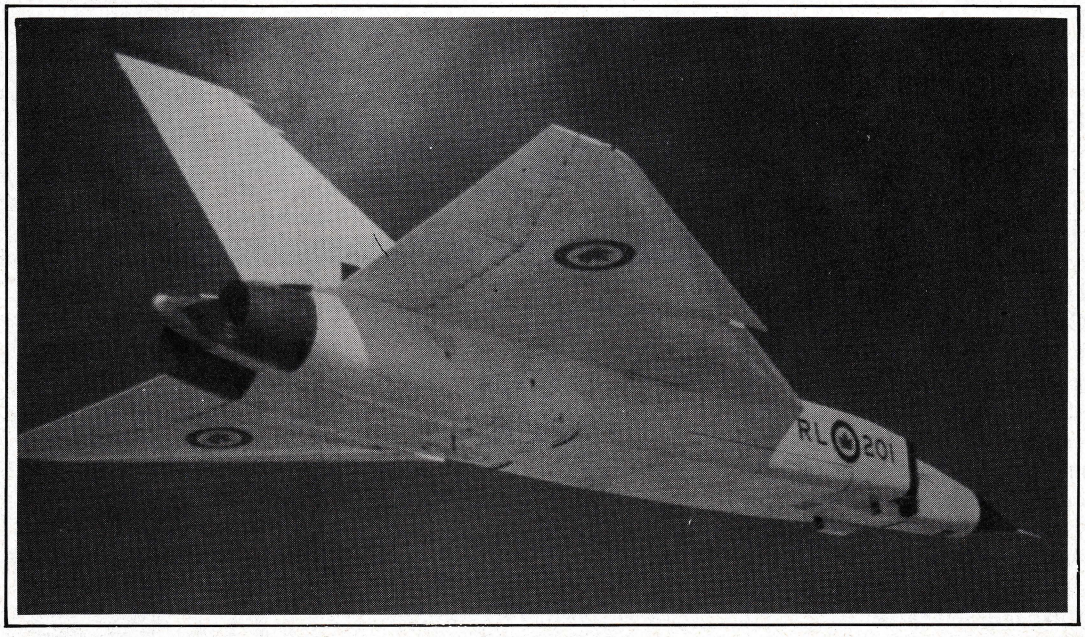
Among those 30,000 workers was Don Graham, who had been responsible for cleanliness checks on the airframe and components of the CF-105 at the Avro Aircraft plant in Malton, outside Toronto. He remembers part of the human tragedy that ensued.

"There was one guy killed when his car crashed into a bridge abutment on the highway. The police went to his house to tell his wife and found her shot dead. He'd killed her and then gone out and committed suicide."

There were several suicides among the laid-off workers, many of whom had big mortgages and other debts. Plant superintendent George Keenan remembers how, on the following Monday, government unemployment insurance personnel entered the plant and began conducting interviews. There was laughter at first, a sort of festive atmosphere. Then it changed.

"People began to realize what had happened. It really hit them. I saw groups of men standing together crying like children. It was all over."

It was indeed over, with a vengeance. Within days after the decision, the greatest aviation design and development structure ever assembled in Canada to date was scattered to the winds. Most of the brain drain was southward, with thousands flocking to Boeing, Lockheed, NASA and other giant aerospace concerns. In fact, chief test pilot Jan Zurakowski recalls just how fast this happened: "The next day (after the cancellation) in Toronto's Royal York Hotel, representatives of American companies were hiring our specialists for work in United States industry . . ."



The first Arrow, RL201, cruising at altitude. This picture, taken from the chase plane, clearly shows the leading edge notch and the high delta-wing configuration. Rather than external stores, the Arrow carried a built-in "weapons pack" which ran from just aft of the engine intakes. It was designed to drop down during combat, then recede into the fuselage so as not to cause drag. (Canadian Aviation Historical Society)

But let's go back to when it all began, as Canada's post-war aviation industry began shaking out for its entry into the supersonic age. A. V. Roe Canada Limited, builders of the famed Avro Lancaster bomber, was a holding company, controlled by the British Hawker-Siddely Group. It had two operating subsidiaries, Avro Aircraft and Orenda Engines, both of which would be key players in the six-year drama about to unfold. The company had already produced an all-Canadian, all-weather interceptor in the CF-100 Canuck, which was affectionately known by its pilots as The Clunk. This aircraft first flew in January 1950, and was retired from the Canadian Armed Forces in 1981.

In 1953, Avro was instructed by the Royal Canadian Air Force to begin design of a high-performance aircraft to succeed the CF-100. It would be a long-range supersonic fighter capable of patrolling Canada's High Arctic frontier, and of intercepting the faster bombers which it was known the Soviet Union was developing.

After five years of developing new techniques, employing revolutionary methods and materials, and working to capacity many of the brightest minds in the business, the first Arrow literally flew right off the drawing board. No hand-built prototype was made, but a full production model powered by the well-tested Pratt & Whitney J75 engine. Numbered RL201, she took to the sky over Malton on 25 March 1958, with Jan Zurakowski at the controls.

A quarter-century later, speaking to the Canadian Aviation Historical Society, he described the experience: "The first flight . . . was very simple. Just check the response of controls, engines, undercarriage and air brakes, handling at speeds up to 400 knots, and low speed in a landing configuration. There certainly was more excitement for the several thousand Avro employees watching . . . than for myself seated in the cockpit trying to remember hundreds of do's and don'ts."

Zurakowski was born in Poland in 1914, and made his first flight at age 15. As a pilot in the Polish Air Force in 1939, he shot down his first German aircraft while flying an old trainer. He escaped to Britain, joined other Polish fliers with the RAF, and had three more kills during the Battle of Britain (Nos. 234 and 609 Squadrons).

He came to Canada as chief development test pilot for Avro in 1952, winning the McKee Trophy for his contribution to test flying in 1958, the year he made the first flight of the Arrow.

"The aircraft's flying characteristics were similar to that of other delta wing aircraft like the Javelin or Convair F-102, but the Arrow had a more positive response to control movement," he remembers. By the seventh flight, he had exceeded 1000 mph. On that day, 18 April 1958, the Arrow was clocked at close to Mach 2, still climbing and still accelerating going through 50,000 feet.

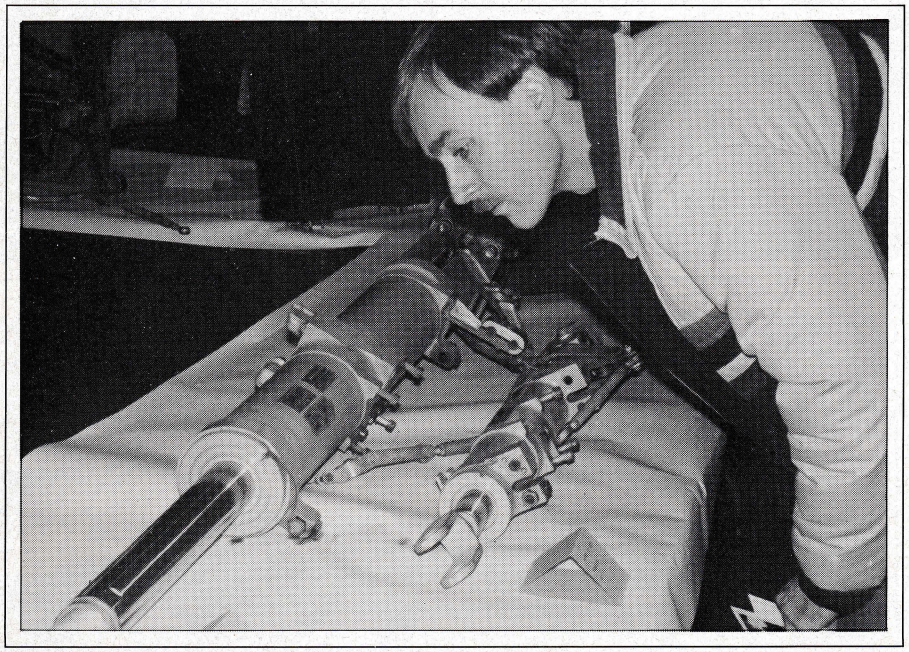
There were a couple of minor accidents. On one occasion, Zurakowski was landing RL201 when the aircraft began to pull to the left.

"Suspecting that the braking parachute had not opened evenly, I jettisoned it; there was no improvement . . . at about 30 mph the aircraft left the runway and the undercarriage collapsed . . ."

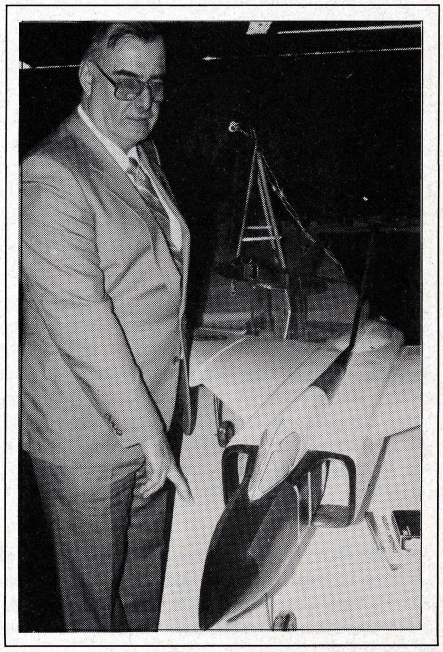
Zurakowski opened the Arrow's distinctive clamshell cockpit and ran down the back of the fuselage. Investigation revealed that the left undercarriage assembly, which had to descend and rotate in order to lock into place, had not fully done so, thus dragging the plane around and off the runway.

As the test flights continued, other pilots joined the program. These were Wladyslaw Potocki, known as Spud, Flight Lieutenant Jack Woodman of the RCAF, and Peter Cope. After almost 24 hours of testing the Arrow, and at the age of 44, "Zura" decided the time had come to retire from flying. He moved to the engineering division as staff engineer, and more aircraft joined the testing program. Soon there were five Arrows thundering into the sky over southern Ontario.

But everyone was waiting for number six, which would be the first to fly with the Orenda Iroquois engine, nearing completion. The development program for this powerplant had proceeded apace with that of the aircraft, with the United States Air Force lending a B-47 bomber to be used as a test bed. The single Iroquois could deliver more thrust than four of the bomber's eight J-47 engines, and the crew found they could spool all eight back to idle when the new engine was developing 16,000 pounds of thrust, 80 percent of full power. Final specifications for the Iroquois called for 25,000 pounds of thrust on afterburner. The Pratt & Whitney F100-PW-100, which powers the F-15 Eagle,



All that remains. A few bits and pieces are all that is left of six great aircraft. A visitor to the 30th anniversary reunion in Toronto on 26 March 1988 examines parts of the Arrow saved from the cutting torch.



Former Avro employee Don Graham at the 30th anniversary reunion with a model of the aircraft he helped build. Just to the rear is a machined steel wind tunnel model.

The last Arrow to fly, RL205, with day-glow markings. The pilot's helmet can be clearly seen, as can the outline of the weapons pack under the fuselage. It was planned to arm the Arrow with a new fire-control system, dubbed ASTRA, and the Sparrow II missile. Later, this plan was dropped in favor of the Hughes MX-1179 system and the Falcon missile. Arrow number six, fitted with the more powerful Iroquois engine, never flew. (Canadian Aviation Historical Society)

A CF-104 photo reconnaissance Starfighter returns to its base in West Germany during the 1960s. This aircraft, with a rated top speed of Mach 2, was one of three retired from the Canadian Forces by the arrival of the Hornet. (Canadian Forces)

has that kind of output, but it was not developed until 20 years after the Arrow program.

During the period the Arrow and Iroquois were under development and testing, it was learned that the Soviets had exploded an atomic bomb and built a jet bomber. On 4 October 1957, the same day the first Arrow was rolled out at Malton, Sputnik I was launched, and this tiny beeping light circling the Earth only added to the fears that the era of war in space was upon us.

While Zura and Spud were carrying out their first test flights, Prime Minister John Diefenbaker announced that two bases for Bomarc defensive missiles would be established in Canada. Although testing and development of the Arrow was to continue, it was obvious that the government saw missiles as more of a threat to North America than manned bombers.

Then, three days before the 50th anniversary of powered flight in Canada, Diefenbaker rose in Parliament in Ottawa and began to speak:

"Mr. Speaker, with the leave of the House, I should like to make a somewhat lengthy statement on the subject of one facet of the national defense of Canada . . .

"The government has carefully examined and re-examined the probable need for the Arrow aircraft and the Iroquois engine known as the CF-105, the development of which has been continued pending a final decision . . . The conclusion arrived at is that the development of the Arrow aircraft and Iroquois engine should be terminated now."

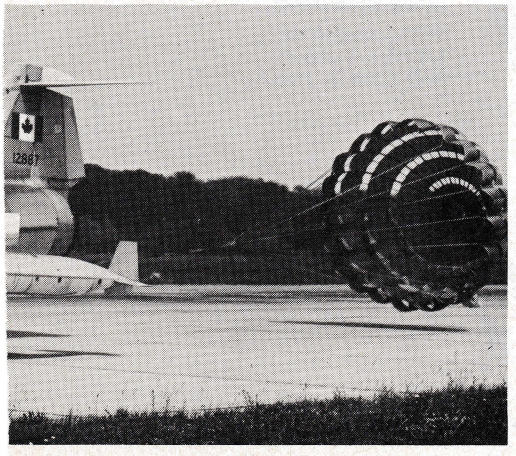
Even as he spoke, termination notices were being sent to Avro and the other contractors involved in the project. Black Friday had arrived for almost 30,000 workers.

The Prime Minister went on: "In recent months it has come to be realized that the bomber threat against which the CF-105 was intended to provide defense has diminished, and alternative means of meeting the threat have been developed . . .

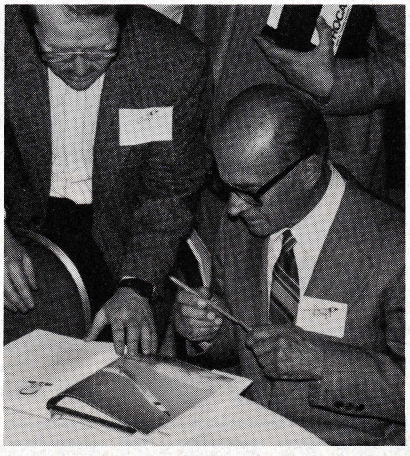
"Potential aggressors now seem more likely to put their effort into missile development than into increasing their bomber force. The United States government, after full and sympathetic consideration of proposals that the US Air Force use the Arrow, reached the conclusion that it was not economical to do so. Already the US Air Force has decided not to continue with the further development and production of US aircraft having the same general performance . . ."

Events would soon show how wrong this assessment was. Within a few short years, the Bomarc missiles would be obsolete and scrapped, and the Canadian Air Force would be forced to spend far more than had gone into the Arrow project, only this time the money would go to aircraft makers in the States. Through the 1960s and 1970s, the RCAF and then the Canadian Armed Forces would fly an almost endless succession of American planes. These aircraft have only recently been replaced by yet another American purchase, the CF-18 Hornet. And this aircraft, in Canadian livery, regularly intercepts Soviet Bear bombers making

(Continued on page 80)



The CF-100 was developed in the late 1940s in response to a need for all-weather interception over Canada's north. It was to have been replaced by the Arrow.



Test pilot Jan Zurakowski signs autographs for fans at the Toronto reunion. He has not touched an aircraft since leaving the cockpit of the Arrow three decades ago.

ARROW

(Continued from page 31)

probing runs toward the country's far northern frontier.

At Avro, and a host of other plants across the country, the grieving had already begun. John Evans, an Orenda employee, looked back 30 years later during a reunion in Toronto: "We all got the axe. I'm afraid one of the persons I rode home with committed suicide that night with a shotgun. He couldn't take it."

The design and production team that worked on the Arrow had been assembled, in true Canadian fashion, from immigrants and native-born experts. And also, in true Canadian fashion, the government found itself unable to make that last leap of faith needed to see the project through. Zurakowski expresses it best: "During the development of the Arrow and Iroquois, we were using the experience and knowledge of other countries, mainly England and the United States, but we destroyed the results of our work. Does that make sense?"

Well, after all, there were still six flyable aircraft left after the production line closed down. Five of them were fitted with the Pratt & Whitney, but number six was ready for the finished Iroquois engines, and was poised to seize the world's speed, altitude and climb records. Since the new engines would provide a 40 percent increase in thrust, coupled to a reduction of between 4000 and 5000 pounds in weight, a radical increase in speed and performance was guaranteed.

There were suggestions from the government's political opposition, and from Avro, that the company be allowed to fly number six and demonstrate just what it was capable of. But that would only have added to the government's embarrassment, and the flight of RL206 never took place. Three decades later, artist Michael Swanson painted "Ghost Flight of RL206," showing the last Arrow thundering heavenward under power from its mighty Iroquois engines. It became a best seller.

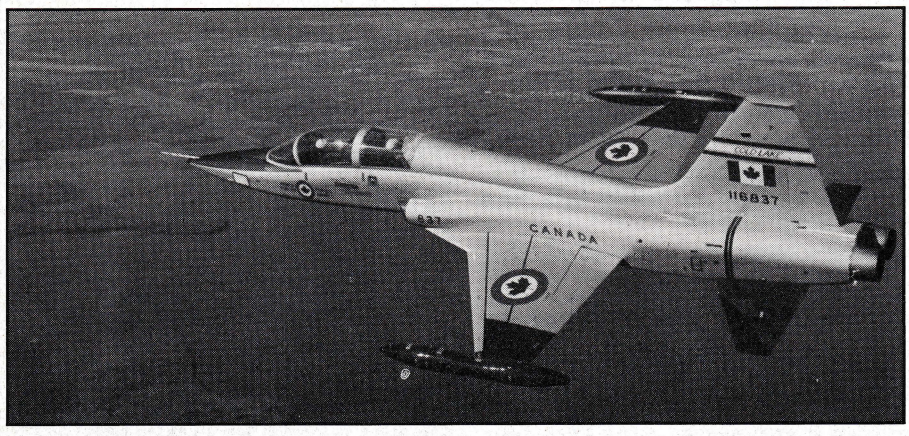
Needless to say, the government found the finished aircraft a problem. A half-hearted attempt was made to transfer them to the Royal Aeronautical Establishment in England for research, but no one seems to have thought for a moment of giving them to the RCAF, which is where they were originally supposed to go.

Then came a bizarre aftermath, an unjustifiable act of official vandalism that even today leaves aviation experts shaking their heads. On government orders, and hidden from view, workers armed with cutting torches reduced the six finished aircraft to scrap. A nose section and a wheel strut were all that was left intact. The Arrow was no more.

And so it ended. As the years progressed, the young pilots charged with keeping watch over the north flew a succession of American fighters, some built in Canada under license, others purchased outright. At the beginning of the 1980s, the government began looking for one plane to replace three

A CF-18 undergoing trials before acceptance by the Canadian Armed Forces. Contrast this cluttered, drag-inducing airframe with that of the Arrow, with its weapons pack retracted. This aircraft, now in service with Canadian squadrons, has a combat ceiling of 50,000 feet, and a maximum speed rating of March 1.8. This performance was matched or exceeded by the Mark I Arrow 30 years ago. The projected top speed of the Mark II, which never flew, was in excess of Mach 2. (Canadian Forces)

A Canadian CF-18 approaches a refuelling drogue over the high Arctic. It was the need for a high-performance aircraft which could operate over vast distances that led to the Arrow program. Now, like so many other countries, Canada is almost totally dependent upon the United States for its fighter aircraft. (Canadian Forces)



A two-seater CF-5 Freedom Fighter, in high-visibility livery, over northern Alberta. The single-seat version has a rated top speed of Mach 1.3. This aircraft has also been replaced by the CF-18. (Canadian Forces)

types then in service: The CF-5 Freedom Fighter, the CF-104 Starfighter, and the CF-101 Voodoo. In 1981, the venerable CF-100 Clunk was retired in a ceremony at the NORAD base in North Bay, Ontario, and many of those in attendance were aware that as the chunky subsonic interceptor roared past on its last flyby, there was a ghost keeping station at its wing, a spirit shape with delta wings and pale white skin.

"I didn't realize at the time how outstanding this aircraft was until I compared its performance to the latest Soviet aircraft," Zurakowski remembers of the Arrow. "We were 25 years ahead of our time."

The first line fighter of the Canadian Armed Forces today is the CF-18 Hornet, manufactured in St. Louis by McDonnell Douglas. Three decades after the Diefenbaker government cited the demise of the manned bomber threat as its reason for destroying the Arrow, Canadian pilots regularly intercept Soviet Bear-H aircraft, configured to carry cruise missiles, probing along the fringes of the country's northern, western and eastern approaches. The Bomarcs have long since faded into oblivion.

The remaining nose section and wheel assembly off the Arrow now rests in a museum in Ottawa. At the reunion on 26 March 1988, in Toronto, a few instruments, a piece of the air conditioning system, and a drag chute were the only solid evidence that there ever was an Arrow. As a 20-minute promotional film prepared by Avro was screened in a darkened room, former Arrow workers, nearly all old men now, sat in the back with tears in their eyes. Jan Zurakowski and Spud Potocki sat nearby, autographing books and pictures for a younger generation who had come to learn a little of their country's aviation history. One enthusiast blurted out the question that many may have wanted to ask: "Do you miss the plane? Do you miss the Arrow?"

The old test pilot, 74 now and partly deaf, took up his pen, gazed at the color photograph on the table, and whispered: "Oh, yes. Oh, yes." He has not touched an aircraft since that day, 30 years ago, when he left the cockpit of the most advanced fighter plane the world had ever seen.

It remains to him, perhaps most fittingly, to have the last word on this heroic tragedy. For Zurakowski, it was more than just an aircraft, more than just a scandalous waste of money, effort and talent: "It's almost as if our spirit as a nation died."

AC