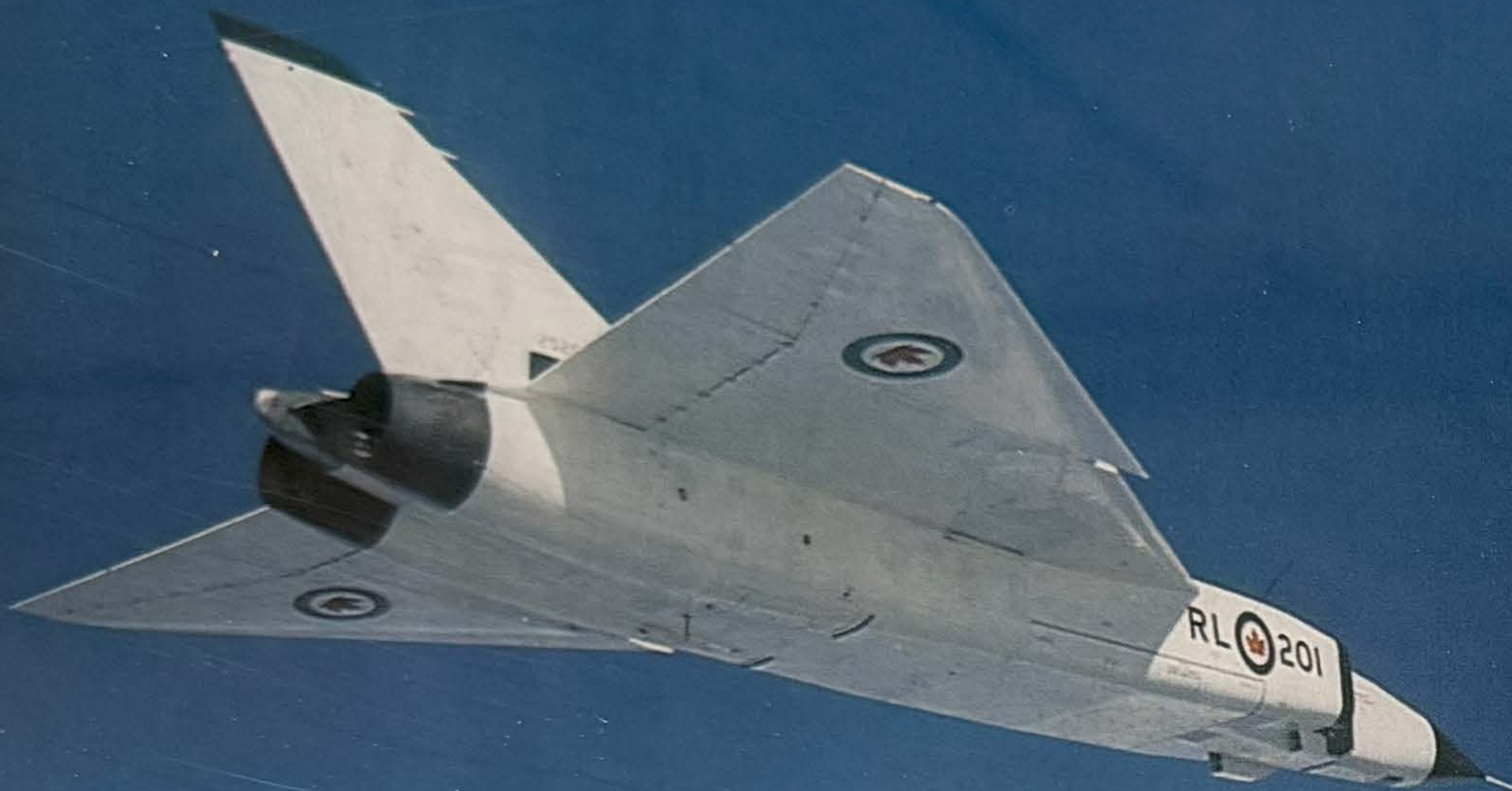


# WOUND OF THE ARROW



*The Avro CF-105 Arrow two-seat twin-engined interceptor was designed to exceed Mach 2.0, but was cancelled in favour of Bomarc missiles before it could enter RCAF service. Production Arrows were to have Orenda Iroquois afterburning turbojets, but the prototypes were fitted with Pratt & Whitney J75s of lower power. WINGS File Photo*

As history has attested, cancellation of the Avro Aircraft (as the airframe division of A.V. Roe Canada had become) CF-105 Arrow in 1959 left a deep wound in the Canadian national consciousness and a scar that still hurts 40 years later.

The Arrow was designed to be a Mach 2 successor to the CF-100. It was an ambitious program, the more so since it was to depend on a brand-new and very powerful turbojet engine, the Iroquois, developed by sister company Orenda Engines (as the engine division of A.V. Roe Canada had become) as the successor to its highly successful Orenda engine series.

Following extensive delta-wing work done in England by parent company A.V. Roe, which had involved several experimental airplanes and culminated in the impressive subsonic Vulcan V-bomber, the Arrow moved into the supersonic regime with all its attendant technical risks. But wind-tunnel testing in Canada and the US validated the design. In the event, prototype Arrow flights proved the airplane to be extremely promising.

The big problem with the Arrow, however, was political. Approved by a Liberal government, it was a natural target for the succeeding Progressive Conservative minority government. Thus, the inevitable rising costs of such an advanced program were assailed with venom born of the technical ignorance not uncommon with politicians. And there was the added negativity of a conflict of beliefs and lifestyles between the prime minister and the head of A.V. Roe Canada.

One of the promises in John Diefenbaker's election campaign of 1957 was a reduction in government spending. So, despite very successful test flying of the Arrow, in September 1958 the government announced that it could not continue to support weapons designed specifically for Canadian needs. Canadian production of the Sparrow II air-to-air missile (development of which had been dropped in the US) and associated Astra navigation/flight/fire-control system (undertaken by RCA which had never before developed such a system) for the Arrow were axed. If the Arrow *did* go into production, said Diefenbaker, it would be with existing US fire-control and missile systems (Hughes MA-1 and Falcon).

To anyone who had experienced the fallout in the UK of the notorious British Defence White Paper of 1957, the message was clear, but this did not lessen the shocking impact of the Arrow cancellation on Black Friday, February 20, 1959, just three days before the industry was to celebrate with John McCurdy the 50th anniversary of his making the first powered flight in the then British Commonwealth at Baddeck, Nova Scotia.

Cancellation of the Arrow and Iroquois cast a pall of gloom over the Toronto area although A.V. Roe engineers were snapped up quickly by eager recruiters from US companies and government agencies who descended on the town like bargain hunters at a bankruptcy sale. But many suppliers and subcontractors were in serious trouble.

It was announced that Bomarc ground-to-air missiles would be procured to replace manned interceptors; the Pinetree radar line would be improved; and the Bomarc's semi-automatic ground- environment control system would be installed. Diefenbaker said that adoption of the Bomarc system would integrate efforts under the North American Air Defence (NORAD) concept and ensure Canadian participation in the Bomarc and future weapons programs.

The argument for missiles was rational since, for geographical and economic reasons, Canadian policy usually followed the trends south of the border and Canada was a partner in NORAD. But few could understand why the Arrow should be dropped and the airframes destroyed shortly before it was due to fly for the first time with its Iroquois engines, then the most powerful in the world, particularly since a prototype had already achieved Mach 1.97 powered by Pratt & Whitney J75 engines of appreciably lower power. It was reasonable to conclude that Mach 2.2 (the heat-limit speed for aluminum-alloy airframes) would have been attainable with Iroquois engines.

One factor was that the US had adopted a policy of moving into missiles rather than new military airplanes, and simply were unaware that the Russians – while also developing long-range missiles – were already flying the supersonic bombers that the Arrow was designed to intercept and destroy. So the Canadian government decided to follow this US lead by adopting the Boeing Bomarc. (It was no consolation to 14,000 laid-off workers in Ontario that Canadair in Quebec would get an order for 140 more F-104s, would be building wings for the Bomarc, and would be able to send 180 engineers to Seattle to help design the Bomarc B that Canada was to receive.)

Conspiracy allegations have been made concerning US military/industrial influences favouring cancellation of the Arrow and some of the evidence is intriguing. Other allegations have been made, by non-technical people, as to deficiencies in the Arrow's engineering and performance. There may be some truth in these assertions, but such machinations and development problems are not uncommon when major programs are afoot, as any informed industry observer is well aware.

The national tragedy was that the program either should have been stopped earlier, at the project stage, as being too rich for Canada's blood, or completed. It has been noted by historians that if the costs of Arrow cancellation, the Bomarc missile system and the Voodoos were added, they would have been of the same order as continuing the Arrow program which – apart from maintaining a world-class technical team in Canada – could have garnered export orders.

There are always pressures from special-group interests to contend with when billions of dollars are involved, and any new airplane goes through a teething period. But the fact remains that the Arrow was cancelled at the wrong time in its development cycle with disastrous effects from which it took the Canadian aerospace industry many years to recover.