RL. 890-0000
DEC 11/09

Avro Canada

From Wikipedia, the free encyclopedia

Avro Aircraft Limited (Canada) was a Canadian aircraft manufacturing company, that was in business from 1945–62. The company was known for their innovative designs, including the Avro Arrow fighter.

Avro Canada

Former type	subsidiary
Fate	aircraft divested, remainder restructured
Successor	Hawker Siddeley Canada
Founded	1945
Defunct	1962
Headquarters	Toronto, Ontario
Key people	Crawford Gordon Jr James C. Floyd Jack Frost Janusz Zurakowski
Industry	aerospace
Products	aircraft, turbojet engines
Employees	15,000 (1958)[1]
Parent	Avro
Subsidiaries	Orenda Engines, Canada Car and Foundry

Contents

Origins

During the Second World War, Victory Aircraft in Malton was Canada's largest aircraft manufacturer. Prior to 1939, as National Steel Car Ltd. of Montreal, the concern had been one of a number of *shadow factories* set up in Canada to produce British aircraft designs in safety.[2] National Steel Car had turned out Avro Anson trainers, Handley Page Hampden bombers, Hawker Hurricane fighters and Westland Lysander army cooperation aircraft. National Steel Car Corporation of Malton, Ontario was formed in 1938 and renamed **Victory Aircraft Limited** in 1942 when the Canadian government took over ownership and management of main plant of the National Steel Car Corporation at Malton.[2] During the Second World War, Victory Aircraft built Avro (UK) aircraft: 3,197 Anson trainers, 430 Lancaster bombers, six Lancastrian, one Lincoln bomber and a single York transport.

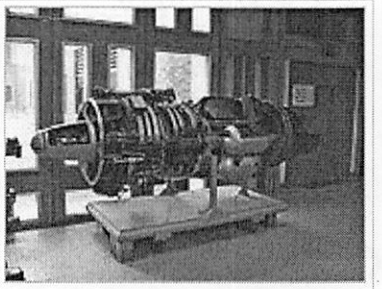
A.V. Roe Canada

In 1945, the UK-based Hawker Siddeley Group purchased Victory Aircraft from the Canadian government, creating **A.V. Roe Canada** as the wholly owned Canadian branch of its aircraft manufacturing subsidiary, A.V. Roe and Company.[2] Avro Canada, as it was commonly known, began operations in the former Victory plant. Avro Aircraft (Canada), their first (and, at the time, only) division, turned to the repair and servicing of a number of Second World War-era aircraft, including

Hawker Sea Fury fighters, B-25 Mitchell and Lancaster bombers.[2] From the outset, the company invested in research and development and embarked on an ambitious design program with a jet engine and a jet-powered fighter and airliner on the drawing boards.

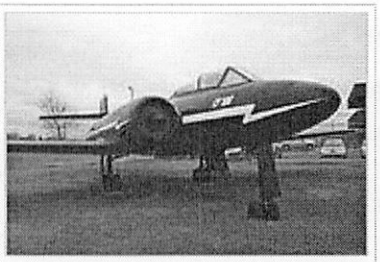
First projects

The first major project was the Orenda jet engine in 1949 which had been developed from the earlier Chinook design of the Turbo Research Ltd. company that was included as part of the start-up Avro organization. Turbo Research was originally a small firm involved in research and cold-weather testing of jet engines for the RCAF, although the company had started work on a number of their own engine designs. When they were purchased by A.V. Roe, they were mid-way through their TR.4 design, which was renamed the Chinook. The company would eventually be renamed in honour of their later TR.5 design, becoming Orenda Engines. The Orenda engine from the Gas Turbine Division (later Orenda Engine Division), would be destined to power fighter aircraft for the RCAF from Avro and Canadair Aircraft Ltd. (Canadair Sabre and Canadair T-33).



Orenda engine on display at Carleton University

In 1946, A.V. Roe Canada's next design, the Avro XC-100, Canada's first jet fighter, started at the end of the era of propeller-driven aircraft and the beginning of the jet age.[2] Although the design of the large, jet-powered all-weather interceptor, renamed the CF-100 Canuck, was largely complete by the next year, the factory was not tooled for production until late 1948 due to ongoing repair and maintenance contracts. The CF-100 would have a long gestation period before finally entering RCAF service in 1952, initially with the Mk 2 and Mk 3 variants. The CF-100 Canuck operated under NORAD to protect airspace from Soviet threats such as nuclear-armed bombers. A small number of CF-100s served with the RCAF until 1981 in reconnaissance, training and electronic warfare (ECM) roles.[2] In its lifetime, a total of 692 CF-100s of different variants, including 53 aircraft for the Belgian Air Force, were produced.



A CF-100 Mk 3 painted as the CF-100 prototype, on display at the Calgary AeroSpace Museum

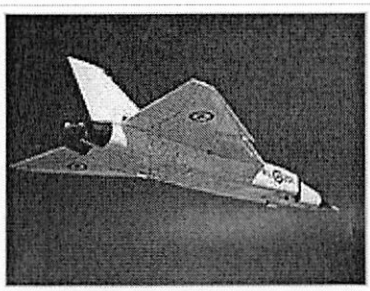
Work was also underway on a jet-powered civilian inter-continental transport known as the C102 Jetliner.[3][2] It nearly became the first jet transport in the world when it first flew in August 1949, a mere 13 days following the first flight of the de Havilland Comet. The Jetliner represented a new type of regional jet airliner that would not see comparable designs until the late 1950s. Despite an aggressive marketing campaign directed at US airlines and the USAF, the sales prospects of the Jetliner floundered after the launch customer, Trans-Canada Airlines, reneged on a letter of intent in 1948. The company was still attempting to get the CF-100 into production at the time and, consequently, the Canadian government cancelled any further work on the C102 project due to the Korean War priorities. Reacting to a direct order from the government, the second C102 prototype was demolished in the plant in 1951, with the first prototype relegated to photographic duties in the Flight Test Department. After a lengthy career as a camera platform and company "hack," *CF-EJD-X*, the Jetliner prototype was broken up in 1956. The nose section now resides in the Canada Aviation Museum in Ottawa.

Expansion

Model of an Avro Canada - 102

A.V. Roe Canada was restructured in the mid-1950s into two separate divisions: Avro Aircraft Ltd. and Orenda Engines, both facilities located across from each other in a complex at the perimeter of Malton Airport. The total labour force of both aviation companies reached 15,000 in 1958.

During the same period, A.V. Roe Canada also purchased a number of companies, including Dominion Steel and Coal Corporation and Canada Car and Foundry (1957) and Canadian Steel Improvement. By 1958, A. V. Roe Canada was an industrial giant with over 50,000 employees in a far-flung empire of 44 companies involved in coal mining, steel making, railway rolling stock, aircraft and aero-engine manufacturing, as well as computers and electronics. The companies generated annual sales in the $450 million range, ranking A.V. Roe Canada as the third largest corporation in Canada.



CF-105 Mk 1 interceptor

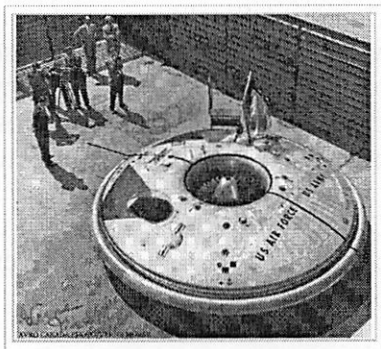
Avro Arrow

Main article: Avro Arrow

The need for a newer and much more powerful interceptor aircraft was clear even before the CF-100 entered service, and a number of design studies on swept-wing versions started as early as 1952. A switch to a more advanced swept wing was studied as the CF-103, and this led eventually (through a series of other designs) to the larger delta-wing CF-105 Arrow interceptor.[2] The sudden cancellation of the Arrow project by the Canadian government on 20 February 1959 led to a massive corporate downsizing and an attempt to further diversify. Many Avro Aircraft Ltd. engineers who remained were reassigned to marine, truck and automobile projects while Orenda Engines continued as an engine manufacturer, albeit on a smaller scale. Numerous engineering and technical staff left Avro Canada primarily to the United Kingdom and the United States in a so-called "brain drain."[2]

Experimental programs

In 1952, the Avro Special Projects team had started research and development work on a series of "flying saucer"-like vehicles. The only design that materialized was the VZ-9-AV Avrocar, funded entirely by the U.S. military from 1956.[2] The Avrocar was proposed to the U.S. Army as a type of "Flying Jeep" that could also serve as a proof-of-concept test vehicle for a later supersonic flying saucer design, the Weapon System 606A for the USAF. Two Avrocars were built, one for wind-tunnel testing at NASA Ames and the other for flight testing. The designs were underpowered and only operated in a ground-cushion effect, much like a hovercraft. When the Avrocar prototypes failed to perform at heights above three feet off the ground, the U.S. Army and USAF cancelled the project, in 1961.



The Avro VZ-9-AV Avrocar.

Both Avrocars were on public display, one in Building 22 of the Smithsonian Paul E. Garber facility, the other at the U.S. Army Transportation Museum, Ft. Eustis, Virginia. The latter Avrocar was dismantled

and put into storage c. 2002, due to increasing deterioration (it was displayed outside, and the museum is very close to the ocean). The curator of the US Army Transportation Museum stated in 2008 that it would take between US$500,000 and US$600,000 to entirely restore it. Furthermore, because it is at a federal (military) installation, the work must be done by contractors, rather than volunteers. A grant of US$80,000 was received to begin restoration, however this amount was only enough to restore one piece approximately five ft by five ft.

Demise

In 1962, the Hawker Siddeley Group formally dissolved A.V. Roe Canada and transferred all A.V. Roe Canada assets to its newly-formed subsidiary Hawker Siddeley Canada.

Hawker Siddeley Canada, at that time, among its diverse holdings, included major manufacturing units:

- Canadian Car and Foundry
- de Havilland Canada
- Dominion Steel and Coal Corporation
- Orenda Engines Limited

The former Avro aircraft factory in Malton was sold to de Havilland Canada in the same year.[2] This facility located on the north end of Toronto Pearson International Airport (the village of Malton was incorporated into the City of Mississauga in 1974), was subsequently owned and operated by several others:

- Douglas Aircraft of Canada (1963-1967): manufacturer of the aircraft wings and tail sections (empennage) for the DC-9;[2]
- McDonnell-Douglas Canada (1967-1997): manufacturer of aircraft wings and related components for the KC-10 and MD-11, MD-80 wings, empennage and cabin floors, and F/A-18 side panels and pylons;[2]
- Boeing Toronto Limited (1997-2005): manufacture of Boeing 717 wings, parts for the Delta rocket, the C-17 airlifter and 737 jetliners.[2]

By the late 1990s, Hawker Siddeley Canada had been diminished into a holding company after divesting itself of almost everything other than its pension fund.

Dominion Steel's assets were nationalized and now part of Industrial Cape Breton. Canadian Car's Montreal operations have closed and been demolished. Its Thunder Bay plant, after several changes of ownership, is now part of Bombardier Transportation. Boeing Corporation later acquired de Havilland Canada and Bombardier Aerospace finally absorbed the original holdings . The Downsview aircraft plant still exists and manufactures and tests Bombardier aircraft.

Orenda Aerospace, as part of the Magellan Aerospace Corporation, is the only remaining original company from the A.V. Roe empire, although greatly diminished in both the size and scope of its operations.

In mid-2005, with the completion of the last shipset of Boeing 717 wings, The Boeing Company discontinued its operations at the former Avro plant.[4][2]

The Malton plant, which had comprised several very large buildings and hangar-like structures, was demolished in progressive stages from 2004 onwards. The approximate 113 acres (46 ha) of land that

the plant resided on at the time of its closure was sold to the Greater Toronto Airports Authority (owner of the Toronto Pearson International Airport) and the title was transferred after the property site had completed its environmental soil remediation.[5]

Some of the brickwork of the site's historic main "C" assembly building, next to the high-bay doors that the Arrow, Jetliner, CF-100 and thousands of other aircraft and major assemblies emerged from, was retained by the Canadian Air and Space Museum in Downsview, Toronto, for future use alongside a number of their Avro displays, which include a full scale replica of the CF-105 Arrow.[6][7]

Aircraft

Product list and details (date information from Avro Canada)

Aircraft	Description	Capacity	Launch date	1st flight;	1st delivery	Production
Avro C102 Jetliner	Prototype medium-range jet airliner	36	1946	1949	Never entered production	One prototype (second prototype-broken up)
Avro CF-100 Canuck	Fighter interceptor	Crew of two	1946	1950	1952	692 from Mk 1 to Mk 5 series
Avro CF-105 Arrow	Delta-wing supersonic interceptor aircraft	Two	1950s	1958	Cancelled during production run	Five Mk 1 flown, (29 Mk 2 airframes in production)
Avro VZ-9-AV Avrocar	Test aircraft	Two	1950s	1959	Cancelled while in test phase	Two prototypes, (second prototype test flown)

References

Notes

1. ^ Stewart 1991
2. ^ *a b c d e f g h i j k l m n o* Lombardi, Mike and Larry Merritt. *Toronto's Long History of Aerospace Achievement, Boeing Frontiers Magazine* (online), Volume 4, Issue 2, June 2005. Retrieved: 15 April 2009.
3. ^ The AVRO C.102 Jetliner, Avroland website. Retrieved: 15 April 2009.
4. ^ Bedell 2005: Referring to the article's last paragraph: "Note: ...On August 12, 2005 the last few CAW [union] Local 1967 represented employees, walked out the plant gates for the last time."
5. ^ *News Release: Boeing Announces Sale of Surplus Property Near Toronto, Canada*, Boeing Shared Services website, 30 May 2006. Retrieved: 15 April 2009.
6. ^ Taylor, Bill Avro Arrow fans lose fight to save final historic hangar, Toronto Star, Toronto, ON, 24 May 2003. Retrieved from www.AvroArrow.net, 16 September 2009.
7. ^ Gregg, Peter Press Release: Historic Significance of Boeing Lands adjacent to Toronto Pearson Airport to be Commemorated, Greater Toronto Airport Authority, Mississauga, ON Canada. Retrieved from www.AvroArrow.net, 16 September 2009.

Bibliography

- Bedel, Glenn. "History: The Life and Near–Death of the Aircraft Industry in Malton." *CAW Local 1967 website*, 12 August 2005. Retrieved: 15 April 2009.

- Campagna, Palmiro. *Storms of Controversy: The Secret Avro Arrow Files Revealed, Third Paperback Edition.* Toronto: Stoddart, 1998. ISBN 0-7737-5990-5.
- Campagna, Palmiro. *Requiem for a Giant: A.V. Roe Canada and the Avro Arrow.* Toronto: Dundurn Press, 2003. ISBN 1-55002-438-8.
- Dow, James. *The Arrow.* Toronto: James Lorimer and Company Publishers, 1979. ISBN 0-88862-282-1.
- Gainor, Chris. *Arrows to the Moon: Avro's Engineers and the Space Race.* Burlington, Ontario: Apogee, 2001. ISBN 1-896522-83-1.
- Page, Ron, Richard Organ, Don Watson and Les Wilkinson. *Avro Arrow: The Story of the Avro Arrow from its Evolution to its Extinction.* Erin, Ontario: Boston Mills Press, 1979, reprinted Stoddart, 2004. ISBN 1-55046-047-1.
- Peden, Murray. *Fall of an Arrow.* Toronto: Stoddart Publishing, 1987. ISBN 0-7737-5105-X.
- Shaw, E.K. *There Never was an Arrow.* Toronto: Steel Rail Educational Publishing, 1979. ISBN 0-88791-025-4.
- Stewart, Greig. *Arrow Through the Heart: The Life and Times of Crawford Gordon and the Avro Arrow.* Toronto: McGraw-Hill-Ryerson, 1998. ISBN 0-07-560102-8.
- Stewart, Greig. *Shutting Down the National Dream: A.V. Roe and the Tragedy of the Avro Arrow.* Toronto: McGraw-Hill-Ryerson, 1991. ISBN 0-07-551119-3.
- Taylor, Bill Avro Arrow fans lose fight to save final historic hangar, Toronto Star, Toronto, ON, 24 May 2003. Retrieved from www.AvroArrow.net, 16 September 2009.
- Whitcomb, Randall. *Avro Aircraft and Cold War Aviation.* St. Catharine's, Ontario: Vanwell, 2002. ISBN 1-55125-082-9.
- Whitcomb, Randall. *Cold War Tech War. The Politics Of America's Air Defense.* Burlington, Ontario: Apogee Books, 2008. ISBN 1-894959-77-3.
- Zuk, Bill. *The Avro Arrow Story: The Impossible Dream.* Calgary: Altitude Publishing, 2006. ISBN 1-55439-703-0.
- Zuuring, Peter. *The Arrow Scrapbook.* Kingston, Ontario: Arrow Alliance Press, 1999. ISBN 1-55056-690-3.
- Zuuring, Peter. *Iroquois Rollout.* Kingston, Ontario: Arrow Alliance Press, 2002. ISBN 1-55056-906-6.

External links

- *Aerospace Heritage Foundation of Canada*
- *Arrow Digital Archives*
- *Avro Arrow Home Page,* the longest running Avro Arrow page
- *AvroLand*
- *AvroArrow.net*
- *Canada Aviation Museum,* home of the remaining pieces of the Avro Arrow
- *Canadian Air and Space Museum,* home of an Avro Arrow replica
- *Fred Smye website*

Retrieved from "http://en.wikipedia.org/wiki/Avro_Canada"
Categories: Aircraft manufacturers of Canada | Defunct aircraft manufacturers | Hawker Siddeley | Defence companies of Canada | Companies established in 1945 | De Havilland | Avro Canada aircraft