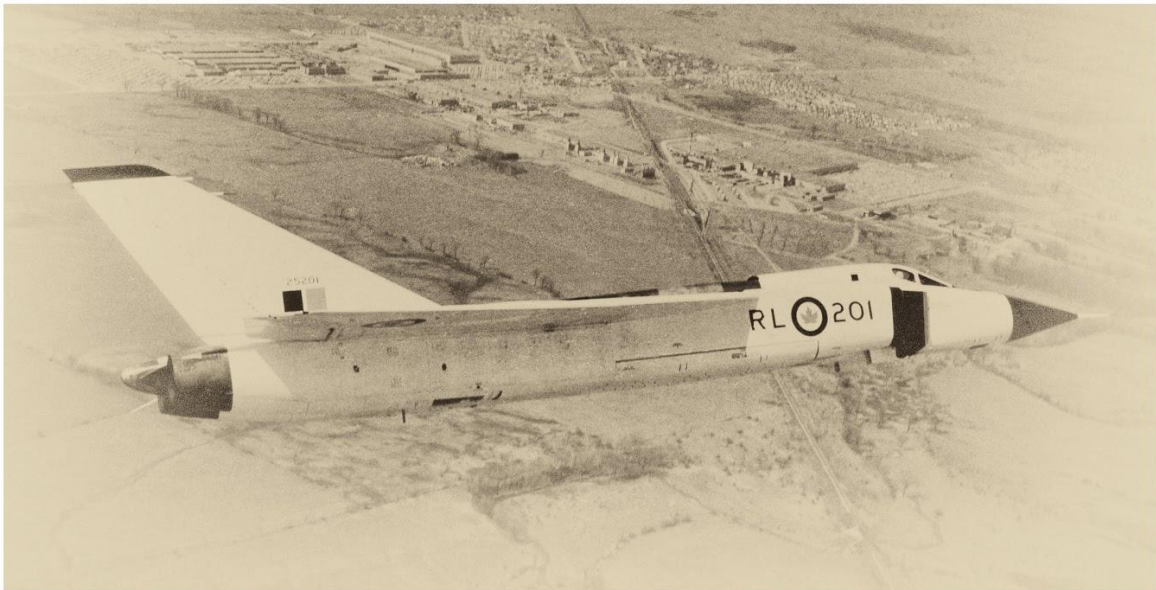


MONDAY, MARCH 25, 2013

55 YEARS AGO::: Avro Arrow Maiden Flight

## AVRO ARROW: MAIDEN FLIGHT March 25, 1958



A 35 minute flight into Canadian and world history.

The small country of CANADA had produced a technological marvel.

THOUSANDS OF CANADIANS waited and watched (inside and outside) Malton Airport as the CF-105 Avro Arrow was put through some light-duty paces on its MAIDEN FLIGHT.

The crowd mills about waiting for another pass of the Arrow, while the Arrow passes over Rexdale.

The Avro Canada and Orenda Engine plants can be seen for the massive structures they were (look just above the flying Arrow).

It would be Canada's first and last all-Canadian supersonic airplane.

Every other Canadian engineered aircraft SINCE has been sub-sonic~.

CF-105 AVRO Arrow (outfitted with Orenda Iroquois Engines) "FIRSTS and NOTABLES"

- First a/c designed with digital computers being used for both aerodynamic analysis and designing the structural matrix (and a whole lot more).
- First a/c design to have major components machined by CNC (computer numeric control); i.e., from electronic data which controlled the machine.
- First a/c to be developed using an early form of "computational fluid dynamics" with an integrated "lifting body" type of theory rather than the typical (and obsolete) "blade element" theory.
- First a/c to have marginal stability designed into the pitch axis for better maneuverability, speed and altitude performance.
- First a/c to have negative stability designed into the yaw axis to save weight and cut drag, also boosting performance.
- First a/c to fly on an electronic signal from the stick and pedals. i.e., first fly-by-wire a/c.
- First a/c to fly with fly by wire AND artificial feedback (feel). Not even the first F-16's had this.
- First a/c designed to be data-link flyable from the ground.
- First a/c designed with integrated navigation, weapons release, automatic search and track radar, datalink inputs, home-on-jamming, infrared detection, electronic countermeasures and counter-countermeasures operating through a DIGITAL brain.
- First high wing jet fighter that made the entire upper surface a lifting body. The F-15, F-22, Su-27 etc., MiG-29, MiG 25 and others certainly used that idea.

- First sophisticated bleed-bypass system for both intake AND engine/exhaust. Everybody uses that now.
- First by-pass engine design. (all current fighters have by-pass engines).
- First combination of the last two points with an "ejector" nozzle that used the bypass air to create thrust at the exhaust nozzle while also improving intake flow. The F-106 didn't even have a nozzle, just a pipe.
- Use of Titanium for significant portions of the aircraft structure and engine.
- Use of composites (not the first, but they made thoughtful use of them and were researching and engineering new ones).
- Use of a drooped leading edge and aerodynamic "twist" on the wing.
- Use of engines at the rear to allow both a lighter structure and significant payload at the centre of gravity. Everybody copied that.
- Use of a LONG internal weapons bay to allow carriage of specialized, long-range standoff and cruise missiles. (not copied yet really)
- Integration of ground-mapping radar and the radar altimeter plus flight control system to allow a serious strike/reconnaissance role. The first to propose an aircraft be equally adept at those roles while being THE air-superiority fighter at the same time. (Few have even tried to copy that, although the F-15E is an interesting exception.)
- First missile armed a/c to have a combat weight thrust to weight ratio approaching 1 to 1. Few have been able to copy that.
- First flying 4,000 psi hydraulic system to allow lighter and smaller components (not until 1974 did another aircraft (Rockwell B-1 Bomber) use a hydraulic system with such high psi)
- First oxygen-injection re-light system.
- First engine to have only two main bearing assemblies on a two-shaft design.
- First to use a variable stator on a two-shaft engine.
- First use of a trans-sonic first compressor stage on a turbojet engine.
- First "hot-streak" type of afterburner ignition.
- First engine to use only 10 compressor sections in a two-shaft design. (The competition was using 17!!)

The Avro Arrow was one of Canada's finest aviation achievements, even though it never entered service.