

✓ STORMS OF CONTROVERSY

by PALMIRO CAMPAGNA 1992

98-02-00 Former Conservative Cabinet Minister Pierre
Sovereign claimed that the destruction of the
/ AVRO Arrow was ordered by AVRO President
Crawford Gordon

45-12-01 / A.V. ROE CANADA formed - Canadian ST

55-09-00 / A.V. ROE CANADA acquires Canadian Can.
Foundry

54-12-02 / Decision to split A.V. ROE Canada into
separate airframe and engine companies

(7) Canadian Steel Improvements was purchased

50-04-18 / Jetliner delivers first jet air mail to New York

49-08-10 / AVRO Jetliner flies for first time - eight years
before the first Boeing 707

Arrow 52-03-26 RCAF all-weather Interceptor Team submits
its final report.

Arrow 53-03-05 RCAF issued Operational Requirement ORI/I-63
followed by RCAF Specification AIR-7-3 "Design
Studies of Prototype Super-Sonic all-Weather
Interceptor Aircraft"

Arrow 53-05-00 AVRO responds to RCAF request with report
P/C-105/1 entitled "Design Study of Super-
Sonic All-Weather Interceptor Aircraft"
RCAF upon review issues Specification AIR-7-4

✓

↓

AIR-7-4

- Combat radius of 200 nautical miles
 - Combat ceiling of not less than 60,000 ft
 - ✓ - Maximum speed at altitude - Mach 2
 - rate of climb - 6 minutes to 50,000 ft
 - maneuverability of 2G at Mach 1.5 @ 50,000 ft without loss of speed or altitude.
- ✓

✓ Arrow 53.08.27 AVRO begins wind tunnel tests at Cornell
Transonic Wind Tunnel in Buffalo, New York.
Testing continued to Sept 2/53

✓ Arrow 53.09.18 AVRO submits report to National Aeronautical
Establishment (NAE) for comment.

✓ Arrow 53.09.28 Air Vice Marshall Douglas M. Smith (Air
Member Technical Services) receives comment
from John H. Burkin, Director of the NAE:
"The Cornell wind tunnel tests indicate that,
aerodynamically, (AVRO's) C105/1200 configuration
is capable of meeting its performance requirements,
although it is important that wind tunnel
measurements be extended to higher Mach
numbers as soon as possible"

✓ Arrow 53.11.30 Liberal Minister of National Defence Brooke
Claxton makes submission to Cabinet
Defence Committee concluded that no
foreign
aircraft could satisfy requirement (cf AIR-T-4)

54.01.15 NAE Director writes Air Vice Marshall Smith to
say his favourable comment on AVRO design
was premature. Their full assessment of AVRO's
work, NAE Report LR-87, concluded that the
aircraft would not meet the 2G manoeuvrability
or 200 nautical mile radius because of
supersonic drag.
(First of ongoing disagreements between AVRO & NAE) ✓

Arrow 54.02.16 In a memo, Air Vice Marshall Smith advises
✓ Air Marshall Stemon, that the AVRO's aircraft
would meet the requirement because of the
increased fuel capacity AVRO had included

Arrow 54.09.29 NAE internal memo:

✓ "Our opinions differ in various ways from
those from those of the company (AVRO) or
the RCAF --- even to the opinion that the
NAE is anxious to hinder the straight forward
development of the (AVRO) aircraft. Nothing
could be further from the truth."

Arrow 54.11.19 ✓ "Joint Report on RCAF-DRB-NAE Visit to
Langley Laboratories to Discuss Aerodynamic
Problems of AVRO CF105 Aircraft"
RCAF request that U.S. National Advisory
Committee on Aeronautics be consulted
results in -

54.12.20 ✓ AVRO called on carpet over NAE submission
to NACA - a second NACA meeting called
that vindicated AVRO

57.02.22 RCAF memo names the AVRO CF105 the "Arrow"

54.06.00 ✓ U.S. General Nathan F. Twining, Chief of Air
Staff, USAF advised the Canadian Chief of
Air Staff, Air Marshall Roy Stemon had
initiated a American design competition for
a long-range interceptor. and requested
that the Canadian plane be evaluated
with those in the competition.

Arrow 54.07.15 Canadian Air Marshall Slemmon forwarded
✓ a copy of A.V. Roe's Design Study to
the Americans.

54.08.26 AVRO officials provide a briefing to the
✓ American Air Research & Development
Command.

55.10.01 Air Marshall Slemmon and Omar Solandt
Chairman of The Defence Research Board
invite high-level technical delegation of USAF
to visit AVRO and study the program
between Oct 31 and Nov. 1, 1955. They
were asked to provide opinion as to the
"essentiality of the 105 Project to the Defence
of North America" and asked flat out if
they would abandon the project under
similar budget restraints.

56.07.00 AVRO Vice President Fred Smye told by
✓ Chief of Air Staff that RCA to provide
fire control system.

Contrary to advice of US technical committee
and over the objections of AVRO,

55.10.01 General Price of US Tech Team ^{reversing 105} advises
✓ Canadian counterparts that the Bomarc
missile was being developed as an addition
to the manned interceptor

55.10.01 Letter sent to Ralph Campney, Minister of
National Defence from Donald A. Quarles, Sec.
of the Air Force: "recommend that "Development
and production of CF-105 proceed as planned"

⑪
55.10.03

✓ Letter from DRB / NAE concludes the Arrow would be no better than American F-102

55.12.09 Air Vice Marshall Hendrick, Air Member Technical

services responds to DRB / NAE letter of NOV, 03^o

✓ "There is a wide difference of opinion between NAE and A.V. ROK on the possible performance of this aircraft - - -

I think it only fair to say however, that we as a Service, can find no serious grounds for differing materially with the Company who are our contractors and designers of this aircraft"

56.01.00

✓ Brenda receives official notification that the USAF was interested in the Arrow only if it were fitted with the PS-13 IROQUOIS engine. -- in addition the USAF was interested in the IROQUOIS for other aircraft including the B-52 bomber.

57.01.00

✓ NAE Director of Engineering, John ORR reports that AVRO and NAE performance figures were finally coming into agreement but by Jan. 21, the NAE was claiming their estimates were more accurate than AVRO's.

57.04.00 RCAF informed that the USAF wanted to be kept up to date on all Arrow/Orenda developments

57.06.20 NAE letter to Defense Research Board (DRB) by new NAE Director, D. C. MacPhail claiming the Arrow would break up in flight

50.12.00 Canadian Gov't establishes National Aeronautical Establishment ^(NAE) as aeronautical research and development center originally administered by the National Research Council (NRC)

→ because it is to be equipped with artificial stability augmentation system which goes beyond what is being attempted in other high speed aircraft

57.07.18 Dr Courtland Perkins, Chief Scientist, USAF, advises AVRO V.P. Engineering, Jim Floyd that a US contract for a long range interceptor might be cancelled and he wished to be kept abreast of all developments. AVRO thought it could meet USAF specification with in-flight re-fueling

273RD Air Council Meeting in Ottawa
57.10.19 Canadian Vice Chief of the Air Staff, Air
Vice Marshall Larry Dunlop advised that
American defense includes long range
interceptors followed by surface-to-air
missiles

54.06.10 Dr. John J. Green, the DRB Scientific advisor
in a memo, states that if the combat
radius of the CF105 is 635 nautical miles.
on internal fuel tanks only.

91-07-31 In an interview, Air Vice Marshall John
Caston confirmed an anti-ICBM capability
was being considered for the Arrow. and
that his view, like the Americans, was for
an all-encompassing program of Arrow
interceptor, Bomarc missile, and improved
radar.

57.10.19 273RD Air Council Meeting in Ottawa
Air Member Personnel, Air Vice Marshall J.
Gordon Kerr, questioned the value of continuing
with the Arrow given that it would only
be in use for only two or three years before
American interceptors were ready - it is not
known if his comments influenced the outcome.

56.01.00 Director of the Royal Aeronautical Establishment
and Deputy Chief of Staff of the British RAF
VISIT AVRO - Their conclusions generally agreed
with American opinion of the aircraft and saying
the Arrow would be RAF's best choice

✓ 58.01.29 U.S. Secretary of the Air Force, James H. Douglas
advises Canadian Ambassador to Washington,
Mr. Norman Robertson, stated categorically
that there was no place in the USAF
inventory for the Arrow and the USAF
was going ahead with its own F-108 long
range interceptor (never built)

57.10.04 AORO NEWS (Corporate Newsletter)

/ "Until recently, high performance aircraft
were not committed to production until
after flight testing of one or more
prototypes - - -. The Arrow program
is unusual in Canada in that even the
first flying model has been built on
production tooling"

✓ 51.04.01 Defense Research Board begins work on
gov't approved ^{Velvet Glove} guided missile program
at The Canadian Armament Research Development
Establishment (C.A.R.D.E.)

/ 53.08.27 First launch of Velvet Glove missile from
F-86 Sabre aircraft. - rather than upgrade
the weapon for the Arrow, the program
was cancelled in favour of foreign missiles
at a cost 24 million

- 56.06.26 Canadian RCA wins contract for new missile
/ fire control system known as ASTRA. even as
The Americans abandoned the Sparrow 2 missile,
which was taken over by Canada and
Westinghouse in Canada.
- 57.06.90 AVRO again suggests the Sparrow 2 be abandoned
/ noting that the Defense Research Board report
suggested it would be incompatible with the Arrow
- 57.08.30 AVRO's Jim Floyd, V.P. Engineering, writes Air Vice
/ Marshall Hendrick to explain the problems with
the Sparrow missile, but the RCAF none the less
pressed ahead.
- 58.09.00 RCAF, cancels ASTRA and Sparrow programs
/ because of huge costs and plans made to
equip the Arrow with Falcon missiles and
Hughes fire control system originally proposed.
- 54.00.90 Rolls Royce abandons its RB-106 on which
the Arrow was designed.
- 55.00.00 Curtiss-Wright abandons work on its J-67
/ engine after AVRO made considerable
design changes to accommodate it in the Arrow
The Pratt & Whitney J-75 was then chosen for the
first five MK1 Arrows.

55.02.25 Minister of Defence, Ralph Campney, in a request to Cabinet Defence Committee for development of the Orenda OS-13 IRDQW015 praised the Orenda design team.

57.10.22 Minister of National Defence, George Pearkes, reports that the Chiefs of Staff were recommending twenty-nine aircraft be ordered for immediate procurement.

59.04.07 Top Secret message from Air Vice Marshall Hendrick to General Faulkes:

"-- The USAF would like to have interceptors in Canada in place of those cancelled--
General Twining reiterated that the manned bomber would remain the threat for a number of years"

54.12.04 First run of Pratt & Whitney 5-75 engines in an Arrow

54.12.21 TAXI trials of Arrow 201 begin

1999
Gov. X supports Canadian Air Force as they
Air Canada (TAXI) could take over Canadian
(CFA)

57.03.06 AORD's Jim Floyd and others go to Ottawa to meet with Defense Research Board and RCAF.
DRB saw need need for interceptors to 1970 but felt a Mach 3 capability desirable with 60,000 ft ceiling and 1000 mile range.
Dr Watson of DRB with RCAF Support recommended degrading the airframe performance to allow for weapons of greater range. - preferably with atomic warheads.

57.12.04 Group Captain Ray Footitt, head of the new Arrow Weapon Systems project office, accuses AORD of mismanaging the project.
- all was eventually straightened out and Footitt was to later say: AORD engineers were the most professional team I had ever worked with.

57.12.02 Air Industries and Transport Association of Canada in a comprehensive brief to PM Diefenbaker warn that Canada's aircraft industry is in jeopardy without long range programs.

58.03.28 RCAF Chief Aeronautical Engineer reports that "quantity production of aircraft as complex as the Arrow can be undertaken in Canada at a cost comparable to that for production of like aircraft in the USA

58.05.12 Canada and US sign NORAD agreement.
✓ although This integrated Air Defense Command had been established since Aug 1 1957.

58.04.28 Diefenbaker memoirs suggest Cabinet was
✓ briefed on the need for both missiles and interceptors for defense.

58.07.08 A top secret briefing document for Ministers of
✓ Defense Pearkes sets forth how development costs for the Canadian Arrow are compounded by the cost of Sage ground control for US aircraft to be used in Canada (Arrow itself didn't require SAGE)

58.08.28 Minister of Defense Pearkes tells Cabinet
✓ the Cabinet Defense Committee had reviewed Canada's air defence requirement and had agreed, amongst other things, to refer to Cabinet, proposals to cancel the 105 (ARROW) programme and investigate additional (BOMARC) missile installations and possible alternative interceptor for the 105.

A secret brief prepared by unknown members of the Cabinet Defense Committee to which Chairman of the Chief of Staff, General Charles Foulkes, and Chief of Air Staff, Air Marshall Hugh Campbell were assigned, is circulated. It speaks of successful testing of plane and engine and the need for a decision whether or not to go into production.

58.09.03 AVRO officials meet with Prime Minister and Ministers. Defence Minister, Peaker and Air Marshall Hugh Campbell did not agree with cost savings associated with cancelling Astra and Sparrow programs.

Later in Cabinet, General Peaker was of the opinion that the Bomarc would give best defence for the money. Despite the impact on the Arrow program, the cost of U.S. need for SAGE ground control, the missile and U.S. F-106 interceptor replacement were unquestioned.

58.09.07 In Conservative Cabinet meeting Finance Minister Donald Fleming, in Cabinet, suggests cancelling the Arrow now could be used advantageously as a political ploy by claiming that the government was abandoning an ill-fated Liberal administration project.

58.09.17 AVRO President Crawford Gordon meets with PM Diefenbaker and is allegedly told the Arrow would be cancelled because it was too expensive and could not be sold to the Americans. This exchange was unlikely as such an announcement would have brought down the government.

58.09.21 Diefenbaker tells Cabinet of the meeting with Crawford Gordon of AVRO. Cabinet decided on a comprehensive review of the Arrow program by March 31/1959 as they could only agree to delay the cancellation until spring.

58.09.23 PM Diefenbaker finally announces termination of the ASTOR and Sparrow programs.

58.12.22 Conservative Cabinet Meeting. PM Diefenbaker clearly annoyed by Air Marshall Slemon saying manned interceptors would be required for some time to come.

58.10.31 France concluded that the PROQUELIS program had or would cease to exist and therefore not risk obtaining it for their own Mirage program.

58.10.21 AVRO President Fred Smyke in letter to Defence Minister Peaker, offers to deliver 100 operational Arrows under fixed price contract of \$3,750,000 per aircraft. Peaker sent the letter the Chiefs of Staff, the Department of Defense Production the Chief of Air Staff because this pricing made cancellation on the basis of cost very difficult to justify.

58.09.27 Secretary of the USAF, James H. Douglas, reports new long range Soviet bombers and the U.S. was embarking on long-range interceptor development.

58.09.23 RCAF memo to AVRO:
" - the companies are instructed to - Keep
commitments to the minimum necessary
to continue the program as authorized
by Cabinet "

58.12.29 RCAF agrees to accept 21st Arrow as
the production standard.

58.12.30 AVRO's Floyd meets with John Pallet, the
MP for Peel County, who tells him
Degeubaker is only keeping the project
alive to prevent massive layoffs at Malton

59.01.12 An Marshall Hugh Campbell writes lengthy
Summary of Arrow/PROQUOIS programs
for Defense Minister Peakes

59.01.13 In Cabinet, Defense Minister Peakes
reads from memo from Chief of Staff
that the Hughes Falcon systems
were to be installed, the delivery
schedule advanced and testing was
reassuring.

59.01.28 Cabinet meeting. - The Minister of Finance
indicated his budget for 1959-60 would
show no provision for the Arrow
save for cancellation charges

59.02.05 Cabinet Defense Committee (CDC) - General
Foulkes, chairman of Chief of Staff indicated
the Chiefs of Staff had doubts a limited
number of costly Arrows could provide
a proper defense.

✓ Acting Minister of Defense Production, Howard
Green, stated that by cancelling the Arrow
immediately, rather than March 31, would
save £15 million.

✓ The CDC finally agreed to recommend
cancellation of the Arrow despite Chief of
Air Staff, Air Marshall Hugh Campbell when
asked stated 110-115 interceptors would
be necessary, no matter where they came from.

The Arrow termination decision was
tabled to the Feb 10 Cabinet meetings

59.02.14 ✓ Conservative Cabinet agree to decision to
cancel the Arrow.

59.02.17 ✓ PM Deffenbaker tells Cabinet that a draft
statement on cancellation has been prepared
that excluded discussion of defense production
sharing with the U.S., as well as the acquisition
of the Bomarc and nuclear weapons.
It was decided that the most appropriate
time for the announcement would be Friday

59.02.19 PM Diefenbaker tells Cabinet that his cancellation statement be made before a proposed CBC program on the Arrow to air on Sunday or Monday.

59.03.04 RCAF establish a Termination Group under Group Captain A. H. Kreff

59.02.40 The Defense Research Board, asked if it had use for the Arrow, was optimistic and outlined some projects

59.03.11 DRB suggests RCAF have indicated that five Arrow aircraft and fourteen engines could be available for research

59.03.13 Air Marshall Campbell advises Defense Minister Beakes of the DRB reply: "... it can be said that there is no use in the RCAF or NAE for these aircraft -- the RCAF intends with your approval to --- make the necessary arrangements to dispose of the Arrow airframes and 180 QUOIS engines

59.03.19 Defense Minister Beakes concurs with Air Marshall Campbell saying he wished to be informed "of the proposed method of disposal of the airframes and engines" before action is taken.

- 59.03.19 Telegram from J.L. Bush of the Dept of Defense Production in Ottawa to C.A. Hore of the same dep't in Malton. Hore is advised that since the RCAF had no further use for the Arrow wooden mockup, it was to be destroyed and the metal mockup to be sent to Crown Asset Disposal.
- 59.03.26 Memo to Defense Minister Peakes from Air Marshall Campbell recommending that the Arrow and materials be reduced to scrap to avoid possible embarrassment of an airframe and engine could conceivably be placed on public view or even, in fact, used as a roadside street. concluding with "This I am sure, you will agree is most undesirable."
- 59.04/07 Air Marshall Campbell asks for Defense Minister Peakes approval concerning the scrapping.
- 59.04.07 Dept Defense Production Bush advises Malton representative Hore that he expects RCAF to turn over flying Arrows for mutilation but two are to be preserved as they might be required by The Dept of National Defense. all else is to be rendered incapable of being assembled in the form of an aircraft. one set of drawings and reports to be retained

59.04.08 Before Mr. Barker replies to
Gen Marshall Campbell confirming the
approval to scrap the Nixon programs

59.04.03 At a luncheon meeting in Washington
with their American counterparts, before
Mr. Barker and associates argue that
the day of manned interceptors are over -
the Americans saying interceptors
were a requirement. After the disposal, General
Foulke would write memorandum explaining
that interceptors were now a definite
requirement and should be preserved

59.04.14 Group Captain Hoff. head of Nixon Disposal
advises Defense Production Bush that the
RCAR had no requirement for any airplanes
or engines and that all should now be
scrapped. and that the RCAR specified did
not wish to have the aircraft disposed of
in the whole state.

59.04.20 G.W. Hunter, Assistant Deputy Minister advises
Raymond O'Hilly of the Dept of Defense Production,
that disposal action was being taken but that
four aircraft were being retained pending
decisions by foreign government.
Eight Nixon A-25202 was in fact being dismantled

59. 04.22 Assistant Minister of Defense Production Hunter reports all five aircraft being held intact -
✓ "No decision has been made to reduce these aircraft to scrap"
59. 04.27 Frank Miller, Deputy Minister of National Defense in letter to D. A. Golden, Deputy Minister of Defense Production seeking confirmation that:
✓ - "there is no intention of allowing the completed aircraft to be flown, maintained in service, or left in the whole state
- the aircraft, as a whole aircraft, or airframe or engine will not be put up for disposal as such but will be reduced to scrap --"
59. 05.12 Deputy Minister Golden replies to Miller saying he was in agreement although the five MK 1 Arrows were being retained pending news from the United Kingdom.
59. 05.15 Defense Production J. L. Bush in Telegram to Defense Production Hore in Walton:
✓ "It has been confirmed that there is no requirement for any Arrow Aircraft or 100000 engines. It is therefore in order to proceed with reduction of the Mark 1 airframes and 100000 to scrap as previously discussed"

- 59.05.08 Concerned Canadian writes government asking that an airframe be preserved for posterity -
Defense Minister replies that the Arrow could not be preserved for economic reasons and that several hundred thousand dollars could be recouped by sale of the scrap.
- 59.05.13 Concerned Canadian writes government asking that an airframe be preserved - - -
Defense Minister Peckes replies that the Arrow would be inadequate for the defense of Canada by the time it would come into Service.
- 59.07.07 Defense Production reports three of the five aircraft totally dismantled - the fourth and fifth to be finished by July 10 and 17. The remainder of the plant had been taken apart. 100 quois engines were being retained pending possible interest by U.S. General Electric and U.K.'s Bristol-Siddeley
- 60.01.21 Defense Production Core advises Arrow Termination Coordinator in AURD that drawings, records and publications that had been retained could also be destroyed

60.07.15 Cabinet concludes that the CF-100 was incapable of policing Canadian skies against intrusions from aircraft similar to the U-2

59.02.05 In a confidential article attributed to the Under Secretary of State for External Affairs for Canada, Norman Robertson, suggests Canada's new dilemma revolves around how to integrate its defenses with the U.S. while retaining its full national sovereignty

59.03.02 Aviation Week article "Intelligence Schism" educates average Canadian to the fact that the Americans remain concerned with growing Soviet bomber threat

60.02.06 PM Defenbaker told that NORAD wants Canada to replace its CF-100's with American F-101B's. Believing the Canadian public had been convinced of the wisdom of the government's decision to cancel the Arrow he is aware that it prove embarrassing to now buy aircraft.

Defenbaker claims to have been against the cancellation but was persuaded otherwise

59.05.14 ✓ Cabinet ^{meets in attempt to} stall any NORAD decision in attempt to avoid having to go before the public with an about-face. (The aircraft purchase is buried in an exchange of aircraft with US in 1961.)

58.04.00 ✓ Canadian Armament Research and Development Establishment (C.A.R.D.E.) concludes favourable report of the Arrow - it is not released until 1961 two years after cancellation.

59.03.02 ✓ Aviation Week article relates as to how Canadian gov't refuses to release Arrow data for security reasons. Meanwhile a Soviet KGB agent is working in Toronto, spying on the Arrow and stealing plans for the fuselage and engine

60.05.00 ✓ American U-2 pilot Gary Powers is shot down by a surface to air missile. →

59.09.01 ✓ American CIA approve development of the A-12 Blackbird which evolved to the SR-71 ordered by the USAF in 1962

Defense Minister Pearson admits American U-2 flights over Canada but insists they are only weather flights

1926-02-20

TORONTO STAR:

For all its sleek technological excellence, the Arrow was a peace lover's ideal weapon: it would self destruct on use.

1998

1992?

"The Arrow was too good and a disinformation campaign - either deliberately or not - has been in effect since 1959

Raimo Campagna "Storms of Controversy"

58.07.08

Defense Minister Beakes states Arrow cost could be accommodated but not with the cost of Sage ground control and Bomarc missiles. RCAF expenses also included gap-filler radar, coastal marine aircraft, CF-100 updates, the Sparrow missile development, Astra fire control system - -

58.08.21

Top-secret memorandum from Lieutenant-General H.D. Graham to General Foulkes

"-- in fact, any defense of Canadian Territory is but a by-product or extra dividend to the main purpose of SAC bases and Northeastern United States"

1949.05.09 Letter by Jas T Bain, Director of Engineering and Maintenance, Trans Canada Airlines (TCA) to W.F. English, Vice President Operations, TCA Winnipeg:

"-- A physical examination of the aircraft showed a quality of workmanship which I have never seen surpassed on a prototype aircraft nor indeed by many product aircraft. --
The skinning and metal work is beautiful and far surpasses the quality achieved by Canadair in production North Stars. ---
The general equipment installation design shows enough care and foresight to make the C-102 a really modern aircraft incorporating the best of present installation knowledge."

53.12.09 Frank Rackley, President of Tensop Steel Company writes Crawford Gordon, President of AURO:
"-- while every industrial facility has its own assets and liabilities, I think when the score is tallied, A. V. ROF is way out in front. I speak of such things as plant maintenance, production flow lines, general layout, employee morale and quality of workmanship --"

54.08.26 General O.P. Weyland, United States Airforce writes Crawford Gordon, President of AURO:
"-- these facilities are as modern and well organized as any I've seen, --- I am more than happy that your capability is additive to that of the U.S. industry."

57.06.10 AVRO Report "Reconnaissance Arrow Drag and Power Summary": (Ramjet assisted power)
"The indications - - - are that a Mach 2.5, 70,000' altitude Reconnaissance Arrow is feasible within the present state of the art" (American SR-71 design begins seven months later)

52.01.03 Toronto Globe and Mail announces Royal Canadian Air Force Requirement for new, supersonic interceptors.

59.02.00 National Aeronautical Establishment offered an Arrow for research but turned it down

54.00.00 It has been said by those present at the time that the reason the NAE went after AVRO was simply that individuals within the NAE felt industry was no place for the kind of research and development required for the Arrow

60.007.12 Top Secret minutes of the Canada-United States Ministerial Committee on Joint Defence":

Howard C. Green, Canadian Secretary of State for External Affairs stated they were told two years ago that the manned bomber was on its way out and that is why they cancelled the Arrow. Now they have to go back and say that both (manned interceptors and missiles) are still needed

↓
Canadian Defense Minister Peckers said perhaps the expectation of two years ago that the bomber threat was lessening has not been fulfilled

↓
Thomas S. Gates Jr, Secretary of Defence ^{then used US.}
referred to the aircraft deal again, sixty-seventy F-101's
for one hundred and five million versus thirty-five
Canadian transports for one hundred and fifty million

58.08.21 Top secret memo from lieutenant-General H. D. Graham, Chief of General Staff to Charles Foulkes, Chairman Chief of Staff:

" - I think it is wrong to leave the impression with the Minister and the government that our air defense plan is primarily for the defense of Canadian Territory when, in fact any defense of Canadian Territory is but a by-product or extra dividend to the main purpose, which is the defense of US Strategic Air Command and Northeastern United States."

58.12.24 Charles Foulkes, Chairman Chiefs of Staff writes report entitled: "Progress Report on the Implementation of the Decisions in regard to Air Defence Taken by Cabinet on 2 Sept 1958"

" - the Chiefs of Staff - - wish to defer making any recommendations until they have had an opportunity to study the plans of the Commander-in-Chief, North American Air Defence Command."

59.01.13 Defence Minister Parkes advises Cabinet that the U.S. had 800 interceptors in service and enough funds to purchase another 650 - - - he stated that the Bomarc would provide a cheaper means of defence but that Canada could rely on the United States for interceptor defence in required.

59.02.04 Cabinet Meeting - Defense Minister Peakes recommended the development of the Arrow be discontinued. - - -

Terms of NORAD agreement allowed for the temporary stationing of U.S. aircraft squadrons at Canadian airfields, should the need for interceptors arise.

59.02.0 Cabinet Meeting - it was pointed out that if the Arrow were cancelled, the U.S. would be defending Canada.

59.02.23 Cabinet Meeting is discussion of Damage Control or how to counter arguments that they should not have terminated the Arrow program.

60.02.00 (Less than a year after the cancellation, General Laurence Kuter, Commander in Chief of NORAD was telling the RCAF that nine RCAF CF-100 Squadrons should be replaced with six squadrons of U.S. Sub F-101 Voodoos.

Prime Minister Diefenbaker, says he was against cancelling the Arrow but had been persuaded otherwise.

59.06.00 Mr Herb Nott rents plane and flies over NORAD plant photographing the destruction of the MK 1 Arrows on the Yarmac

55.04.19 J.H. Parkin, Director of Defense Research Board. advises Crawford Gordon, President of AVRO "

"I am pleased to learn - - of your complete support of the proposal that a member of the laboratory staff be attached to the project in your plant "

55.10.09 Letter from Donald A. Charles, Dept of the (U.S.) Air Force to Canadian Minister of National Defence, Ralph Campney:

"It is the recommendation of the U.S. Air Force, that development and production of the CF-105 proceed as planned "

55.10.31 Canadian Air Marshall and Dr Solenoff, Chairman, Canadian Defense Research Board, ask representatives of U.S. Airforce:

Should the RCAF proceed with development and production of the CF-105 in the face of firm U.S. interceptor development. ?

58.10.04 General Charles Foulkes, Chairman Chiefs of Staff, acknowledges AVRO letter from Fred T. Syme proposing Arrow fixed price of 3.5 million based on 100 aircraft

59.03.26 Memo from Hugh Caysbell, Air Marshall, Chief of Staff to Defence Minister Peakes: on disposal of Arrow aircraft
" -- selling this material in its original state could lead to subsequent embarrassment, that is, airframe and engine could conceivably be put on public view, in fact, used as a roadside stand. This, I am sure, you will agree is most undesirable.

(recommends the Dept of Defense Production, reduce all to scrap)

59.04.17 Letter from J. L. Bush, Aircraft Branch, Dept of Defense Production to C. A. Hore, representative of Walton:

" -- still remote possibility that one or two aircraft may be required by Dept of National Defence, therefore the two best aircraft should be retained in fact for the present. --

↓
Recognizable components and aircraft are to be mutilated to the extent that they cannot be assembled in the form of an aircraft "

Retain one set of reproducible drawings, process sheets, technical reports, specification test reports --- one complete cockpit to be made available to the Institute of Aviation Medicine.

59.04.08 Defense Minister Peakes ^{MEMO} concurs with recommendation to scrap Arrow Program:

"The aircraft as whole aircraft will not be put up for disposal (sale) but will be reduced to scrap ---"

59.05.12 Deputy Minister, Dept of National Defense DA. Cohen & Mr Miller:

"I am in complete agreement --- and confirm that airframes and engines will not be disposed of in a useable condition. The Five MK 2 aircraft are being retained "AS-IS" pending a decision by The United Kingdom, but all others are being reduced to scrap."

59.07.07 Letter from J. L. Bush, Defense Production to Louis Richard, President and General Manager, Crown Assets Disposal Corporation

"--- confirming all completed aircraft to be disposed of as scrap."

60-01-21

Letter from C.A. Hore, Defense Production at
Malton to Arrow Termination Co-ordinator
J.C. Wilson @ Malton:

"... As the RCAF have now advised that
there appears to be no purpose in retaining
engineering data on the Arrow aircraft, you
are instructed to dispose of it in the same
manner as you have disposed of other records,
drawings, etc."

60-05-27 MEMO for US Deputy Secretary of Defense
from acting Deputy Joseph V. Charyk
on Canada-US. exchange of F-101 / CF-144
aircraft:

"... The production sharing program initiated
18 months ago has not produced the expected
results from the Canadian viewpoint. The
exchange-procurement presents an ideal
opportunity to improve this situation while
simultaneously attaining a significant
benefits to the United States."

58.03.28 Memo by G. G. Truscott A/C, CAF

" -- It may, therefore, be concluded that quantity production of an aircraft as complex as the Arrow can be undertaken in Canada at a cost comparable to that for production of a like aircraft in the U.S.A.

58.09.00 Budget calculations for cancelling Arrow and Sparrow missiles in favour of ^{other options like} F-106 and Bomarc missiles carry notation "Increased cost for Canadian production of the same plane - add 74.3 million" (continuing the Arrow program alone was never considered)

59.05.08 PM Deffenbaker receives letter from concerned Canadian, Robert MacMillan.

" -- Will we treat the Arrow the same way we did the Bluenose and then when the damage is done, wish we had it back. Will the Arrow follow the same path as the Jetliner, the first jet transport in North America and now in a scrap heap. Is not this country proud enough to want to save any of its achievements? -- --

Whatever is done, this aircraft must be saved to show future generations of Canadians what their forefathers did. "

62.04.00 "Canada's Role in Western Defence - Melvin Conant
Foreign Affairs: An American Quarterly Review,

"The assumption in 1958-59 had been that the threat of the manned bomber was changing - - This was one of the reasons which prompted the U.S. Air Force to urge the Canadian government to accept the Bomarc anti-aircraft missile and to consider phasing out its interceptor force."

58.01.23 Canada's Changing Defense Policy 1957-63
by Don B. McIn

Defense Minister Peakes stated that the future of the Arrow depended "entirely on the nature of the threat, not its cost"

58.07.58 Defense Minister Peakes briefing notes explain that the government could make provisions for the Arrow itself, but not for the NORAD requirement for Bomarc missiles and Sage ground control.

59.00.00 Defense Minister Peakes in a ¹⁹⁶⁷ interview with Dr Reginald Roy comments on cancelling the Arrow:

"I took chances - - one thing I had to face was, if you scrap the Arrow you've got nothing - - but putting your pride in your pocket say we will give facilities to American fighter squadrons to come and be stationed in Canada. - - The Americans were not just carrying out exercises but that it was part of the agreement to allow the Americans to defend us. - - it was anything which was advertised but Hugh Campbell,

Chief of Air Staff, knew about it.

- 59.05.00 First flight of Bomarc B missile in the U.S.
- 62.00.00 Canada's Bomarc missile activated.
- 64.00.00 Americans start dismantling their Bomarc stations
- 61.00.00 Canada buys 66 ageing American F-101's
- 57.10.21 Aviation Week magazine:
 "AVRO CF-105 Arrow has given Canada a serious contender for top military aircraft - -"
- 57.10.02 Flight magazine:
 "Arrow a World leading interceptor by Avro Aircraft."
- 78.05.00 American Smithsonian Air & Space magazine acknowledges the advances of the Arrow
- 57.12.02 Air Industries and Transportation Association in report to PM Diefenbaker:
 "Canada is today among the fine leading producers of aircraft in the world. - - - employing over 100,000 Canadians."

Aerospace Heritage Foundation
Sept 2004

2004

"AN Airliner Historian's View of the Jetliner":

William F. Wellberg

-- The Jetliner was a good 10-15 years ahead of its time -- The rest of the world was simply not ready for it -- "

-- The decision to terminate the Jetliner was made - ultimately - by C.D. Howe. And it was - undoubtedly - one of the biggest blunders in aviation history (not to mention Canadian history)

-- five factors that influence airliner sales the most:
(Note - the following has been condensed by Timeline author in the interest of space --)

Timing - had government allowed airlines to buy the Jetliner, the industry would have skipped prop jet aircraft (viscounts) that took its place

It's who you know - airline presidents often favoured those they happened to know in the aircraft industry - rather than the merits of any particular product.

BIAS - TCA President Gordon McGregor preferred British built aircraft

2004 " - five factors that influence airlines sales the most.
TIMING, who you know, Buyer's bias, External
Factors, and Competition - -

(Note - Timeline author has condensed the following
in the interest of space - -)

AURO was attempting a pure jet - years ahead of
its time - most airlines preferred a smaller
step from piston-prop to jet prop. aircraft.

Oncoming TCA President, Gordon McGregor who
had served with the RCAF and had developed a
preference for British Aircraft and
existing relationship with George Edwards
who had become head of Britain's Vickers Aircraft

Vickers was developing a jet prop Viscount
aircraft the size of the Tethers - McGregor
opted for the Viscount. which was 100 mph
slower than the more productive pure-jet Tethers

When McGregor distanced himself from the Tethers
his contacts in Canadian government followed
his lead, using the Korean War to justify his
decision to terminate the Tethers. - - - "

Airpower - Sept 2003

2003.00.00

" - - Auro hoped that TWA might produce the Jetliner under licence in America. If this could be done, the Jetliner would be removed from the unimaginative and suffocating bureaucratic bungling of the Canadian Dept of Transport - - "

AIRFORCE July 1996

"C.D. Howe wrote to AARO Gordon:

"- I have heard the rumours -- that you are planning to use the space in the AARO plant for further work on the C-102 (Setline) --- I have instructed you --- the C-102 is to be moved out of any useful manufacturing space in your plant and put aside --"

2006.00.00
~~49.00.00~~

Aerospace Heritage Foundation

July 2006

EX AURD Flight Engineer Bill Baker:

" - In the months before the first flight a Team Spirit developed - - Normal work hours were forgotten - - sixteen hour days, seven days a week became routine and no overtime was paid by the company. Such dedication and spirit could not be ordered, it had come from the heart, inspired by the leadership of Jim Floyd.

TAM ROLLOUT SPEECH

Jim Floyd - 2006

" - - Some of the self-styled Revisionist Historians argue that since no supersonic bomber ever flew in anger over the Canadian North, the Arrow requirement was overkill and such an advanced aircraft was never necessary. Well, AVRO didn't write the spec. We simply gave the RCAF what they asked for. - - "

James C. Floyd - ex Vice Pres-AVRO Engineering

There Never was an Arrow

KAY SHAW 1981

58.10.25 McLean's Magazine reporting on PM
Diefenbaker's Sept 23 announcement
claimed the Arrow "a very obsolete
fighter aircraft"

58.11.10 US AVIATION WEEK countered with:
"The Arrow is bettering its predictions - - The
price will be 3.5 million per aircraft for
one hundred aircraft. Speculation is that
it will be difficult for foreign governments
as well as that of Canada to turn down
a Mach 3 aircraft that is flying in early
1959." This would be several years before
other Mach 3 aircraft now in development,
and would give Canadian industry an
achievement that could not be ignored."

Seemingly inspired by McLean's negativity
Canadian press followed suit - any
attempt by NRRO to correct errors made
was criticized, and called lobbying by
columnists such as Pierre Burton. - Kay
Shaw

printing errors, distortions and omission of
fact.

in one week
58.12.00 Five Times, Auro officials wanting to consult with government were given written appointments - two were broken by government and three cancelled after Auro personnel waited for hours in Production Minister O'Hurley's office.

Questioned re: The ultimate cancellation of the Arrow, Defence Minister Peaker was "asked whether or not the company had been consulted before Feb 59, responded with: "Members of the company have been in Ottawa on a number of occasions."

59.02.24 Toronto Star Headline: PM Diefenbaker claims "Auro firings needless; the company knew that fifty million dollars was available"
In the House of Commons, Liberal Opposition leader Pearson says a search revealed no record of such an allotment.

59.02.27 TORONTO STAR: "The jobs of 1,000 Auro technicians were pulled out of the fire today by the Diefenbaker government, but another 11,000 received their severance pay."

59.02.27 Toronto Telegram; "Government to Share Brains Pool cost: 3000 Aero Jobs for Six Months: Recall 1000 Engineers"

59.09.14 Weekend Magazine publishes photos of Arrow destruction taken months earlier

59.11.00 Aircraft magazine finally publishes photos of the destruction of the Arrows.

58.00.00 Author Kay Shaw comments on the re-election of PM Diefenbaker:

"Diefenbaker's majority gave him a free hand to prepare public opinion for his attack on A.U. ROE and the ARROW --- Purchase of the Bomarc planted the idea in the public mind that Canada was updating its forces to meet the challenges of the "missile age".

--- The PM used wildly exaggerated figures to arouse the public against further expenditures on the Arrow. In his estimates he included costs of all research, development, Astra-Sparrow development, cost of weapons and armament, and even, in one estimate, the cost of airport improvements. In the case of the Bomarc, he gave the public a cost of only 20 million, although the cost of each base only, without missiles, was 120 million. Similar favourable costs were given for "alternative" American plane purchases"

Diefenbaker went on to attack the company directly, accusing AURO of being a "Lobby" protesting pitiously on television that "no one will ever know the pressure which has been brought to bear on us". He publicly told the armed forces to keep quiet.

Mr Diefenbaker's actions served to divert public attention from the real media lobby launched with the McLeans magazine issue of Oct 25/1958

58.10.00 Fall issue of Financial Post lists 650 major sub contractors with expenditures, in Canada for 1959, of 25 million. The Post suggests the livelihoods of 100,000 Canadians would be affected as well as the fate of dozens of companies

(The Government delayed the settling of termination contracts with any of hundreds of companies involved so that the costs would not appear in the financial records for the current 1959 year)

59.02.20 Cancellation notes: Ex-Auro/Orenda employees were labelled locally as loafers, their work belittled in the press as "wasteful", "useless" and "obsolete" and overpaid. Most, not unable to find work, left the country

- 1960.00.00 Canada contracts with ^{US} Lockheed Aircraft to build ²⁰⁰ CF-104 Starfighters ^{for RCAF} under licence by Canadair in Montreal. (It has a history of having the worst accident rate of US single engine aircraft) Cost 2.0 million each
- 1961.00.00 Canada, in a complicated Political exchange buys 66 Mac Donnell aircraft from storage in Arizona desert. A 1948 design renamed the Voodoo. Cost 1.5 million each but Canada delayed signing the agreement, losing a 400 million freighter contract (It has the worst accident rate of US twin engine aircraft)
- 1966.00.00 Canada contracted with Northrop for 115 Republic F-5 aircraft to be built by Canadair in Montreal. A light fighter for border defense, Canada bought it for air to ground bomb attack. Cost 2 million each - twice the cost of the aircraft in the US. One third went into mothball storage. (The F-5 was a converted US Navy trainer that had failed to go into production but resurrected for sale to third world countries)

58.10.03

~~58.11.00~~

Globe & Mail Editorial:

-- One of the virtues of the Arrow's development has been its contribution to Canada's industrial diversification -- new skills, new techniques, new industrial processes and plants which otherwise would not exist --

59.03.02 AVIATION WEEK "

-- "Political thought in Canada now seems to range from a great fear that Canada will lose its sovereignty if it does not have the technical capabilities to develop advanced weapons and does not pay completely for its own defense to beliefs at the other end of the scale that, if the U.S. will not share equitably in defense production, Canada should withdraw gradually from the North American defense picture and let the U.S. carry the burden alone"

46.00.00 TCA Chief Engineer James Bain consults with NORO on development of commercial jet transport - wanting TCA to be one of the first airlines to use jet transports. TCA placed provisional order for 30 aircraft

55.12.00 Sir Rob Dobson speaking at the 10th Anniversary of AVRO:

-- Whatever the future holds for us, let's just pursue it and stick together and go forward. The future will only belong to Canada if Canada, the people of Canada, have faith in the destiny of Canada and work like blazes to make that destiny come true --

58.09.20 Financial Post: in article on Arrow

-- for every \$100 million spent in Canada on domestic production, \$65 million or more comes back to the government in taxes alone, instead of going out of the country. In addition to employees' wages spent in Canada on homes, furnishing, food and clothes, and the taxes accruing to the government, AVRO also pays taxes on 16 percent of Toronto Township assessment."

58.11.10 AVIATION WEEK: "New Hope for CF-105"

-- Currow is bettering its predictions -- Estimates are that the Orenda-Troquers engine -- will give the Arrow a top speed of better than 2000 mph or Mach 3 at 30,000 ft and above.

- 58.01.16 Globe & Mail "Defence Chiefs Warned by PM on Airing Views" (AIR VICE MARSHAL CURTIS AND AIR MARSHAL SLEMON ALONE HAD EXPRESSED THEIR VIEWS AS TO NEED FOR INTERCEPTORS AND THE NON-EXISTENCE OF ANY PLANE COMPARABLE TO THE ARROW.)
- 59.02.14 The Globe Magazine "What Wings for the RCAF ABROAD": author George Bain quotes Defence Minister Peaker's assertion that the Arrow could not work without SACR ground control: therefore it was unsuitable for use with NATO in Europe. Truth being there was in 1958 only one station set up in the New York area, it was not available in the rest of the US, the far north, let alone Europe. Mr Bain went on to analyze replacements for the RCAF, excluding the Arrow.
- 59.02.10 Toronto Telegram "Rabbits for the Eagle"
 "... American aircraft producers are advertising for (Canadian) engineers and technicians - -
 "... By the time it and a couple more delegations like it have come and gone it may not matter very much what the politicians decide in Ottawa. The team that designed & built the Arrow in Canada for the defence of Canada will be broken up - -"

58. 10.25

Author Kay Shaw commenting on media coverage on the Arrow following the series of McLean's articles

McLeans Magazine: "Never, not even in June 1957 (Conservative election) has PM Diefenbaker met the press with such well-earned glee as when he announced discontinuance of our all-Canadian supersonic fighter aircraft, the Avro Arrow."

"The McLeans articles unleashed a torrent of stories, columns and editorials in the popular press. It is as if the whole Canadian media had been waiting-- for someone to give the signal. --- These repeated and enlarged on the errors, the distortions and omissions of fact. -- as fast as one mis-statement was proven false, they produced new ones equally false. This powerful and vocal lobby also effectively controlled the opportunity for any public reply."

"The Toronto Telegram cancelled the daily column of a long time regular columnist who dared to discuss the Arrow and the national and international consequences of its cancellation"

59.02.24

TORONTO STAR: PM Diefenbake claims "SURO
firings needless; the company knew that fifty
million dollars was available"

1959.00.00

There are already 8,000 us military personnel
in Canada and it's estimated another 4,000 will
be needed if assigned the role of Canada's
arctic

59.03.02

MCLAREN'S MAGAZINE

The Government "it will not release the test
data because, although no Western power is
interested in either the engine or the airframe,
it feels that the information possibly could
aid a potential enemy."

58.11.11

Canadian General Macklin:

"Even now, Canadian armed forces cannot
compliment each other in the simplest operation
of war. Not one of them can carry out a strategic
decision of its own government without help
of another country - - The RCAF is preparing to
give up air warfare and get right down to earth
to fire untested, obsolete US. anti-aircraft missiles.
It will soon wield no more power than a flock
of common barnyard hens"

60.00.00 (7)

"There was a common impression at the time that politicians wanted all tangible evidence rubbed out to prevent it returning to haunt them in later years - - - Canada, by creating its own industry, could have satisfied most defense requirements - but not the American industrialists who wanted the market - - . Diefenbaker and Defense Minister Peckers were blinded by a salesmanship of people whose vested interests lay in seeing Canada's aircraft industry die"

Jan Zurakowski - Arrow Test pilot
EGLAVILLE ONTARIO LEADER

(But the Americans alone could not have done it; it had to be done by Canadians" -

~~E.K. SNOW-AUTHOR~~"

COMMENT BY AUTHOR E.K. SNOW

THE UFO FILES

PALMIRO CAMPABNA - 1997

- 47.00.00 Suspected UFO crash at Roswell, New Mexico
- 47.12.30 USAF established Project Sign to investigate reports of Unidentified Flying Objects later to be known as Project Grudge and Project Saucer.
- 47.09.23 USAF General Twining, in secret memo suggests UFO are real and the possibility could not be ruled out that these objects belonged to a foreign power with advanced propulsion techniques
- 50.11.21 Project Magnet led by Wilbert Brockhouse Smith is authorized by Canadian Dept of Transport to research geomagnetic energy and the effects of magnetic fields on rotating, circular, metallic objects - such as the propulsion systems for flying saucers
- 53.09.10 Dept of Transport, Smith submits final report concludes that UFO's have capability of known earth technology. Neither the Dept of Transport or the Defence Research Board endorsed or rejected the report.
- 50.04.00 Canadian Defense Minister Brooke Claxton requests Defense Research Board organize the army, navy, and airforce in reporting UFO occurrences of flying saucers seen over Canada

50.09.04 Canadian Joint Intelligence Committee reports
The Americans declared there was nothing
to investigate on UFO's

52.00.00 Canadian Dept of National Defense formally
organize Project Second Story to investigate
UFO Sightings.

Chaired by Dr Solandt
of Defense Research Board

He said that aeronautical engineers of A.V. Roe
Canada Ltd, believed the UFO's were of Russian
design based on WWII German technology

54.02.25 Final meeting of Canadian Project Second Story
"UFO sightings ... did not lend themselves
to scientific methods of investigation"

52.04.00 Avro engineer, John C.H. Frost, co-authored a
paper with T.D. EARL entitled "Proposal for a
gas Turbine Powered Aircraft of Circular Plan Form"

52.06.00 FROST authors "Project Y: An All-Wing Super-Sonic Aeroplane."

54.09.00 USAF Commander, General O.P. Weyland visits
Avrocar project and expressed interest in
joining the venture.

USAF AIR RESEARCH & DEVELOPMENT COMMAND

55.00.00 USAF General Pett, in negotiation with Canadian
Defense Research Board awards Avro \$758,000
contract for development of Avro Project Y2
Saucer program

55.00.00 USAF
Lieutenant Colonel George Edwards (retired)
writing in Ideal's UFO magazine in 1978 that
the AVRO Saucer was being developed as a
"Cover" so the Pentagon would have an explanation
whenever people reported seeing a saucer in flight

53.02.11 TORONTO STAR "takes off Straight Up Report 'Malton
' Flying Saucer' to do 1,500 mph" (US. media
kub at the "AVRO Omega")

54.06.00 AVRO release report: "Project Y2: Flat Vertical
Take-Off Supersonic Gyroplane"

55.10.25 U.S. Secretary of the Air Force, Donald Quarles,
in public statement notes US involvement in
circular aircraft design by AVRO Canada,
indicating that such aircraft might "give the
illusion of the so-called flying saucer"

57.10.29 AVRO presents US General Gavin with
report on subsonic ^{ground effect} circular aircraft entitled:
"U.S. Army Requirement for a New Family of Air
Vehicles" dated NOV 27, 57. This concept
led to The AVROCAR and the unrealized
discovery of the principal of ground cushion
effect. Had AVRO put a skirt around the saucer
they would have had a hovercraft years before
anyone else.

- 59.05.00 First AVROCAR designated U.S Army VZ-9 AV rolled out for testing
- 59.09.00 Second AVROCAR for U.S Army rolled out
- 59.09.12 First free flight test of AVROCAR reveal instability
- 61.00.00 Despite AVROCAR Designer John Frost assertions that stability issues had been resolved, funding was terminated and the aircraft prototypes delivered to the U.S. Unknown if the program was continued in the U.S.
- 55.10.05 American officials, Senator Richard Russell, Lieutenant Colonel E. A. Hathaway and U.S. Army Staff Officer Reuben Ebron witness two circular objects take off vertically while travelling in Russia
- 56.12.04 With mounting reports of UFO sightings Canada - US Joint Communications Electronics Committee gave approval for standardized reporting of "Vital Intelligence Sightings" The term "unidentified flying object" simply meant any object puzzling to the observer or witness, but documentation included small drawing of a "flying saucer."

1952

Canadian Project Blue Book with secret
Security Classification reported more than 600
unexplained UFO Sightings

52.04.22 First Meeting of Canada's ^{latest UFO group} Project Second Story,
chaired by Dr. Soltant of the Defence Research
~~Committee~~ ^{BOARD} suggested that aeronautical engineer
John Frost of N.V. Roe Canada Ltd., believed UFOs
were of Russian origin.

1950

Canadian Minister of National Defence orders
Dr. Soltant of Defence Research Board to
analyze UFO reports

The Roswell UFO Crash -

1947

The Ottawa Citizen runs headline in Sept 18/1947
Air Force shoots down UFO Thruws about 1947.
(Roswell) Crash " In a 1994 report the USAF
admitted that the weather balloon story was
disinformation, concocted to effectively kill the
UFO story

CANADIAN AVIATION & THE ARROW
FRED SMYF 1985

- 59.08.00 Government contracted Canadian to build 200 F-104 aircraft for the RCAF - Their primary weapon to be nuclear missiles for strike attack rather than the traditional defensive role.
- 62.10.00 Canada refuses to let American nuclear armed aircraft fly over Canadian territory during the Cuban missile crisis.
- 64.00.00 Liberal government ordered 135 Northrop F-5 light weight fighters from Canadian under licence. As there really was no role for these aircraft, many were put in storage at RCAF hangars in Trenton Ontario.
- 72.00.00 Trudeau's liberal gov't cancels the Bomarc missile program.
- 80.00.00 Douglas Aircraft - Northrop consortium awarded \$3.5 Billion contract for 135 F-18 aircraft valued at \$25 million each.
- 85.03.00 Canada & U.S. sign agreement to install a "North Warning System" of advanced radar systems to defend against cruise missiles and nuclear armed bombers declared obsolete 25 years prior. Cost \$1.2 B.

- 1939.00.00 Canadian aviation industry built a collection of eight small plants of some 0.5 million sq ft employing some 4,000. By 1944, eight prime contractors occupied some 6.5 million sq ft not counting great areas used by sub-contractors. The aviation industry, largest in Canada, employed 100,000 producing 3,600 planes per year.
- 47.11.00 Design begins on AVRO CF-100 Canuck
- 49.05.00 RCAF ordered Ten pre-production MK-2 Canucks
- 51.06.00 RCAF ordered 70 Mark 3 Canucks (\$690,142 ea)
- 52.00.00 New Brenda Engine plant opened with planned production of 100 engines per month.
- 52.00.00 RCAF placed orders for 330 Canucks (\$416,970 ea)
- 52.00.00 AVRO, under government pressure to build CF-100's for the Korean War, is forced to reject an order for 30 Jetliners for TWA by Howard Hughes.
- 53.00.00 First Brenda powered Canuck delivered.
- 54.00.00 Brenda powered Sabres enroute to RCAF-Europe.
- 55.00.00 Canuck MK 5 introduced as 100. Canuck delivered (\$376,590 ea)
- 57.00.00 First of four Canuck Squadrons to RCAF-Europe
- 57.06.00 Order for 53 Canucks by Belgium Air Force.
- 57.00.00 Mark 6 Canuck design nearly complete - it was cancelled by Diefenbaker government

57,000.00

" In terms of cost economics, There can be no doubt of the success of the CF-100/Orenda program. Close to the entire investment remained within the Canadian economy as against total procurement outside the country. Thousands of engineers, skilled and semi-skilled workers were trained and developed, thus strengthening Canada's industrial base. A major step was taken in the advancement of technology. Not the least of the benefits was the value of the export.

53.00.00 . The RCAF had to be persuaded to accept a target price by DUKO for 330 Comets - they thought it unreasonably low. The profit was such on both aircraft and engine contracts that large amounts of undue profit were voluntarily repaid to the Government.

- 54.00.00 A.V. ROE Canada Ltd acquired Canadian Steel Improvement Ltd.
- 55.00.00 A.V. ROE Canada acquired Canadian Car & Foundry, which was producing the T-34 Monitor for the RCAF.
- 56.00.00 Canadian Car becomes Canadian Steel Foundries (1956) Ltd. - a wholly owned subsidiary of A.V. ROE Canada Ltd.
- 57.00.00 Canada Applied Research acquired by A.V. ROE Canada
- 57.00.00 A.V. ROE acquired Dominion Steel & Coal Corp (DISCO), Canadian Steel Castings, Canadian General Transit Ltd., Canadian Steel Wheel Ltd., making A.V. ROE one of largest and most diversified companies in Canada employing some 25,000 from coast to coast.
- 50.12.00 A.V. ROE employed 4,000
- 50.12.00 A.V. ROE employed 15,000 - mostly immigrants that were trained on the job and a company school created and staffed by A.V. ROE. The company ^{operates 24 hours} also providing its own water & sewer services, security force, fire department, hospital with doctor and nurses, and food service for 6,000, photo illustration and paintment departments

- 54.03.00 AIRD received design and development contract which provided for construction of two prototype (Arrows) It was assumed the engine would come from the UK and the weapons from the U.S. In
- 54.05.00 Design of the airplane designated the CF-105 commenced.
- 55.03.00 Canadian Government adopted Cooke-Craigie process of going to production taking from engineering design drawings. This required ^{prior} extensive testing typically done with prototype aircraft.
- 56.07.00 AIRD President, Fred Smye advised RCAF Chief of Staff that awarding RCA a company with no experience in the field, a contract to develop a missile fire control system for the Arrow would threaten the Arrow program.
- 56.00.00 The Government awards Canadian = Canadian Westinghouse contract for further development of the Sparrow 2 missile abandoned by the US Navy.
- 57.06.00 Conservative gov't elected. New Defence Minister is ^{70 yr} retired army Major General. The new Minister of Defense Production, an ex-timber grader and estimator.

- 58.01.23 Defense Minister Peaker advises the House of Commons that the future of the Arrow depended "entirely" on the nature of the threat, not on its cost.
- 57.10.04 Defense Minister Peaker at Arrow rollout
"-- I do not feel that the missile and manned aircraft have, as yet, reached the point where they should be considered as competitive. They will in fact be complementary. --- both will be required in the inventory of any nation seeking to maintain an adequate deterrent to war."
- 57.10.04 Air Marshall Hugh Campbell at Arrow Rollout
"--- The planned performance of this aircraft is such that it can effectively meet and deal with any likely bomber threat to this continent over the next decade..."
- 58.03.31 ^{Defensaker.} Conservative govt returned to government with commanding majority
- 58.00.00 Defense Minister Peaker embarked on a reputed sales trip to U.S. to sell the Arrow. but did not take HRO designer. He was unsuccessful in selling the Arrow but bought into a US plan to build two Bomarc missile bases in Canada along with gap filler radar stations and Sage ground control.

58.09.17 Meeting between Auro's Crawford Gordon and PM Diefenbaker: - the PM's opinion " - The company (Auro) seemed horror-struck at the prospect of having ever to compete in a normal market place situation.

"A.V. Roe, since the end of the Second World War had lived and grown rich on Canadian contracts.

1960.07.00 Despite being ^{privately} advised in writing by Auro President Fred Smye, as to the USN's offer to supply missiles and fire control systems. General Peakes advised the Committee of Defense expenditures: "The United States, at no time, would consider the purchase or make any contribution towards the development of this aircraft (Arrow) - - there was no indication at anytime that they made a financial or other contribution"

58.11.00 Defense Minister Peakes in the House of Commons: " - manned interceptors would continue to be needed in the foreseeable future"

58.11.19 Auro submitted revised performance figures for the ^{Mk 2} Arrow to the RCAF - all well in excess of the original specification which had been previously advised of potential Mark 2A & 3 aircraft to come. Auro pleaded with the Defence Minister to know if the programs were to be cancelled

59.02.09 AVRO President Fred Smye wrote the Minister of Defence Production who refused to meet with him, to outline that the company was owed some \$20 Million and although contracts did not authorize it, the company was carrying on work on the assumption the Government wished it to do so. No reply was received, but the letter was later tabled in Parliament, as a feeble attempt to justify the Government's claim that the company knew the contract was to be cancelled.

59.02.00 AVRO Director ^{MR} ^{, a CONSERVATIVE,} ~~Tory~~ granted a meeting with PM Diefenbaker. ^{first week of FEB} provided he come alone - he reported back that it appeared unlikely that the aircraft would be put into production, nevertheless, he was optimistic that thirty seven aeroplanes and their engines would be completed, in order to afford AVRO & Orenda the opportunity of undertaking alternative projects.

The companies remained confident that the Government would not renege on Canada's responsibility in the joint defence of North America.

59.02.20 PM. Diefenbaker cancelled Arrow & OROQUOIS programs - The promised review never took place

59.02.21 PM Diefenbaker agrees to request by AURO's Gordon and sends Minister of Finance Fleming and Minister of Labour Starr to confer with the companies for the first time since June 57. A television was set up in Mr Tory's office so those in attendance might watch the CBC documentary commemorating the 50th anniversary of the first flight in Canada.

59.02.23 PM Diefenbaker in the House of Commons releases a Verbal against AURO saying: "the company's action 'was cavalier, so unreasonable, that the only conclusion any fair minded person can come to is that it was done for the purpose of embarrassing the Government.'" He went on to say: "We will give consideration to any suggestions that may be made to alleviate the particularly disastrous conditions under which various employees find themselves as a result, not of our action - for that action we gave notice last September - but the participate, unwarranted and unjustifiable action on Friday last of discharging these employees who had been faithful over the years, without regard to any considerations."

59.02.23 Liberal member, George McDraith in response to PM Deffenbaker parliamentary comment

59.02.24 AVRO'S Gordon and Smye are chastised by PM Deffenbaker who in concluding his dissertation, he waved his finger in a menacing manner and declared the company knew the contract was going to be cancelled. Asked who in the company knew it was going to be cancelled, he replied that AVRO Director Mr Tory knew.

59.02.00 Cancellation Notes. PM Deffenbaker said "all the employees will be entitled to approximately three weeks salary or wages." - it was only after a court case that the Government paid the termination allowances recommended by the company for monthly paid staff.

59.02.20 Cancellation notes

" - after some delay The government issued orders to scrap the aircraft. This was refused. I was told if action wasn't taken, The Army would be sent in to act. With that I capitulated. This was a terrible mistake, one which I would regret the rest of my life

FRED Smye - President, AVRO Aircraft

59.02.20 Because Canadian gov't wanted to convert to "strike fighters". The US choice was the Republic F-105 in production by Republic. Auro secured a deal to offer the 100 quors in return for an immediate production sharing that meant immediate work for Auro/Orenda. Republic officials to make the proposal to Government and that was the last we heard of that -
Fred Smye - Auro AIRCRAFT

1960.00.00 In testifying before the Special Committee on Defence Expenditures, Defence Minister Peakes understate the Arrow performance but when asked responded with:

"As long as there is a bomber threat, manned interceptors would be required and a means of defeating the bomber threat"

Asked "Did you at any time between Sept and Feb. tell Auro/Orenda that cancellation would be announced shortly?"

Mr Peakes responded with: "No, because they were not told cancellation would be announced at any particular time."

58.11.24 Article by Robert Crichton in the Toronto Globe & Mail after interviews with NORAD Commander, ^{US} General Partridge and Canadian Deputy Commander, Air Marshall Stemon.
"Auro Arrow next to indispensable to NORAD, AIR MARSHALL INDICATES"

(1960.00.00) Questioned before the Defense Expenditure
Expenditure Committee, Defense Minister
Peakes was asked:

"A number of senior military advisors, General
Partridge, Air Marshall Stemon, General Kutty,
General Thomas White, Commander in Chief USRF,
General Peakes, General Taylor, General Twinnings
and others have made public statements to
the effect that manned interceptors would be
required as far ahead as they could determine.

Can Minister Peakes give the committee any
public statement of any senior military person
during the same period in which the contrary
opinion was expressed?"

Minister Peakes: "No, I do not know of any
serving officer who made a public statement
to contrary effect."

Defense Minister Peakes and Deputy Minister Miller
went on to present costs totalling £7.8 million
per Arrow

(Commenting on the government's cost figures
later Fred Smye challenged their conclusions
but would point out that development of a
plane as complex would never be attempted
for only 100 units - It was government that
reduced the program from 600.)

1960

Chairman of Defense Committee report to the House of Commons:

" - - In the view of the opinion expressed by the Minister (Peakes) that the period of effectiveness of the CF-100 (Canuck) is limited, the Committee hopes that an early decision can be taken as to the advisability of obtaining a replacement for this aircraft."

58.10.00 "In the latter part of 1958 the Chief of Air Staff refused to go along with a Prime Minister request for a submission to cancel the Arrow in favour of a US. replacement. In order to cover up dissension amongst the Chiefs of Staff, Minister Peakes decided to put forth the submission with out any recommendations from the Chiefs of Staff"

General Foulkes

58.09.23 PM Diefenbaker's announcement of the Arrow cancellation provoked heated debate enflamed by the press.

60.03.00 The USAF accelerated its interceptor program putting the Bomarc missile program in jeopardy. - some suggest it would have been cancelled outright if not for the commitment to Canada. In Canada, the liberals voiced their opposition to nuclear warheads required and proposed the use of interceptors, if only for the purposes of identification.

'62.00.00 Two Bomarc bases in Ontario and Quebec could be operational except that the missiles had no warheads and were useless until 1964. The US declared the Bomarc useless in 1963.

PM Diefenbaker in his memoirs would say:

"Had I even a inkling of what was to come, there would have been no announcement on Sept 23, 1958. Of our decision to introduce the Bomarc, because no such decision would have been taken."

To begin with, the Bomarc was very soon proven to be virtually obsolete, even before it was set up - - -

59.08.00 Canada, looking for a cheap strike aircraft, Canadair and Orenda Engines awarded contracts for 200 US. F-104 aircraft with General Electric J-79 engine. The U.S. bought an additional 140 for Nato countries.

Canada's aircraft, to be used as strike aircraft in Europe were, like the Bomarcs useless without nuclear warheads until 1964

During this same period, Canada refused to allow USAF Squadrons at Goose Bay and Newfoundland to use nuclear armament. On the other hand, the US would not permit Canada control of nuclear weapons

61.06.00 Canada announced arrangements to acquire 66 used U.S. F-101B's. in exchange for Canada taking over operation of U.S. radar operations in Canada.

72.12.00 Fortune Magazine article recounts how McDonnell-Douglas had built 4200 F-4 Phantoms in eleven versions - fifteen years after PM Diefenbaker's statement of Sept 23/58

63.01.00 ^{opposition} Liberal Leader Pearson makes announcement in favour of nuclear weapons on the grounds that Canada must fulfill its commitments

63.01.25 PM Diefenbaker tells the House of Commons that discussions will be held with the U.S. so that provisions might be made for the acquisition of nuclear weapons in the case of emergency.

63.01.30 U.S. Government Statement repudiates PM Diefenbaker's remarks:
"The Canadian Gov't has not as yet proposed any arrangement sufficiently practical to contribute effectively to North American Defense -- The Soviet bomber fleet will remain at least throughout this decade a significant element in the Soviet strike force. An effective continental defence against a common threat is necessary"

63.02.04 Minister of Defence resigns in letter to PM Diefenbaker:

"-- It has become quite obvious that your views and mine as to the course we should pursue for the acquisition of nuclear weapons... are not capable of reconciliation"

63.02.05 The Conservative Government was defeated in a vote of non-confidence, resulting in resignations of acting Minister of Defence Pierre Seigny, and Minister of Trade & Commerce George Hees.

60.10.00 Defense Minister Parkes resigned to be replaced by Douglas Harkness.

63.04.18 Pearson liberals for minority gov't

63.09.00 Pearson announced arrangements had been made for nuclear weapons - to be installed in spring of 64.

REQUIEM FOR A GIANT
(A.V. ROE CANADA LTD. THE NUNO ARROW)
by PALMIRO CAMPAGNA 2003

- 1986.00.00 Bombardier acquires a failing Canadair and within a month is awarded a 1.4 billion contract for maintenance of Canada's F-18 fighters
- 42.11.05 Minister of Munitions & Supply, C.D. Howe
Canadian Federal gov't expropriates National Steel Car and renames it Victory Aircraft
- 45.12.01 A.V. ROE CANADA LTD takes over Victory Aircraft as a wholly owned subsidiary of the British based Hawker-Siddeley Group.
- 46.05.04 A.V. ROE takes over Turbo Research LTD, a group involved in jet engine research.
- 48.17.48 first run of Turbo Research's first jet engine called the "Chesock"
- 37.04.10 Canadian federal gov't. passed Trans-Canada Airlines Act to creating a Crown Corporation to coordinate air travel in Canada.
- 44.00.00 Canadair takes over former aircraft division of Canadian Vickers. C.D. Howe arranges contract for Canadair to build four engine North Star transports
- 47.00.00 Canadair is sold to the American Electric Boat Company, forerunner of General Dynamics who sell it back to the Canadian gov't in 1976
- 76.00.00 General Dynamics sells Canadair back to Canadian gov't

46.04.09 Trans Canada Airlines issues letter of intent for what would become NORO's Jetliner - with a delivery in 1948. Neither A.V. Roe or its parent Hawker-Siddeley could sell the Jetliner or a modification of it to anyone else for a period of three years. This agreement later falls apart.

46.07.20 Mrs C. D. Howe christened Canada's first North Star.

This, and other burdensome conditions were apparently an attempt to prevent the Jetliner from being produced in time to compete with C. D. Howe's North Star.

47.10.00 A.V. Roe submits revised design to TCA - in their response of Feb 1948, TCA changes its requirements

48.04.19 TCA President Gordon McGregor tells A.V. Roe representatives that he did not want TCA to be the first airline in North America to fly a jet transport.

48.10.01 Aviation Week article quoting a noted American transport technician states that everything an airline would want for maximum efficiency, safety, and ease of maintenance was incorporated into the Jetliner design

49.12.17 DOT Chief Aeronautical Engineer, H.S. Rees releases and permits ANROE to conduct demonstration flights with Jetliner which was yet to be certified.

- 50.04.24 DOT, Rees writes A.V. Roe giving permission to fly bona fide potential customers within Walton area.
- 50.06.01 Canadian Dep't of External Affairs receives letter to the effect the U.S. would certify the Telliner but not the British Comet. A.V. Roe was apparently not told.
- 50.09.05 At C.D. Howe's request for route assessments TCA requests modifications before undertaking flight trials
- 50.10.01 Fred Smye of A.V. Roe advises TCA that they will not turn the aircraft over to TCA, but will continue their own testing - an act that seemed to set TCA on a course of negative comments about A.V. Roe and the Telliner
- 51.07.31 Air Vice Marshall D.M. Smith:
 "It never was our intention that if this aircraft (Telliner) was required that it would be built by A.V. Roe"
- 51.02.05 At request of C.D. Howe, A.V. Roe's Fred Smye issues a stop work order on the Telliner
- 51.02.26 National Airlines President, James T Baker:
 "I think you (A.V. Roe) have a grand airplane and it can do a fine job on airlines if your company can build and sell them -"

51.03.06 U.S. Wright Air Development Center and Training Command, upon completion of testing, suggests Teller, with a few modifications, could be transformed into a pilot trainer, bombardier trainer or tanker aircraft. Word spread that the U.S.A.F. was ready to purchase twenty Tellers.

51.07.03 Air Vice Marshall D.M. Smith:
"- During the last few days there have been an examination of the C-102 (Teller) by the National Research Council, Dept of Transport, and ourselves (Dept of National Defense), and it is the feeling of this Board that the present state of the C-102 is nothing like as far advanced as is advertised by the company -- Perhaps we would be unwise at this time to try to sell it at all -- "

51.06.28 J.N. Arkin, Chairman of National Aeronautical Establishment Working Committee on Jet Transports
"- cost comparison between the Teller and the best aircraft of the day was difficult at the moment due to the lack of existing competitive jet aircraft "

50.05.29 In a report specifically requested by C.D. Howe,
entitled

"Comparative Cost Analysis of the Triangular
Route Toronto - New York - Montreal - Toronto
when using either the Aero Teller, or the
Canadair North Star"

-- It is shown that within the range of
conditions chosen for the study the operation
can be conducted at a lower total cost
with the Aero Teller aircraft than with
Canadair North Star equipment -- "

(Aero Teller Designer, Jim Floyd was
never made aware of these findings)

51.07.25 TCA pilot, Captain R. J. Baker after in-depth
technical discussion with AURO personnel
"stated, that in his view there was no
defect serious enough to prevent operation
of the aircraft by TCA for experimental
purposes"

51.12.00 TCA asks AURO to turn over the Teller
to National Aeronautical Establishment
as part of deal to have an independent
party assess the aircraft with AURO covering
all costs - AURO did not accept

51.08.14 Letter from Group Captain H. G. Richards
at the Canadian Joint Staff in Washington,
to Chief of Air Staff at Dept of National
Defense. %

"--- The USAF and USN are both interested
in this aircraft (Teller) --- the U.S.
Weapons Board approved purchase of
12 aircraft ---"

AURO apparently was not told of the offer
presumably refused by C. D. Howe.

51.10.15 Crawford Gordon takes over as president
of A. U. ROX

52.01.08 AURO's Fred Smye writes Dept of Transport
REEB to advise that all work on the Teller
had stopped other than maintenance.

52.03.29 AURO's Jim Floyd receives permission from
Director of Air Services Cowley, to
take Teller to Howard Hughes in
Culver City in California.

"This particular aircraft is not airworthy
and will not be modified to make it
airworthy, there is no point in proceeding
any further with demonstrations--"

52.11.14 C.D. Howe, upon hearing that Hughes wanted AUKO to build 30 Telleries for his Trans-World Airlines, ordered to stop all work on the Telleries - - -

56.12.10 AUKO's Telleries designer, Jim Floyd receives memo from AUKO Vice President Fred Smye, asking that the Telleries be dismantled, never to fly again.

with order for two prototypes

- 46.00.00 AVRO CF-100 Canuck project started under Chief Engineer Edgar ATKIN
- 47.06.00 John Frost added to AVRO Canuck design team.
- 49.05.00 AVRO awarded contract for 10 Mark II Canuck aircraft with Orenda engines
- 50.01.17 Canuck prototype aircraft with AVON engines begin taxi trials
- 50.01.19 First flight of an AVRO Canuck with pilot Bill Webster
- 50.07.10 First flight of second Canuck prototype.
- 51.06.00 AVRO receives order for seventy Mark III Canucks with Orenda II engines
- 51.07.00 First flight of Canuck Mark II
- 51.04.05 Second Canuck Mark II prototype crashes killing pilot Bruce Warren and observer Bob Ostrander.
- 52.00.00 First Canuck Mark III delivered in spring
- 52.10.17 First pre-production Canuck with Orenda engines turned over to RCAF. It and other pre production aircraft had problems with spars cracking. The fix required considerable rework and delay

- 51.00.00 Ray Footitt, RCAF Officer on the ^{Canuck} project recalls accusations that AURD was not being truthful about the CF-100 program - a situation that would carry over into the development of the Arrow.
- ~~52.01.00 AURD's Jim Floyd made head of AURD engineering~~
- 53.09.30 First Canuck Mark IV with Orenda engines comes off the production line
- 52.01.00 AURD Jetliner Designer, Jim Floyd, made head of AURD Engineering following
- 52.05.30 MP Rodney Adamson, speaking in the House of Commons:
- " - - I think this company (AURD) has been subjected to a great deal of criticism. A.V. Roe Company started virtually from scratch. - - for a formative company which has in its formative stage to attempt these three things (Orenda engine, Canuck & Jetliner) was almost a heroic venture
- 54.12.02 A.V. Roe gives crown corporation, Canadian Steel Improvements
- 55.09.00 A.V. Roe gives Canadian Car & Foundry

56.00.00 Canadair Car : Forestry becomes a separate company but remains a wholly owned subsidiary of A.V. Roe

57.00.00 A.V. Roe gives PSC Applied Research, renaming it Canadian Applied Research and goes on to purchase interest in Algoma Steel and makes a successful bid for Dominion Steel & Coal Corporation

58.00.00 A.V. Roe ranked amongst top 80 companies in North America and paid out 183 million in wages.

52.00.00 Future Arrow test pilot James Zurakowski joins AVRO saying:

"There is obviously a great future ahead for Canadian aviation and this country is now at the beginning of great developments in the field"

52.12.18 AVRO test pilot, James Zurakowski (nicknamed "Zura") breaks sound barrier with Canuck in eight mile dive.

46.05.00 Canada and U.S. sign Military Cooperative Committee (MCC) to provide recommendations concerning mutual defense and policy planning, recognizing that future threats would come from supersonic aircraft, atomic bombs, and long range rockets and guided missiles

49.09.00 Russia Tests first Atomic bomb and
Blockades Berlin

50.06.25 Korean War breaks out

51.09.00 Canada & U.S. agree to establish the
Pinetree line of thirty radar stations
across southern Canada but it left the
far North vulnerable

55.00.00 Pinetree radar line operational

54.00.00 Canada & U.S. concerned about far north
agree to build two more radar nets:

Canada - The M.I. Canada line

U.S. - Distant Early Warning (DEW) line

56.12.00 Canada-U.S. Military Cooperation Committee
sub committee MSG
produces report designed to make joint
defense of North America more politically
acceptable to Canada. Canadian Chief of
of Staff General Foulkes asked that it
be kept secret.

57.02.00 Canada-US militaries approve ^{MSG} joint defense
study.

57.06.10 Canada elects new Conservative minority gov't
and General Foulkes approaches new Minister
of Defense, George Peakes in hopes of
getting early approval of MSG joint defense
proposal.

57.07.24 PM. Diefenbaker, presented with the MSC joint defense proposal by George Pearkes, approves it without consulting the Canadian Cabinet or External Affairs

57.07.31 Canadian Cabinet approves MSC report brought forward by PM Diefenbaker

57.09.12 Canada-US joint defense agreement. results in North American Air Defense Command (NORAD). Canadians voiced concern over lack of parliamentary debate and issues of Canadian sovereignty and nuclear weapons being forced on Canada.

58.05.12 NORAD agreement officially recognized by Canada & US.

58.07.00 Automatic system of coordinating defense operations devised by Air Force called SAGE (Semi Automatic Ground Environment) (Arrow did not require ground control)

57.05.16 USAF orders 1M-99A Bomarc missiles to used with SAGE - They carry only nuclear warheads and are deemed only effective against the threat of bombers, not inter-continental missiles. Range 200-250 miles, the later Bomarc B to have a range of 400 miles.

- 59.05.27 First launch of a Bomarc B missile
- 60.07.08 First successful intercept of a drone by a Bomarc missile
- 63.11.00 Canadian Bomarc sites become operational
- 64.00.00 USAF start shutting down its Bomarc bases
- 59.01.19 AVRO release report on Bomarc

"The present version of BOMARC has no provision for counter-counter-measures and therefore is vulnerable ---"

58.00.00

Canadian General Foulkes writes in a document entitled: "Report on the Development of the CF-105 and Associated Weapon System 1952-1958"

"Canada was primarily responsible for the air defence of Canada, and while the United States co-operated with Canada, the only arrangement for U.S. support at this time dealt with reinforcing after the battle had begun"

- 58.07.00 Defense Minister Bonkes secret brief concedes that Canada could bear the cost of the Arrow but not the cost of U.S. systems arising from the NORAD agreement (SAGE ground control that the BOMARC required but not the ARROW)

58.01.29 General Pitt of U.S. Air Force Research argues in favour of purchasing Canadian Arrows for NORAD in Canada-US meeting

56.09.01 RCAF draft missile requirements report:
"Operational Characteristics for an Interceptor Missile Weapon System" suggests missiles as primary defence "augmented by supersonic interceptors."

56.06.11 Top Secret memo from RCAF to Canadian Cabinet Defence Committee:

"A factor of prime importance to the security and lasting peace of the Western World is the deterrent power of the United States Strategic Air Force. This means that the defenses of this Continent must be such that this retaliatory force cannot be destroyed or severely reduced by surprise attack. -- As part of these defenses it is proposed to introduce a line of Bomarc guided missile bases from coast to coast. --"

58.07.00 U.S. Secretary of State John Foster Dulles responds to Defense Minister Pearson by pointing out that missiles which were now becoming available would be obsolete in a few years and that they were merely a stop-gap until much improved missiles were available. --

55.09.00 Canadian govt establishes interdepartmental Committee to re-appraise Arrow program with Chief of Air Staff as chair. Members include Deputy Minister of Defence, Chairman of the Defence Research Board, Deputy Minister of Defence Production, representatives of the Cabinet Secretariat, The Dept of Finance, The Dept of External Affairs and a representative for the National Research Council.

Their recommendations promoted continuation of the Arrow, improvements to the Canuck and installation of Bomarc missiles. The group also submitted cost estimates for 26 heavy radar, 123 gap filler radar and processing equipment totalling \$867 million. plus \$210 million for Bomarc bases.

56.06.13 On the basis of a draft document. Cabinet Defence Committee authorizes half million dollars for radar site surveys - as the Sage/Bomarc systems was seen as essential American requirement, it became a matter of higher priority than the Arrow. ---

The Sage/Bomarc systems had been approved without parliamentary debate

57.04.05 RCAR meeting to discuss introduction of SAGE/BOMARC, the attendees seemingly excited about obtaining nuclear-tipped weapons

- 53.05.03 RCAF memo states that the Chief of Air Staff (CAS) had obtained the approval of the Cabinet Defence Committee for negotiation and introduction of Bomarc into the RCAF
- 58.01.08 Chief of Air Staff, Air Marshall Hugh Campbell in report to Chairman Chief of Staff that the SAGE/Bomarc system was designed to intercept non-evasive targets - if the enemy simply changed course, the Bomarc would miss its target - the American designers were addressing the problem and indications were the new program would be 80% effective.
- 58.07.09 Dept of Defence Production commenting on Canada accepting the Bomarc said it that the issue came down to one of defence sharing
- 58.08.08 In a ^{draft(?)} memo to Cabinet Defence Committee Defence Minister Peckes requests termination of the Arrow
- 58.08.28 Defence Minister Peckes formal request to Cabinet Defence Committee to cancel Arrow program.
- 58.07.03 US General Partridge in letter to Canadian General Foulkes, he has been asked to study feasibility of setting US Nike Zeus ^{anti-ballistic} missile batteries in the U.S. and Canada. He stressed that the information was not for the general Canadian government

- 59.01.00 Canadian Chiefs of Staff being briefed on North American Defense Objectives are told Russia will have 2000 subcontinental ballistic missiles by 1966.
- 58.08.25 Memoir for the Minister of National Defense:
"It is not possible to put a nuclear warhead on a Sparrow missile, and therefore the CF-105 with Sparrow was not the most modern air defence weapon available."
- 59.01.00 Canadian Chiefs of Staffs briefed on NORAD plans, calling for Americans to spend 5.5 billion and Canada 300 million.
Plan included nine squadrons of 12 Arrows across Canada. The RCAF VIEW was for six squadrons, and the expectation that American interceptors would be stationed at Saskatoon, Gimli, and Naino.
- 59.02.09 Canadian Chief of the Air Staff, commenting on the NORAD Plan states that the Arrow is the best weapon for satisfying Canada's interceptor requirement.
- 59.05.26 first Bomarc Test fired un-successfully and while in jeopardy in US Congress, the USAF was able to demonstrate that Canada was a buyer and the Bomarc program survived.

60.03.24 American House Appropriations Committee:

"... There is no proof before this committee that Bomarc has ever proved that it will work to any great degree -- so you scale back but keep enough on order to maintain appearance of defence and bail out Boeing --"

61.03.21 U.S. Dept of Defence issues statement that it will put increased emphasis on 19314 defenses and development of its own 19314's. Also listed as high priority is improvement of American aircraft.

72.04.01 Bomarc's ceased being operational in Canada.

61.04.29 U.S. House Appropriations Committee terminates funding for further Bomarc production - At Canada's request, a modest program is allowed to continue to fill Canadian orders.

58.07.08 Canadian Defence Minister asks Americans to buy Arrow but instead make agreement for introduction of the Bomarc into Canada. and a "Memorandum on Production Sharing Program - United States and Canada" which stated that Canada decided its defence industry needed business from the U.S. to sustain itself.

61.12.19 Letter from Minister of National Defence
Doug Harkness to the Secretary of State
for External Affairs

"... Agreement has been reached with the
United States whereby Canada acquire
66, F-101 aircraft equipped to carry
bomber-destroying missiles using atomic
warheads. - - "

55.02.11 Chief of Staff Committee recommend
acceleration of the Arrow program to
meet rising threat of Russian T37 Bison
and supersonic aircraft.

58.09.19 General Foulkes in a report on Arrow
development commented that the Russian
Sputnik had a profound effect on the whole
concept of air defense.

57.00.00 U.S. Central Intelligence Agency declares the
Russian bomber threat to be exaggerated -
that ^{MOSCOW} fly parts of Russian bombers were in
fact the same group of aircraft circling the
parade route. The Russian bomber force
is said to consist of between 90-150 planes

59.02.21 London Times ^{quotes} British Secretary of State
for Air saying the need for fighters
would continue

61.04.01 In a secret Cabinet paper for US President Eisenhower:

"-- On April 11⁽¹⁹⁶⁰⁾ his (Deffenbaker's) Defense Minister indicated privately to (U.S.) Defense Secretary Gates that Canada would probably abandon interceptors unless the United States regards their retention as really important--"

58.11.19 General Foulkes, ^{rather than try to sell the Arrow,} tries to cash in on the Defense Production Sharing ^{by} telling the Americans: "Canada must, therefore, get into the production of components for joint defence weapons

59.02.18 RCAF GROUP Captain Ray Frost in a letter ^{and Arrow project manager} marked secret to Air Member in Washington "although there has been no decision, as yet, on the Arrow program continuation the RCAF is proceeding with all necessary planning as though the project is continuing"

59.02.20 PM Deffenbaker seemed to indicate that the Sept 23/58 announcement to cancel the Astra/Sparrow missile system and introduce SAGE/BOMARC in fact was a cancellation of entire Arrow program. although the Sept announcement specifically said the Arrow and PROQUOIS would continue and be renewed March 31/59.

59.00.00 Lester Pearson, opposition leader:
"Canada will now move very rapidly
to a position of complete dependence on
the United States."

55.00.00 Findings of a special government committee
on the Arrow:

"-- Aircraft for aircraft the (U.S.) F-102B is less
costly but, dollar for dollar, the CF-105 provides
significantly more defence -- The burden of
cost involved in this course of action, while
high, is inherent in air defence system which
is kept abreast of the developing threat."

55.00.00 RCAF decide the best missile for the Arrow
would be the Sparrow 2 being developed by
the U.S. Navy. Auro had been developing the
Arrow to use the proven Hughes Falcon
with Hughes fire control system. The change
required major structural airframe changes.
Shortly thereafter the US Navy abandons the
Sparrow forcing the RCAF to continue its
development in Canada.

56.00.00 RCAF select ~~the~~ Astra fire control
system, a new development undertaken
by RCA in Montreal. It is estimated this
decision causes some 50 structural
changes to the Arrow.

- 55.11.17 Cabinet Defence Committee briefed on defense budget - it was decided to seek American assistance with development of the Arrow - no commitment was forthcoming
- 55.12.07 Cabinet Defence Committee approached by RCAF wanting to limit Arrow order to eleven aircraft - with order for remainder to be made in March 58 if flight test successful, the order would total 40 aircraft.
The net effect gives the illusion of much higher cost per aircraft.
- 57.02.06 Cabinet Defence Committee agree to a reduction of eleven to eight Arrows and a total of 37 aircraft. -
- 57.09.00 Chiefs of Staff recommend cancellation of the Canuck Mark IV and related work on the Sparrow missile.
- 57.10.24 The Defence Research Board is asked to examine alternate proposals for air defense.
- 57.10.29 PM. Diefenbaker's new Cabinet Defence Committee briefed - decision made to continue Arrow program for another twelve months - This included the order for the additional 29 aircraft, for a total of 37.
- 58.09.00 Astra costs estimated in 1957 @ \$72 million now estimated at \$208 million - partly because of RCAF to carry nuclear Genie missile rather than Sparrow

58.06.00 Chief of Air Staff prepare to submit recommendation to purchase the 37 Arrows as well as an additional order for 46

58.07.00 Army requests Defense Research Board examine the full air defence requirement with various alternatives to be provided to the Minister.

58.03.00 Chief of Staff submission to Cabinet - costs would not exceed £216.7 million previously authorized and total costs for the program were estimated at £446 million.

58.09.00 Better definition of RCAF requirement raises estimated cost of 37 aircraft to £789 million.

58.09.21 Chief of Air Staff wrote the Minister, explaining to him the Arrow was required and he could not go along with any recommendation to cancel it. Minister Flanker apparently ignored his air requirement specialist.

58.09.28 After a trip to Washington, Defence Minister officially asks Conservative Cabinet to approve cancellation of the Arrow as well as approval of two Bomarc bases.

59.01.00 Air Marshall Hugh Campbell summarized Arrow program, explaining costs could decrease further - projected cost for 100 Arrows was projected at £702 million - by
FEB 5, 1959 IT WAS \$1.781 MILLION

60.05.03 House of Commons Special Committee on
Defense Expenditures reviewing expenditure
for 1958-59.

The Dept of National Defense underspent
its budget and returned \$262 million
to gov't coffers. AVRO was asking
for \$257.8 million to complete the 37
aircraft in its entirety, within parliamentary
approved expenditures for the program

58.07.29 Air Vice Marshall Hendricks writes Chief of Air Staff
"We are now being stampeded into
considering (~~nuclear~~) Genie as the weapon
merely because it makes a atomic bang. I
suggest that it still has the same endowments
as it did when we considered it for the CF-100"

58.07.29 Canadian Chief of Air Staff sends memo
requesting that AVRO be instructed to begin
the Genie development program. AVRO replied
that it would take four years. --
Air Commander G Truscott that there would
be increased costs

58.09.08 Chief of the Air Staff, Wing Commander G.B. Waterman
advised that although AVRO could develop
Genie systems in the aircraft but Astra fire
control was not ready. Waterman believes
the Astra/Genie system will -- "require
astronomical amount of money"

- 58.09.21 Canadian gov't cancels Sparrow/Astra programs.
- 58.11.05 Minister of National Defence gives approval to obtain and install Hughes MA-1 electronic fire control system with Falcon and Genie missiles. Acquiring the U.S. system had the effect of substantially reducing the cost of the Arrow.
- 57.11.13 First flight test of 1ROQUOIS engine on American B-47
- 64.06.05 RCNCF instructs Brenda to dispose of tooling and drawings for the 1ROQUOIS
- 59.02.20 At the time of cancellation A.V. ROE had acquired DOSEO and its complex of thirty three companies and was third largest Canadian employer behind Canadian Pacific Railway & the Aluminum Company of Canada.
- 60.12.00 There are five ^{complete} 1ROQUOIS engines in storage, four more partially complete and enough parts for perhaps another twenty
- 59.06.17 Sir Roy Dobson writes PM Diefenbaker to advise that he had requested and received Crawford Gordon's resignation

58.00.00 William L Turner, Arrow Weapons Systems Coordinator is to reveal in 2000 that he believes the Arrow was ultimately cancelled because while Auro had recommended the Hughes missile fire control system, the United States initially denied the request, as the Hughes system was classified technology. Hughes also did not want to modify the systems to fire other missiles such as the Canadian Sparrow

This resulted in the decision to have RCA in Montreal, a company with little expertise in missile control, build the Canadian Astra system.

There was also concern on the part of the Americans about ^{national} Canadian security - that technology given to Canada was soon in Russia.

51.08.14 Chief of Air Staff receives letter from Group Captain H. G. Richards of Dept of National Defence in Washington "It is now confirmed that the USAF wish to purchase 12 Jethlers"

58.07.00 Defense Minister Bourke in a secret brief

"It is expected that the Total United States content in CF-105 will be approximately 20% in ^{the} development and pre-production aircraft and 10-15% if this aircraft goes into production. --"

59.02.19 A.V. ROE calls executive meeting to secretly discuss plans should the government terminate the Arrow program on or before March 31ST.

"While the chairman recognized that the formulation of such plans (quite apart from their execution) was part of the costs of carrying out the government's termination instructions, and that the proper task of the company at this time was to get on with the important job of developing the Arrow with the highest priority in the best interests of Canada and its people, nevertheless certain preliminary thinking was needed to be done by Management in the unfortunate event that the Canadian government, in its wisdom, resolved to cancel the Arrow program."