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Prologue

Tom Dugelby

Productions

Proposal

CF-105 PROGRAM 4

BROCHURE AD-44

DECEMBER 1956

AVRO AIRCRAFT LIMITED

MALTON — ONTARIO

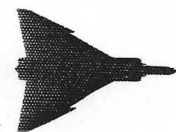
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PROPOSAL CF-105 - PROGRAM 4

BROCHURE AD-44

INTRODUCTION

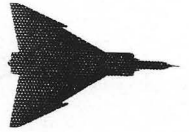
During the past few months it has become apparent that Program 3 is no longer the best overall development program and as a result the Company has now completed a reassessment of the Design, Development, Tooling, and Manufacturing Programs. This analysis has resulted in a revision to Program 3, which the Company proposes as Program 4.

This brochure presents Program 4.

The principal reasons for this new proposal are to present a more realistic schedule and revised forecast of costs, and at the same time to provide for the change in concept between the Mk 1 and Mk 2 aircraft.

In the revised program the number of aircraft fitted with P. & W. J-75 engines is reduced to 5. The total number of aircraft in the Development Program has been reduced to 8, of which the last 3 are Iroquois powered.

For planning purposes a preproduction quantity of 29 aircraft has been shown, together with a forecast of costs. These aircraft are all powered with Orenda Iroquois engines.



SECTION 1

TECHNICAL CONSIDERATIONS

Initially, Program 3 considered that the early CF-105 aircraft would only differ significantly from the combat aircraft in respect to the engine installation. Aircraft sub-systems such as air conditioning, electrics, etc., were to remain essentially the same in the combat aircraft as in the first aircraft. Since the date of submission of Program 3 the implications of the installation for Astra 1 have become apparent and it is no longer possible to utilize the aircraft systems already frozen for the J-75 powered version of the aircraft.

Consequently, it is now apparent that we have two distinct versions of the aircraft. The major difference between these two versions as they are now known is shown in Figure 1. The

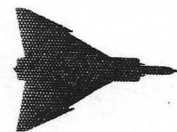
MAJOR DIFFERENCES		
ITEM	MARK 1	MARK 2
ENGINE INSTALLATION	2 J-75 WITH APPROPRIATE INTAKES, NOZZLES, MOUNTS ETC.	2 IROQUOIS WITH APPROPRIATE INTAKES, NOZZLES, MOUNTS ETC.
ELECTRONIC SYSTEM	MINIMUM NAVIGATION AND FLIGHT AIDS FOR FLIGHT TEST OPERATIONS	ASTRA 1
AIR CONDITIONING SYSTEM	DESIGNED FOR J-75 ENGINE AND MX 1179 (113 LBS. AIR/MIN.)	DESIGNED FOR IROQUOIS ENGINE AND ASTRA 1 (150 LBS. AIR/MIN.)
ELECTRICAL SYSTEM	2 X 30 KVA FOR USE IN CONJUNCTION WITH SEPARATE HUGHES MX1179 POWER SUPPLY	2 X 60 KVA (PREDICTED ON ASTRA 1 AND SINGLE ALTERNATOR REQUIREMENT)
FUEL SYSTEM	DESIGNED FOR CONSTANT AIRPLANE C.G.	DESIGNED FOR C.G. CONTROL
HYDRAULIC SYSTEM	NO PROVISION FOR RADAR DISH DRIVE	WITH PROVISION FOR RADAR DISH DRIVE
ARMAMENT	NIL (REPLACED BY INSTRUMENT PACK)	4 SPARROW 2D MISSILES
CREW COMPARTMENTS	MINIMUM NAVIGATION PRESENTATION FOR FLIGHT TEST OPERATIONS PLUS BASIC AIRPLANE CONTROLS	ASTRA 1 PRESENTATIONS PLUS BASIC AIRPLANE CONTROLS
EXTERNAL STORES	NIL	JETTISONABLE FERRY TANK

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● CF-105 MK. 1 FLIGHT TEST VEHICLE LEADING TO THE PRODUCTION OF CF-105 MK. 2

● CF-105 MK. 2 HIGH ALTITUDE ALL WEATHER, NIGHT AND DAY SUPERSONIC INTERCEPTOR AS DESIGNATED IN AIR 7-4

FIG. 1 MAJOR DIFFERENCES BETWEEN MK. 1 AND MK. 2 AIRCRAFT



J-75 powered Mk 1 has aircraft systems already committed which are not compatible with the requirements of Astra 1. The Iroquois powered Mk 2 will have new or revised air conditioning, electrics, hydraulics and fuel system. The plan outlined in Program 3 to undertake intensive development of the combat airplane upon the J-75 variant is no longer feasible and emphasis must now be given to getting Mk 2 flight test hours as soon as possible. The Company, therefore, offers Program 4 as the best that can be achieved in attaining this objective.

It should also be noted that a reduction in the technical risks has been achieved by extensive free flight model and wind tunnel testing. These tests have resulted in considerable refinement of the weight and drag estimates and the aircraft performance is now more accurately defined in Avro Periodic Reports Nos. 9 and 10.

Subsonic, transonic and supersonic 3-axis stability and control have been checked at low and high Reynolds numbers in the Cornell and N. A. E. tunnels using the configuration of the Mk 1 aircraft.

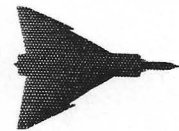
A study of directional stability at high angles of attack has been completed in the Unitary tunnel at supersonic speeds. The results of these stability tests have been made available to the designers of the stability augmentation system.

Additional checks of directional stability and drag of the Mk 1 aircraft have been obtained through the firing of several 1/8 scale rocket models on the C. A. R. D. E. and Langley Field Ranges. A longitudinal stability model is ready for firing.

A supersonic study of airflow conditions in the engine intakes has been completed in the Lewis Laboratory tunnel at N. A. C. A. The results of this testing have been incorporated in the aircraft design.

An extensive antennae model program has been undertaken by Sinclair Radio Laboratories to determine antenna design and location. Research continues to improve U. H. F. Antenna design.

Extensive test rig programs are continuing to develop the fuel system, flying control and hydraulic systems to the highest standard of performance possible before the initial flight date. The flying control system rig will be used in conjunction with an aircraft simulator to check control performance before flight. Simulation testing will also be carried out on the stability augmentation system prior to flight.

SECTION 2STATEMENT OF WORK

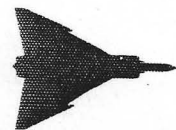
The Contractor shall design, develop and manufacture five CF-105 Mk 1 aircraft, and three CF-105 Mk 2 aircraft, as defined in the Mk 1 and Mk 2 model specification, together with related spares and ground handling equipment and shall accept responsibility for the integration of Government Supplied Equipment into the aircraft not to include responsibility for performance of the aircraft and/or equipment where such performance depends on the performance of the Government Supplied Equipment.

The aircraft shall be designed to meet the requirements of RCAF Specification AIR 7-4, Issue 3, as agreed between the RCAF and Avro Aircraft Limited. Upon agreement between the RCAF and the Contractor as to the provisions of the Mk 1 Model Specification, the Contractor shall thereafter design the first five aircraft to its requirements. Upon agreement between the RCAF and Contractor as to the provisions of the Mk 2 Model Specification, the Contractor shall thereafter design the sixth, seventh, and eighth aircraft to the Mk 2 Model Specification. Modifications to the specifications shall be agreed upon by the RCAF and the Contractor.

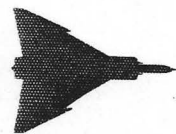
Part 1. Engineering Program

The Contractor shall carry out the following:

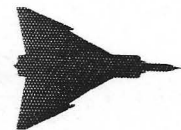
1. Preliminary design of the aircraft to RCAF Specification AIR 7-4, Issue 3.
2. (a) Preparation and revision, as necessary, of the Model Specification for Mk 1 aircraft.
(b) Preparation and revision, as necessary, of the Model Specification for Mk 2 aircraft.
3. Design and construct, in accordance with the requirements of RCAF publication CAP479, the following mock-ups:
 - (a) Mk 1 aircraft, including interim electronic system and cockpit.
 - (b) Mk 2 aircraft, including complete Astra 1 system and Iroquois engines.
 - (c) Weapon pack for Sparrow 2D missiles, including missile launchers.
 - (d) Relevant ground support equipment.
 - (e) Special cockpit mock-up for evaluation of take-off and landing conditions.



4. The design of the CF-105 Mk 1 airframe, systems, equipment installations and ground support equipment including test equipment.
5. The design of the CF-105 Mk 2 airframe, systems, equipment installations, installation of Sparrow 2D missiles, installation of Astra 1 electronic system, and ground support equipment including test equipment, but excluding test equipment for the Sparrow 2D missiles and the Astra 1 system.
6. The design and construction of free flight and wind tunnel models, together with the testing and evaluation of the test results.
7. Testing of structural and mechanical components including the design and construction of test rigs and facilities as required.
8. The testing of systems and related equipment including the design and provision of test rigs and facilities as required.
9. Supply of production drawings and data to enable the manufacture of:
 - (a) The Mk 1 aircraft and the procurement of related Contractor Furnished Equipment.
 - (b) The Mk 2 aircraft and the procurement of related Contractor Furnished Equipment.
10. Supply of one copy of sub-assembly and assembly drawings to the RCAF as requested for the subject aircraft.
11. The provision of facilities and data for RCAF engineering evaluation of the first aircraft in accordance with the requirements of RCAF report DDA 24.
12. The design, acquisition and installation of flight test instrumentation (including instrument packs) in CF-105 aircraft for Phase 1 and Phase 3 testing.
13. The carrying out of Phase 1 and Phase 3 Flight Testing on three Mk 1 aircraft, including the provision of facilities, aircraft maintenance, fuel, oil, and data reduction of flight test results.
14. The provision of facilities, aircraft maintenance, fuel and oil for one CF-105 Mk 1 aircraft for Phase 2 flight testing by the RCAF for a program not exceeding 10 hours flying time.
15. Preparation of two CF-105 Mk 1 aircraft for delivery to designated Radio Corporation of America flight test facilities.



16. Preparation of a CF-105 Mk 2 aircraft for delivery to a designated Orenda Engines Limited flight test facility.
17. The carrying out of Phase 1 and Phase 3 Flight Testing on the Mk 2 aircraft including provision of facilities, aircraft maintenance, fuel, oil, and data reduction of flight test results.
18. Study and report on the following:
 - (a) Weapon system analysis for targets for use in the period 1960-1965.
 - (b) Facilities required to maintain and support the weapon system on the ground.
 - (c) Qualitative requirements of personnel to maintain the weapon system.
 - (d) Aircraft System Trainers.
 - (e) Ground support equipment, including readiness, maintenance, and test equipment.
19. Study and report on the following, relative to the Astra 1 system installation in collaboration with the Radio Corporation of America.
 - (a) Investigations of electrical power requirements and power supply equipment.
 - (b) Investigations of installation, configuration, volume, weight, cooling, pressurization and environment of the equipment.
 - (c) Design study on integrated display, controls and cockpit layouts, including the division of functions between two cockpits.
 - (d) Investigations of missile stowage, launching and power supplies.
 - (e) Air data and flight data requirements.
 - (f) Investigations of snap-up and breakaway for automatic attack mode.
 - (g) Investigations of best installation design for infra red scanner.
 - (h) Investigations of optimization of the scanning angle and dish size within the aircraft nose for maximum detection range.
 - (i) Investigations of the range of pitch and roll at which engagement of the Automatic Flight Control System can be accomplished and the range of pitch altitude under AFCS control.
 - (j) Investigations on maintenance and overhaul of this electrical equipment.



Part 2. Tooling Program

The Contractor shall carry out the following:

1. Tooling

Process, design, develop and manufacture or otherwise acquire such tooling as may be required for the production of the subject aircraft and continued production of Mk 2 aircraft at the rate of 4 aircraft per month thereafter.

Part 3. Manufacturing Program

The Contractor shall carry out the following:

1. Aircraft

Manufacture and supply five aircraft to the CF-105 Mk 1 Model Specification and manufacture and supply three aircraft to the CF-105 Mk 2 Model Specification in accordance with the production drawings called for under Item 9 of Part 1 of this section.

On the completion of the first flight each aircraft shall be officially transferred to the RCAF and immediately returned to the Contractor on an indefinite loan basis to carry out the various phases of the Flight Test Development Program.

2. Metal Mock-Up

Manufacture a full scale metal mock-up of the Mk 1 Aircraft.

3. Test Components

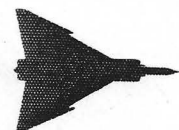
Manufacture test parts and test components as listed on page 9.

4. Spares

Supply a sufficient quantity of spares to maintain the development aircraft during the flight development program for a period commencing with the flight of the first aircraft and ending March 31, 1959, in accordance with spares provisioning required, as agreed between the RCAF and the Company.

5. Ground Handling Equipment

Manufacture or otherwise acquire a minimum quantity of Ground Handling Equipment necessary to support the CF-105 Flight Test Development program of the subject aircraft at Malton, to the extent that the requirements for such Ground Handling Equipment may be agreed between Avro and the RCAF.



6. Publications

Avro will supply such Publications as may be necessary to support the 8 aircraft during the flight test development program to the extent that the Publications requirement is agreed to between the RCAF and the Company.

Part 4. Work Program and Reports

1. Work Program

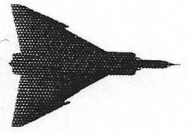
The Contractor shall prepare and submit a Work Program for the work required by Parts 1, 2 and 3 above. This Work Program shall define the methods of conducting the various facets of the work together with co-ordination requirements and related schedules calculated to collectively result in program achievement. Copies of this program shall be supplied not later than March 31, 1957.

2. Reports

The identity, purpose and interval of issuance of Progress, Technical and/or Special Study Reports shall be as set forth in the Work Program.

TEST COMPONENTS FOR CF-105(Part 3 Item 3 under Statement of Work)

Description of Item or Component	Quantity (A/C Sets)	
Front Fuselage	1	Including Canopy & Canopy Actuation Mech.
Canopies	5	
Centre Fuselage	1	
Air Intakes	1	
Duct Bay	1	
Engine Bay	1	
Rear Fuselage	1	
Inner Wing Comp.	1	
Outer Wing	1	
Air Brakes	2	
Aileron	2 Standard	
	1 Modified	
Elevator	2 Standard	
	1 Modified	
Fin	1	
Rudder	2 Standard	
	1 Modified	
Main & Nose Undercarriage	1	
Main & Nose Undercarriage Doors	2	
Radar Nose	1	
Armament Pack (Falcon)	1	
Fin T/E for Rudder Tests	1	Complete with Control Linkage and Mtgs.
O/W T/E for Aileron Tests	1	Complete with Control Linkage and Mtgs.
Air Conditioning Ducting	1	
Engine Intake Duct - Fwd. Portion	1	
Engine Intake Duct - Aft Portion	1	
Inner Wing Posted Box Tanks	5	
Windscreen for Canopy Testing	2	
Single Missile Armament Pack	1	
Power Panel for Electrical System	1	



SECTION 3

FLIGHT DEVELOPMENT PROGRAM

In setting up the Flight Development Program associated with Program 4, it becomes apparent that three significant key dates are governing the framework of this program.

These are:

1. First flight of the Mk 1 aircraft.
2. First flight of the Mk 2 aircraft.
3. The start of development flying with preproduction Astra 1 system installed.

Within the framework set by these dates the program falls naturally into three stages. Figure 2 indicates diagrammatically the three stages with their associated dates.

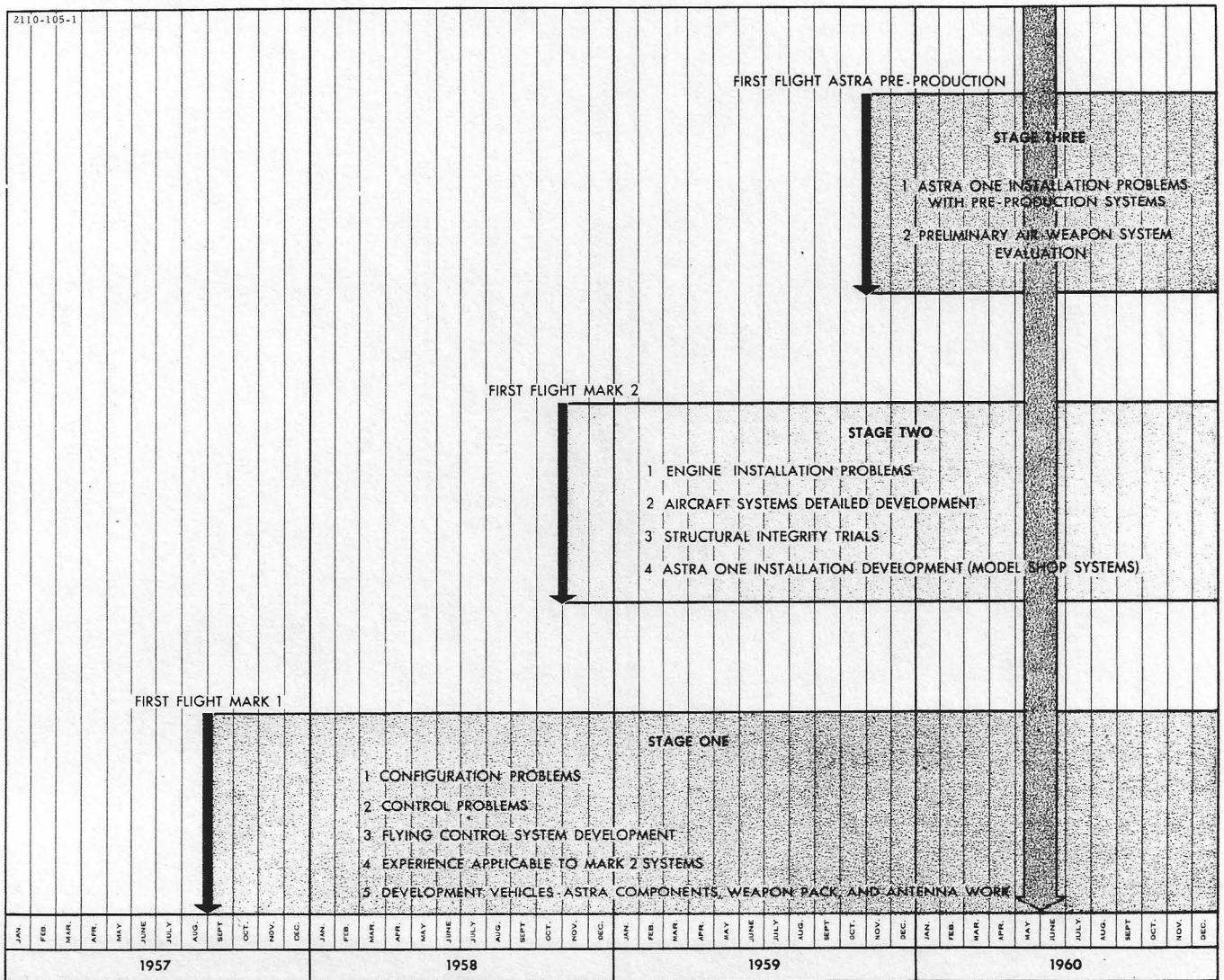
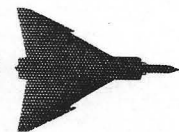


FIG. 2 AVRO FLIGHT DEVELOPMENT PROGRAM



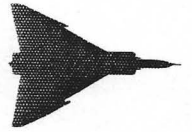
In the first stage the airplane available is the CF-105 Mk 1 with J-75 engines. Although this aircraft is fitted with aircraft systems incompatible with the requirements of Astra 1 it can be used to resolve many of the basic aircraft problems, e. g. problems associated with the basic configuration, with handling and control development, with development of the flying control system itself, etc. In addition, much of the experience gained in making the Mk 1 systems function successfully, e. g. air conditioning, electrics, etc., will be directly applicable to the systems in the Mk 2 aircraft. Finally, the Mk 1 aircraft will provide an excellent flying test bed for the development of Astra components, weapon pack, antennas, etc.

In Stage 2, the start of which is defined by the first flight of the Mk 2 aircraft with the Iroquois engine, it is possible to tackle in detail, problems associated with the engine and aircraft system installations for the actual combat airplane. Final structural integrity trials take place in this stage. Although all Mk 2 aircraft will be built with provision for the installation of the Astra 1 system, the Astra development program is such that actual installations will not be possible in all the aircraft in this phase. However, it is expected that at least one and probably two of the Mk 2 aircraft in Stage 2 will start on Astra 1 installation development using systems built in the R. C. A. Model Shop.

Finally, Stage 3 which is established by the start of the preproduction run of Astra 1 systems, brings together the complete CF-105 combat airplane. In this stage the detailed problems associated with the operation of a complex air weapon system can be tackled and the combat aircraft can be checked out to the extent defined by the Company's responsibilities.

Within this framework it is apparent that the program should be set up to provide the optimum distribution of aircraft. Since the objectives of Stage 1 are limited by the configuration of the aircraft, only a limited number of Mk 1 aircraft are required. This number is estimated to be five. The objective in Stage 2 is to provide the greatest number of Mk 2 test flying hours at the earliest possible time and to this end Program 4 provides, in the Company's opinion, the most rapid build-up possible. This rapid build-up together with the fact that the Mk 2 aircraft have provision for the installation of Astra 1 automatically insures that the requirements of Stage 3 in terms of aircraft are met.

These three stages deal only with the Company's flight development program, that is,



Phases 1 and 3 as defined in RCAF report 'Aircraft Evaluation and Test Program' DAEng. 33. The requirements of the RCAF for evaluation aircraft for the other phases of the overall flight test program have been given full consideration in Program 4. The allocation of aircraft to the different phases as laid down in DAEng. 33 is as follows:

			NO. OF AIRCRAFT
PHASE 1	AIRWORTHINESS	AVRO	3
PHASE 2	CONTRACTOR COMPLIANCE	RCAF	
PHASE 3	AIRCRAFT & ARMAMENT DEVELOPMENT	AVRO	9
PHASE 4	PERFORMANCE & HANDLING	RCAF	2
PHASE 5	ALL WEATHER OPERATION	RCAF	2
PHASE 6	INTENSIVE FLYING	RCAF	6
PHASE 7	WEAPON SYSTEM EVALUATION	RCAF	5
PHASE 8	OPERATIONAL SUITABILITY	RCAF	6
	ATTRITION	AVRO	3

Figure 3 shows the practical program resulting from the considerations already discussed. The combined Avro and RCAF development and evaluation programs require a total of 36 aircraft. The start of delivery of combat aircraft to the Squadrons is predicted for September 1960.

The flying hours available within this program are shown in Figure 4. This utilization is obtained from analysis of Company and U. S. A. F. statistics, the flying hours per airplane per month being as follows:

Phase 1, 2 and 3	7 hours per month
Phase 4	9 hours per month
Phase 5	10 hours per month
Phase 6	50 hours per month
Phase 7	30 hours per month
Phase 8	7 hours per month

The figures for the Air Force evaluation phases may not be in line with RCAF experience and should be assessed with this in mind.

FIG. 3 ALLOCATION OF AIRCRAFT

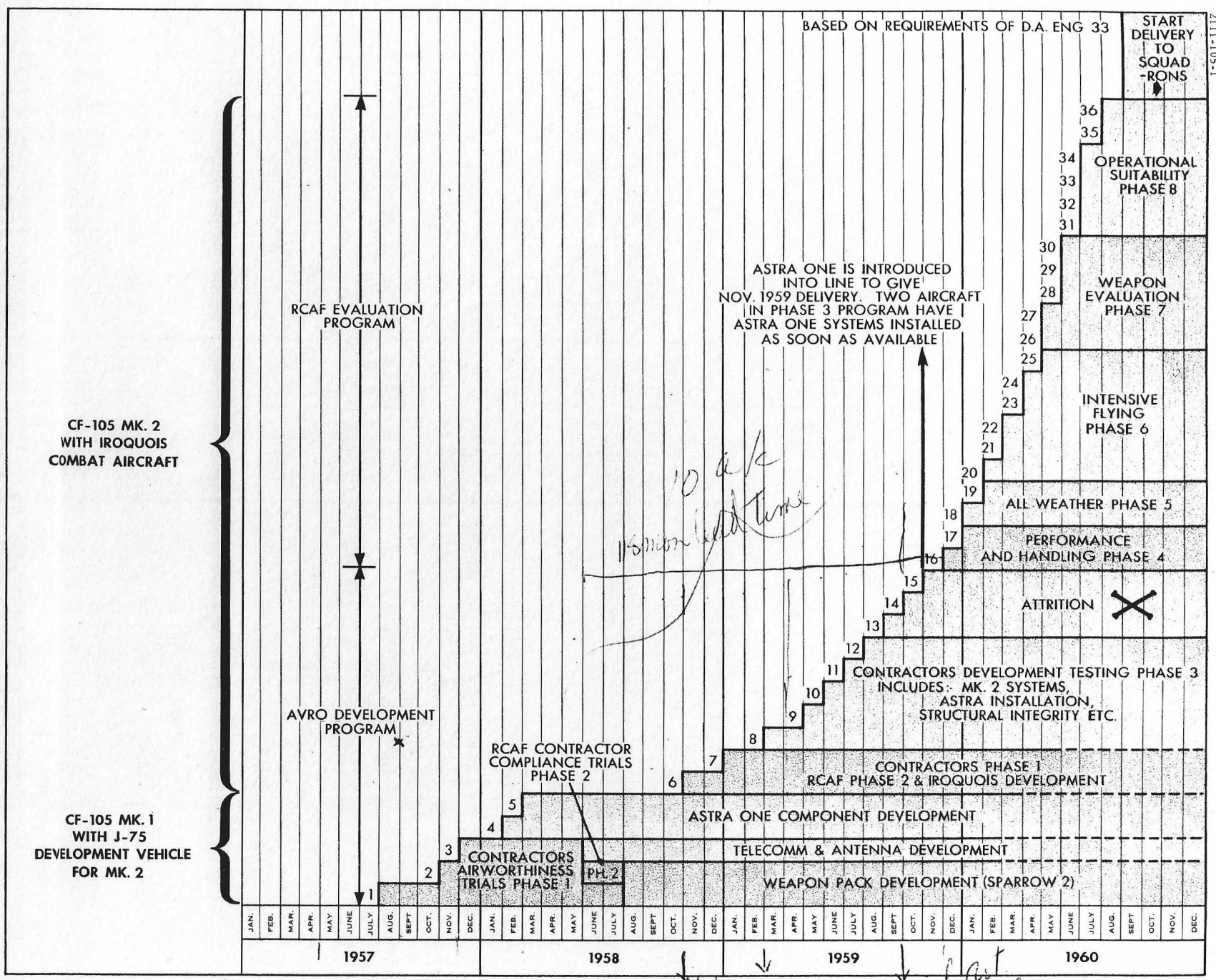
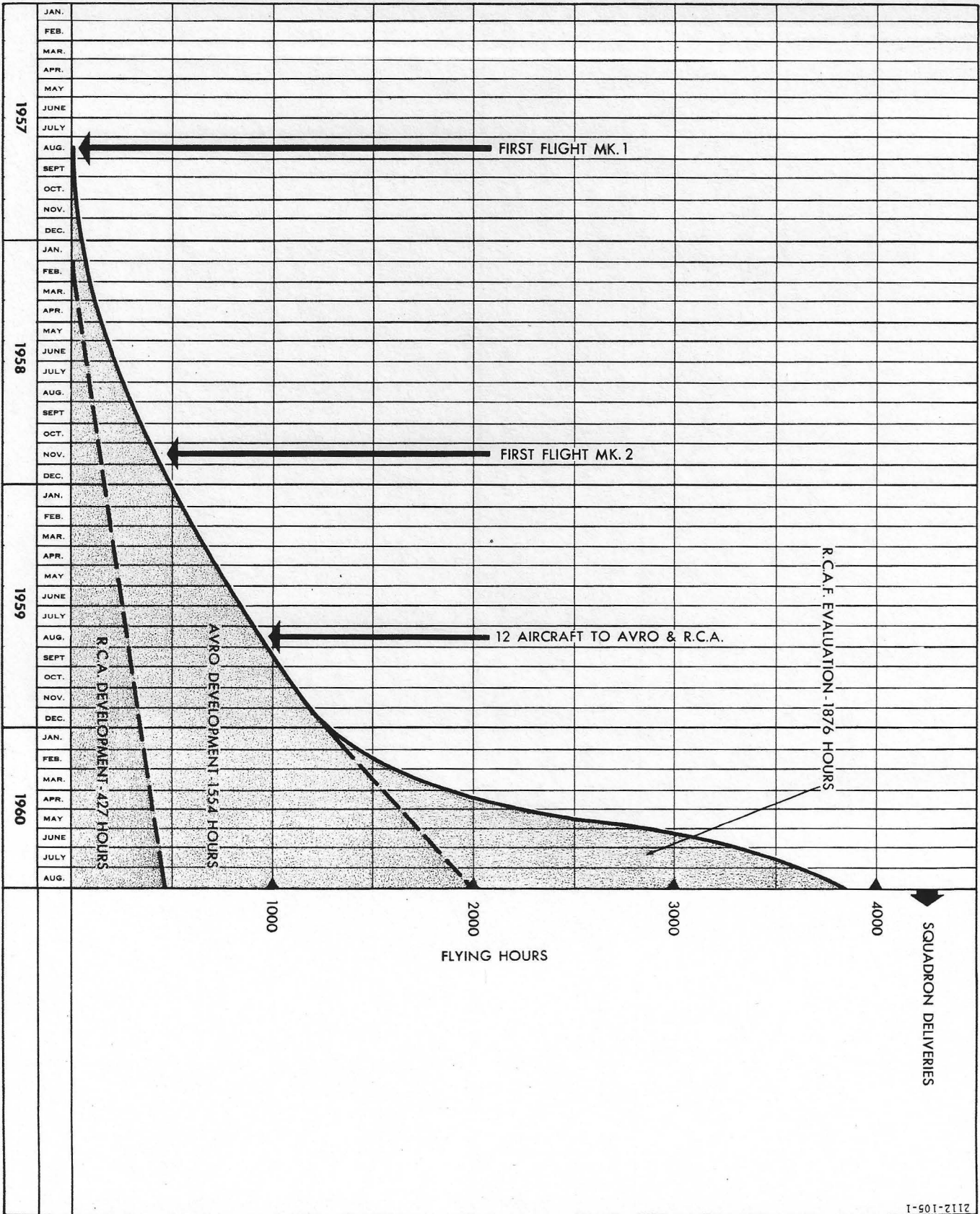
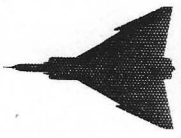
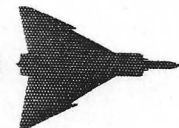


FIG. 4 UTILIZATION OF TEST AIRCRAFT



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SECTION 4SCHEDULESAircraft Schedules

A schedule showing the first flight dates for each of the 8 aircraft on the development program is shown on the following page.

For planning purposes, a preproduction program for 29 aircraft has been included showing the acceptance date of each aircraft.

Although a lead time of 18 months commitment authority has been indicated, it should be recognized that it is inadequate for certain items with long lead times. Some special authority in advance of the commitment date shown will be required for these items.

Government Supplied Equipment Schedules

The requirement dates for major Government Supplied Equipment items is shown on page 17. This includes the dates when J-75 and Iroquois engines will be needed and when Astra 1 will be required for installation in preproduction aircraft.

For Development aircraft a lead time of 4 months before first flight date has been established for installation engines and one month lead time for spare engines.

For Preproduction aircraft a lead time of 5 months has been established, for installation engines i. e. 1 month in Final Assembly and 4 months in Flight Test. Spare engines have been allocated 1 month lead time.

The Astra 1 will be installed into Preproduction aircraft with a planned retrofit program for 2 of the Mk 1 aircraft. Astra 1 lead time is shown as 6 months based on 1 month for bench testing, 1 month for Final Assembly and 4 months in Flight Test.

CF-105 SCHEDULES

DEVELOPMENT
8 AIRCRAFT

PRE PRODUCTION
29 AIRCRAFT

A/C PROVIDED WITH J-75	1
A/C PROVIDED WITH IROQUOIS	1

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Year	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	Year	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	Year	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	Year	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.																																																																																								
1957								1			1	1		1958												1																							1959																																											1960																																															

FIRST FLIGHT DATES

COMMITMENT AUTHORITY

ACCEPTANCE DATES

SQUADRON DELIVERY

AVRO AIRCRAFT LIMITED

CF-105

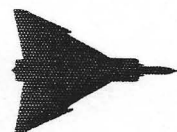


SECRET

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G. S. E. REQUIREMENTS SCHEDULE

		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.												
		1957												1958												1959												1960											
ENGINE REQUIREMENTS																																																	
P & W J-75 ENGINES FOR INSTALLATION																																																	
CUM. TOTAL J-75 ENGINES FOR INSTALLATION																																																	
CUM. TOTAL J-75 ENGINES FOR SPARES																																																	
ORENDA IROQUOIS ENGINES FOR INSTALLATION IN MK. 1 AIRCRAFT																																																	
ORENDA IROQUOIS ENGINES FOR INSTALLATION IN MK. 2 AIRCRAFT																																																	
CUM. TOTAL IROQUOIS ENGINES FOR INSTALLATION																																																	
CUM. TOTAL IROQUOIS ENGINES FOR SPARES																																																	
ASTRA 1 REQUIREMENTS																																																	
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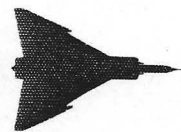
SECTION 5FINANCIAL FORECASTS

The financial forecasts contained in this proposal are based on the following work:

Engineering

All costs estimated to be incurred in the performance of the work called up in Part 1 of the Statement of Work, up to the flight of the sixth aircraft in November 1958 not including the following:

- (a) Design and development of Flight Simulator and Aircraft System Trainer.
- (b) Extra work called up by changes to the Specification.
- (c) Design and Development of Missile Launchers.
- (d) Design and Development of Multiplexing for Antennas.
- (e) Repair and Overhaul of flight test aircraft.
- (f) Training of RCAF personnel.
- (g) The forecast includes the integration of Government Supplied Equipment into the airframe, but does not include the responsibility for the performance of the air weapon and/or equipment when such performance depends on the performance of Government Supplied Equipment.
- (h) Flight testing other than from Malton.
- (i) Maintenance and operation of aircraft on loan to other companies.
- (j) Maintenance and operation of aircraft for Iroquois development.
- (k) Maintenance and operation of aircraft beyond March 31, 1958. It is assumed that the Company will negotiate an additional contract for the operation of flight test vehicles beyond this date.
- (l) Weapons evaluation and sled testing.
- (m) Development work related to Government Supplied Material and among other things the following:
 - (i) Modification and instrumentation of Mk 1 aircraft furnished to the Radio Corporation of America for Astra 1.



(ii) Delivery to, and maintenance of, aircraft at R. C. A. flight test facility.

(iii) Maintenance and Operation of Mk 1 aircraft at Malton for Astra 1 development.

An interim fee figure at 5% of costs is included.

2. Tooling

All costs estimated to be incurred in the performance of the work called up in Part 2 of the Statement of Work including tool design, process planning, and manufacture of basic Mk 1 and Mk 2 tooling.

Tooling is capable of manufacturing the CF-105 Mk 1 and Mk 2 aircraft at the planned build-up to four aircraft per month, as shown in the schedule.

The forecast does not include tool maintenance or modification tooling.

An interim fee figure has been provided at 5% of costs.

3. Manufacturing

All costs estimated to be incurred in the performance of the work called up in Part 3 of the Statement of Work including the manufacture of five CF-105 Mk 1 aircraft (J-75 engines) and three CF-105 Mk 2 aircraft (Iroquois engines).

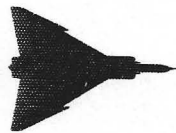
The figures also contain forecasts for maintenance spares and publications at approximately 15% of airframe costs.

Ground handling equipment is included for the minimum requirements of the program at Malton.

The figures also contain costs for the metal mock-up, test specimens, and test components, including one complete set of static test components.

No provision has been made for the manufacture of Flight Simulators, Aircraft System Trainers, or Missile Launchers.

An interim fee figure has been provided at 5% of costs and sales tax has been applied at 10% of costs.



4. Work Program and Reports

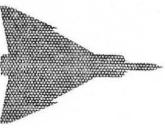
All costs estimated to be incurred in the performance of the work called up in Part 4 of the Statement of Work including preparation of Work Program and Reports.

CF-105 DEVELOPMENT PROGRAM - 8 AIRCRAFTPROGRAM 4FINANCIAL FORECAST

	Cum. to March 31/56	1956/57	1957/58	Cum. to March 31/58	1958/59	1959/60	Total
<u>ENGINEERING</u>	\$21,500,000	13,900,000	14,250,000	49,650,000	8,245,950	-	57,895,950
<u>TOOLING</u>							
For Mk. 1 Aircraft	\$ 9,353,204	10,246,796	-	19,600,000	-	-	19,600,000
For Mk. 2 Aircraft	-	-	5,260,000	5,260,000	2,500,000	776,350	8,536,350
Total	\$ 9,353,204	10,246,796	5,260,000	24,860,000	2,500,000	776,350	28,136,350
<u>PRODUCTION (8 Aircraft)</u>							
Manufacture	\$ 2,200,826	8,904,767	19,025,020	30,130,613	8,520,755	-	38,651,368
Spares & Publications	-	390,000	2,960,000	3,350,000	2,200,000	200,000	5,750,000
Ground Handling Equipment	-	210,000	1,500,000	1,710,000	290,000	-	2,000,000
Total	\$ 2,200,826	9,504,767	23,485,020	35,190,613	11,010,755	200,000	46,401,368
<u>GRAND TOTAL PROGRAM</u>	\$33,054,030	33,651,563	42,995,020	109,700,613	21,756,705	976,350	132,433,668

NOTE:

Fees and Sales Tax calculated at 5% and 10%.
Sales Tax applicable to Production only.
Spares & Publications calculated at approximately
15% of Aircraft Costs.



CF-105 DEVELOPMENT & PREPRODUCTION PROGRAM - 37 AIRCRAFT

PROGRAM 4

FINANCIAL FORECAST

	Cum. to March 31/56	1956/57	1957/58	Cum. to March 31/58	1958/59	1959/60	1960/61	1961/62	Total
<u>DEVELOPMENT PROGRAM</u> (8 Aircraft)	\$33,054,030	33,651,563	42,995,020	109,700,613	21,756,705	976,350			132,433,668
<u>PREPRODUCTION PROGRAM</u> (29 Aircraft)									
Manufacture	\$ -	-	-	-	21,441,115	47,296,421	6,023,654	-	74,761,190
Spares, Publications and Ground Handling Equipment	-	-	-	-	4,550,000	8,050,000	1,750,000	200,000	14,550,000
Engineering Support and Tool Maintenance	-	-	-	-	8,000,000	8,500,000	3,500,000	-	20,000,000
	\$ -	-	-	-	33,991,115	63,846,421	11,273,654	200,000	109,311,190
GRAND TOTAL	\$33,054,030	33,651,563	42,995,020	109,700,613	55,747,820	64,822,771	11,273,654	200,000	241,744,858

NOTE: Preproduction program for planning purposes only.