

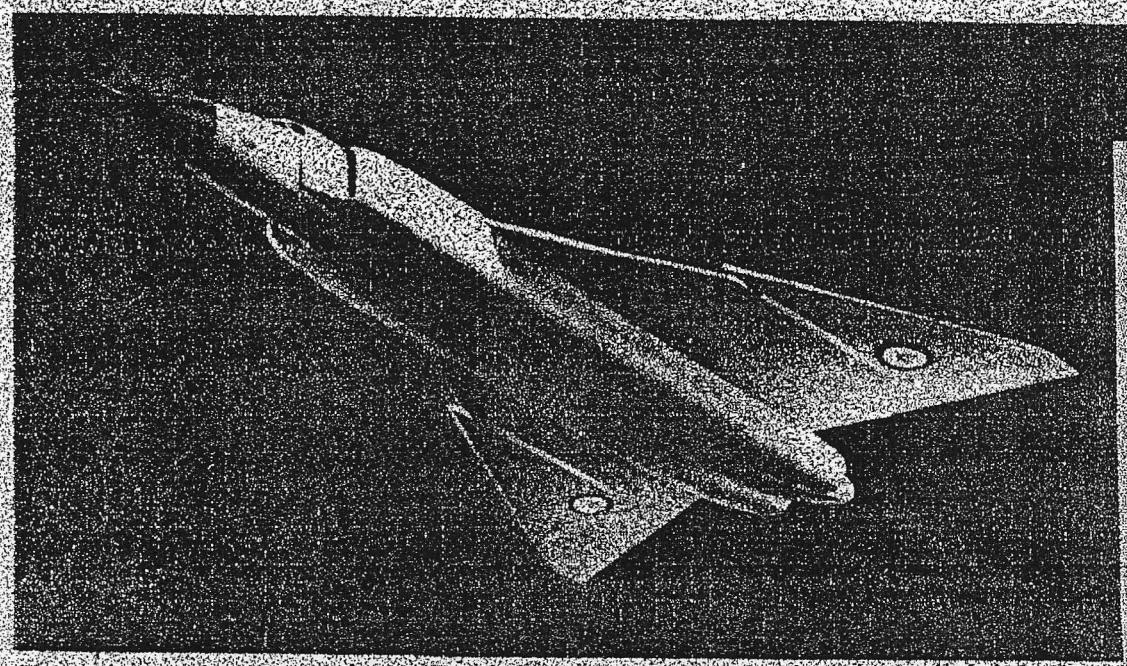
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SECRET

SECRET



Standard Aircraft Characteristics

CF-105 PRODUCTION AIRCRAFT

AVRO AIRCRAFT LIMITED
MALTON-ONTARIO

AUGUST, 1957

2: D Website.

CLASSIFICATION/DESIGNATION

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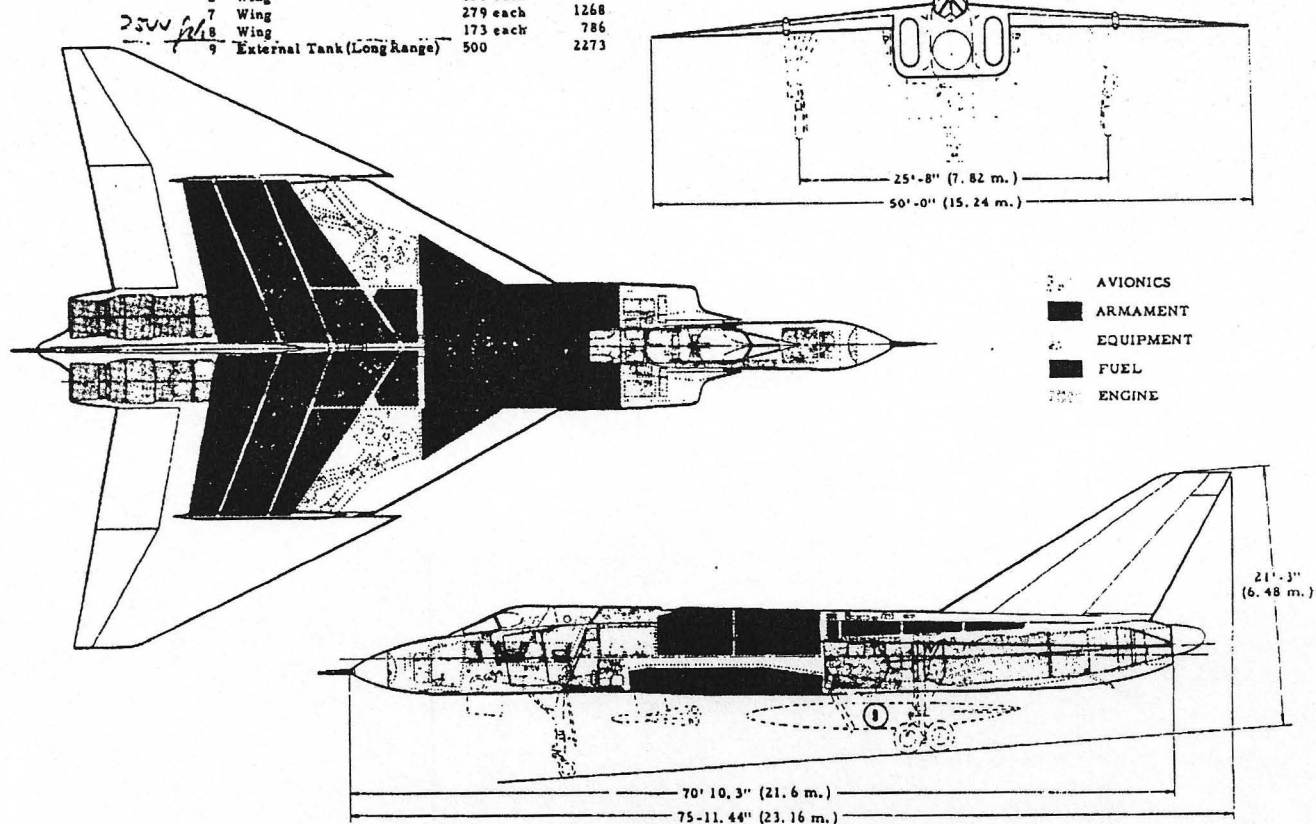
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Tank	Location	Capacity	
		Imp. Gal.	Litres
1	Fuselage	277	1259
2	Fuselage	281	1277
3	Wing	151 each	686
4	Wing	90 each	409
5	Wing (collector)	146 each	664
6	Wing	154 each	700
7	Wing	279 each	1268
8	Wing	173 each	786
9	External Tank (Long Range)	500	2273



Mission and Description

The primary mission is high altitude, all-weather, night and day interception and destruction of enemy bomber aircraft.

The secondary mission is similar, but performed at low altitudes.

A crew of two is carried in the pressurized cockpit; a pilot and a radar operator. Both crew members are provided with upward ejection seats.

The airframe is an all-metal stressed skin structure and consists of ten major sections, the fuselage nose section, fuselage front section, fuselage centre section, fuselage rear section, fuselage tail cone, two inner wing panels, two outer wing panels and the vertical tail.

The landing gear, wheel brakes, and missile launching gear are hydraulically operated with provision for emergency operation by high pressure air. The surface controls and speed brakes are operated by two separate hydraulic systems.

The tricycle landing gear has twin wheels at the nose leg and a two wheel bogie at each of the main legs. The nose gear retracts forward into the fuselage; the main gear retracts inward and forward into the wing.

Internal fuel is carried in integral wing tanks and bladder cell fuselage tanks. An external fuel tank can be carried underneath the fuselage for long range operation.

The radome, engine intakes and critical instrument reference areas are fitted with anti-icing means.

An automatic cabin pressurization, ventilation and temperature control system is installed.

FEATURES

Two Man Crew

Maximum level speed, $M = 1.95$

Two engine reliability

Combat level speed, $M = 1.50$

Time from engine start to 50,000 feet (15,240 m) = 4.1 minutes

Combat Ceiling = 62,200 feet (18,959 m)

Manoeuvrability at 50,000 feet (15,240 m) at 1.50 M.N. = 1.84 g level turn

Range - High Speed Mission at $M = 1.50$ on 78.2% internal fuel = 200 nautical miles radius (370 km)

Maximum Range Mission at $M = .92$ with supersonic combat on 78.2% internal fuel = 315 nautical miles radius (584 km)

Long Range Ferry Mission at $M = .92$ with 500 gals. external tank = 1675 nautical miles (3104 km)

ARMAMENT

Eight - Hughes 'Falcon' GAR-1A and GAR-1C Guided Missiles

or

Four - Douglas 'Sparrow 2' Fully Active Guided Missiles

Hughes Integrated Electronic and Control System developed from MX-1179

Leading Particulars

POWER PLANT

Manufacturer: Orenda Engines Limited
 Model: P. S. 13
 Type: Two spool, axial flow turbojet with integral afterburner.
 Diameter: 46.625 in. (1.185 m.)
 Length: 229.8 in. (5.84 m.) from intake front face to rear face of afterburner nozzle.
 Application: For production aircraft. Prototype aircraft engines will be P & W J.75.

FUEL

	Imp. Gals.	Litres
Twelve Integral Wing Tanks (Internal)	1,986	9,028
Two Bladder Type Fuselage Tanks (Internal)	558	2,537
One Long Range Tank (External under fuselage)	500	2,273
	3,044	13,838

Fuel of Specific Gravity = 0.78 used for performance data.

DIMENSIONS

GENERAL		WINGS	
Length ...	75'-11.44" (23.16m)	Anchored ...	4 degrees
Height over Fin	21'-3" (6.48m)	Aspect Ratio ...	2.0
Height over Canopy	14'-6" (4.42m)	Area ...	1253 sq. ft. (116.4 sq. m.)
Tread	25'-8" (7.82m)	Section	
		- Inner Wing, NACA 0003.5-6-3.7	
		Modified Camber (Neg) .0075	
		L. E. Droop ...	8 degrees
		- Outer Wing, NACA 0003.5-6-3.7	
		0003.8-6-3.7	
		Modified Camber (Neg) .0075	
		L. E. Droop ...	4 degrees

WEIGHTS

Take-off weight with external tank	64,432 lb.	(29,226 kg)
Normal take-off weight - 200 nautical miles (370 km) radius high speed mission	55,889 lb.	(25,351 kg)
Operational weight empty (without external tank)	40,379 lb.	(18,316 kg)
Combat Weight (Half fuel weight for 200 nautical miles radius high speed mission)	48,134 lb.	(21,833 kg)
Load factors of 10.00 g ultimate and 7.33 g limit at 47,000 lb. (21,319 kg) combat stressing weight.		

ENGINE RATINGS

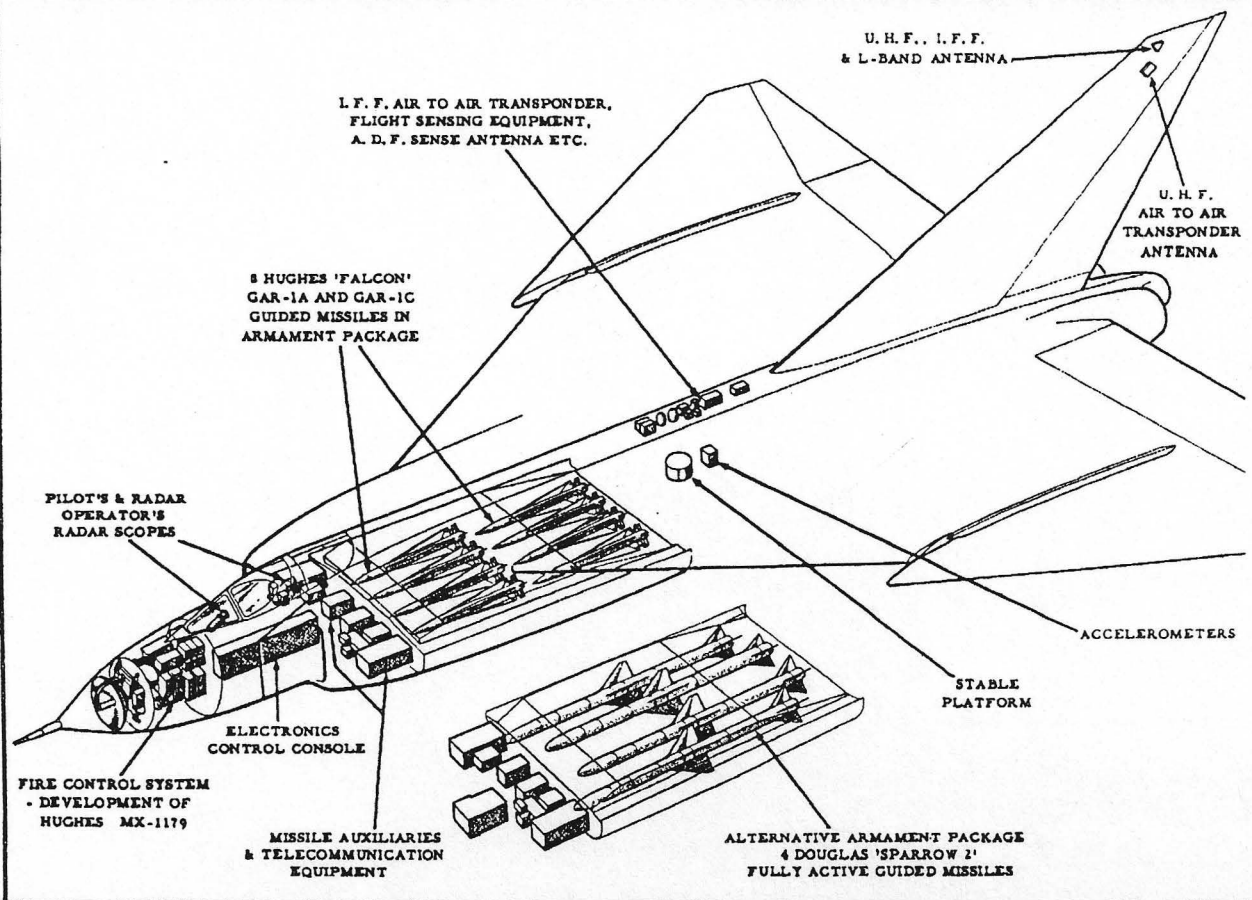
N. A. C. A. Standard Sea Level Conditions

Condition	L. P. Compressor R. P. M.	Thrust - lb. (kg.)	S. F. C. lb/hr/lb. (kg/hr/kg)	Maximum Allowable Temperature °F
Maximum with A/B	5,500	25,000 (11,340)	1.932	1391
Military	5,500	20,000 (9,072)	1.025	1391
Normal	5,500	18,400 (8,346)	0.912	1220

NOTES

Development contract placed and prototypes ordered by the Royal Canadian Air Force.

Armament



Loading and Performance

WEIGHT

Take-off Weight with 15,510 lb. fuel (7035 kg.) i. e., 78.2% maximum internal	55,889 lb.	25,351 kg.
Operational Weight Empty	40,379 lb.	18,316 kg.
Combat Weight (1/2 fuel)	48,134 lb.	21,833 kg.
Landing Weight (with reserve fuel and missiles)	42,200	19,142 kg.
Wing Loading at Normal Take-off Weight	44.5 lb./Sq. ft.	217.3 kg./sq. m.
Power Loading at Normal Take-off Weight	1.12 lb./lb. thrust	1.12 kg./kg. thrust

SPEED

True Air Speed in Level Flight at Sea Level at Combat Weight		
Maximum Thrust with Afterburners	720 knots	1,334 km./hr.
Military Thrust	650 knots	1,205 km./hr.
True Air Speed in Level Flight at 50,000 ft. (15,240 m.) altitude at Combat Weight		
Maximum Thrust with Afterburners	1,110 knots	2,057 km./hr.

CEILING

Combat Ceiling, Rate of Climb 500 ft./min. (2.54 m./sec.), at Combat Weight		
Maximum Thrust with Afterburners at M = 1.50	62,200 ft.	18,959 m.

RATE OF CLIMB

Steady Rate of Climb at Sea Level at Combat Weight		
Maximum Thrust with Afterburners at M = .92	50,000 ft./min.	254 m./sec.
Military Thrust at 530 knots (982 km./hr)	25,200 ft./min.	128 m./sec.
Steady Rate of Climb at 50,000 ft. (15,240 m.) at Combat Weight		
Maximum Thrust with Afterburners at M = 1.50	11,500 ft./min.	58.4 m./sec.

TIME TO HEIGHT

Time to 50,000 ft. Altitude (15,240 m.) and M = 1.50 from engine start at take-off weight of 55,889 lb. (25,351 kg.)		
Maximum Thrust with Afterburners	4.1 min.	4.1 min

MANOEUVRABILITY

Combat Load Factor at Combat Weight		
Maximum Thrust with Afterburners at M = 1.50 at 50,000 ft. (15,240 m.)	1.84 g.	1.84 g

TAKE-OFF DISTANCE

Take-off Distance over 50 ft. (15.2 m.) Obstacle at Sea Level,		
Take-off Gross Weight 55,889 lb. (25,351 kg.)		
Maximum Thrust with Afterburners	2,500 ft.	762m.
Military Thrust	3,800 ft.	1,158 m.

Performance under N. A. C. A. Standard Atmospheric Conditions to R. C. A. F. Specification AIR-7-4.

$C_{D_{min}} = .020$

Loading and Performance

LANDING DISTANCE

Landing distance over 50 ft. (15.2 m.) Obstacle at Sea Level at Combat Weight

5,000 ft.

1,524 m.

STALLING SPEED

True Stalling Speed in Landing Configuration at Sea Level at Combat Weight

105 knots

195 km./hr.

RANGE

Combat Radius of Action at 50,000 ft. (15,240 m.), Climb at $M = .92$, Cruise out at $M = 1.50$, Combat for 5 mins. at $M = 1.50$, Cruise back at $M = .92$, 15 min. stack at 40,000 ft. (12,192 m.), 5 min. fuel reserve on landing

High Speed Mission with 78.2% Internal Fuel

200 naut. mi.

370 km.

High Speed Mission with Full Internal Fuel

318 naut. mi.

589 km.

Combat Radius of Action at 50,000 ft. (15,240 m.), mission as above, except climb at 530 knots (982 km./hr) and cruise out at $M = .92$

Maximum Range Mission with 78.2% Internal Fuel

315 naut. mi.

584 km.

Maximum Range Mission with Full Internal Fuel

500 naut. mi.

927 km.

→ Combat Radius of Action at Sea Level, Cruise out at $M = 0.6$ and Combat at $M = .92$ at Sea Level, Cruise back at $M = .92$ at 40,000 ft. (12,192 m.), 15 min. stack at 40,000 ft. (12,192 m.), 5 min. fuel reserve on landing

Sea Level Mission with 78.2% Internal Fuel

217 naut. mi.

402 km.

Sea Level Mission with Full Internal Fuel

318 naut. mi.

589 km.

Ferry Range Mission at economical cruise speed ($M = .92$) and height, including 15 mins. stacking at 40,000 ft. (12,192 m.) and 5 min. fuel reserve on landing

Range with Full Internal Fuel and 500 gals. (2273 litres) External tank

1,675 naut. mi.

3,104 km.

Range with Full Internal Fuel

1,457 naut. mi.

2,700 km.

Performance under N. A. C. A. Standard Atmospheric Conditions to R. C. A. F. Specification AIR-7-4.

$C_{D_{min}} = .020$

