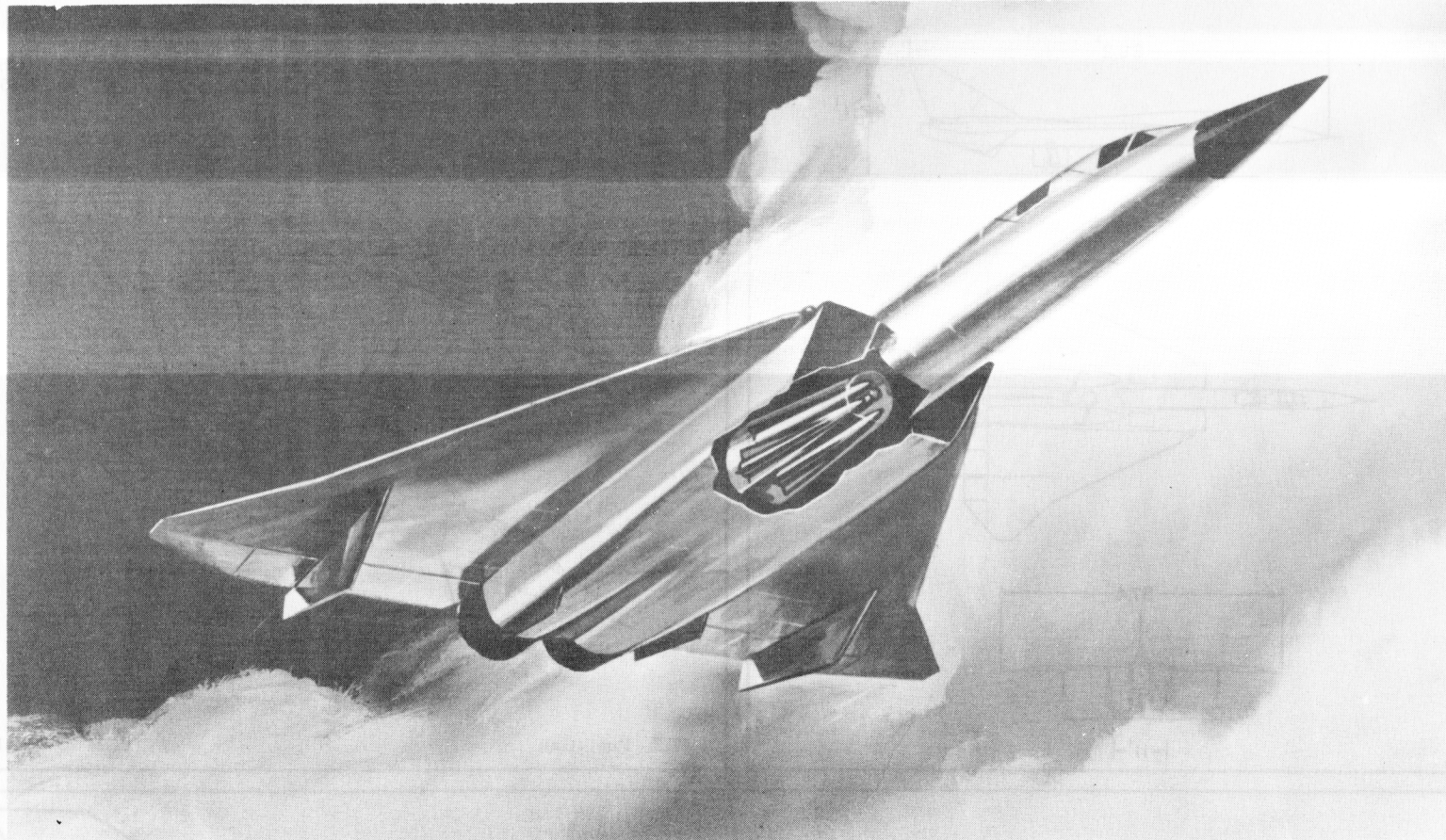


~~CONFIDENTIAL~~

Unclassified
SECRET

MOCKUP



Standard Aircraft Characteristics

BY AUTHORITY OF
THE SECRETARY
OF THE AIR FORCE

F-108 A
LONG RANGE INTERCEPTOR
North American

TWO J93-GE-1
GENERAL ELECTRIC

15 DEC 58

~~SECRET~~

F-108 A

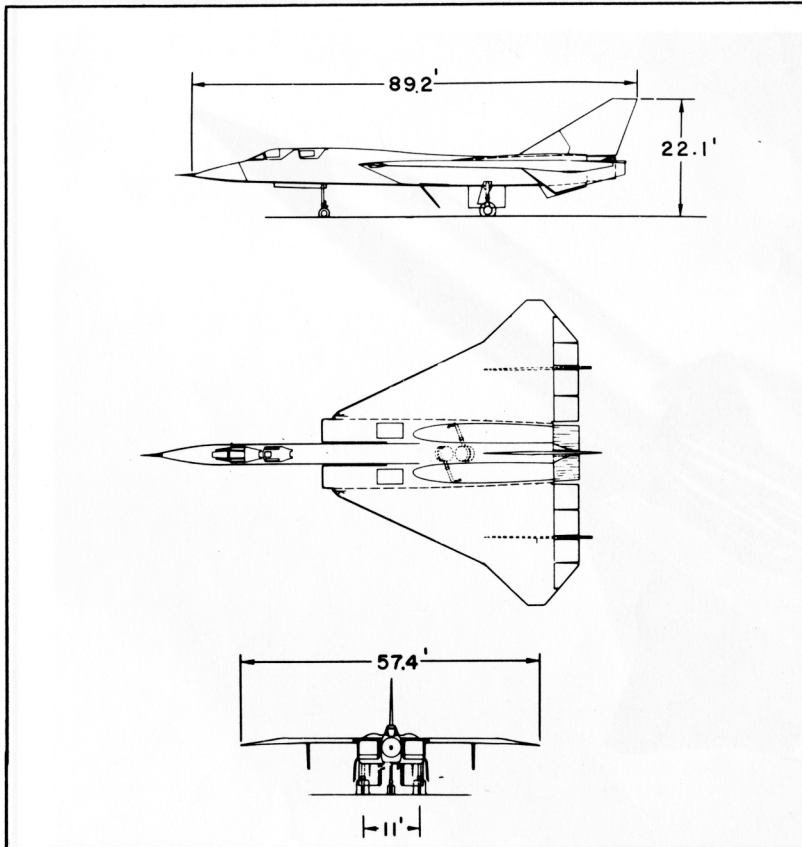
DOWNGRADED AT 3 YEAR INTERVALS,
DECLASSIFIED AFTER 12 YEARS.
DOD DIR 5200.10
30 Dec 70
A.P. Lovelorn 31 March 71

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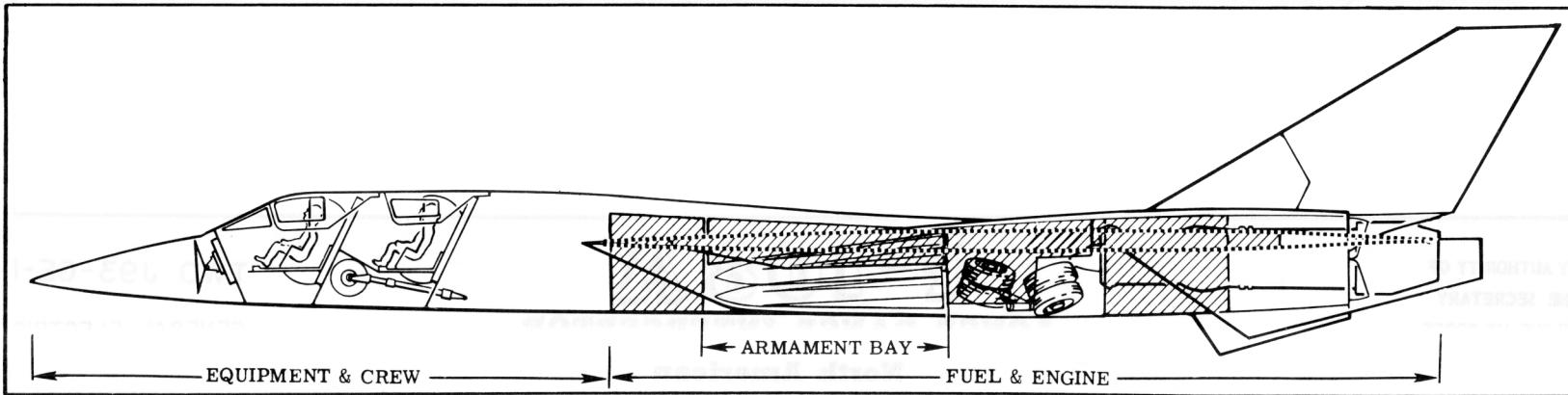
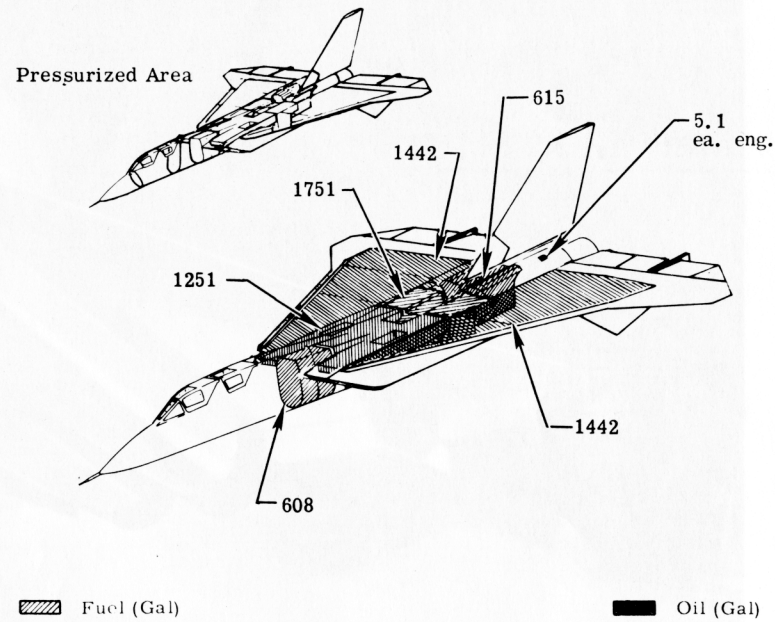
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Wing Area 1865 sq ft
 Aspect Ratio 1.68
 M.A.C. 507.9"

Wing Section
 Flat Sided Airfoil With
 NACA 66 Series Nose
 Thickness @ Fuselage 2%
 Thickness @ Tip 2.65%



POWER PLANT

Nr & Model (2) J93-GE-3R
 Mfr General Electric
 Engine Spec. Nr . . . R58AGT288C
 Supplement A
 Type Axial Turbo Jet
 Length 233.0"
 Max Diameter *59.0"
 Weight (dry) *5115 lb
 Tailpipe . . . Mech, Variable C/D
 Augmentation Afterburner
 *With thrust reverser

ENGINE RATINGS

S, L, S. LB - RPM - MIN

Max: 27, 200 - 6825 - cont

Mil: 18, 500 - 6825 - cont

Nor: 17, 500 - 6825 - cont

DIMENSIONS

Wing
 Span 57.4'
 Incidence (root) 0°
 (tip) -3°
 Dihedral 0°
 Sweepback (25% chord)
 Inboard 58.1°
 Outboard 32.1°
 Length 89.2'
 Height 22.1'
 Tread 11.0'

ROCKETS

GUNS

BOMBS

NONE

Mission and Description

Navy Equivalent: None

Mfr's Model: NA-257

The primary mission of the F-108 Weapon System is to deter armed attack against the U.S. and its areas of defense responsibility by providing maximum defense potential against all airborne threats in the post-1962 time period. This defense function is implemented by the F-108's potential to search out, evaluate, and destroy these hostiles at ranges beyond the capabilities of other defense systems. The F-108 is designed to operate not only in conjunction with SAGE and in cooperation with other weapons in the defense inventory, but to be equally effective well beyond the bounds of ground environment surveillance and under minimum operational control, relying on its self-contained high performance search, navigation, and communications equipment.

In time of war, F-108 operations can include directed intercepts and organized search missions resulting in repeated attacks with up to three kills by each interceptor. Operating beyond SAGE, the F-108 can make positive identification of DEW line violations, attack and trail hostile raids through remote zones, and report directly via long-range radio. Operating within the ZI, the F-108A performance features of all-weather capability, long range at Mach 3, and 15-minute turn-around, permit flexible commitment of forces to achieve the precise concentration of power required at any battle area with maximum retention of reserves.

The F-108A carries two crewmen and internally stowed missile armament. This high performance air vehicle cruises and combats at Mach 3 with a 1000-nautical mile radius on internal fuel. It has a 1.2g maneuver ceiling in excess of 77,000 feet and a zoom-climb ceiling in excess of 100,000 feet. Under normal loading and weather, the air vehicle requires runway lengths of only 3200 feet for take-off and landing. It can be operated from 6000-foot runways in all conditions of weather. From a nominal 70,000-foot combat altitude, missile launch can be accomplished against any air-breathing target flying at altitudes from sea level to 100,000 feet. The pulsed-doppler radar, with 40-inch antenna, provides target detection in excess of 100 nautical miles at all altitudes and is backed up by infrared search and track devices.

The air vehicle is a low-aspect-ratio, delta-wing configuration which employs elevons for pitch and roll control, an all-moving vertical stabilizer, fixed ventrals, variable geometry inlets, speed brakes, reverse thrust, and nose-wheel steering. The completely air conditioned crew compartment provides a "shirt-sleeve" environment. Integrated instrument presentations and control functions are utilized, and a complete attack display is provided. Capsule survival equipment affords the maximum probability of survival under all climatic and teraqueous conditions.

Development

Date of contract (letter contract) Jun 1957
 Mock-up (est) Jan 1959
 First Flight (est) Mar 1961

WEIGHTS

Loading	Lb	L, F.
Empty	50, 544(E)	
Basic	50, 908(E)	
Design	74, 084	5.33
Combat	*75, 719	5.33
Max T.O.	102, 234	3.00
Max Lndg.	† 96, 719	
(E) Estimated		
* For basic mission		
† Limited by structure		

FUELS

Location	Nr. Tanks	Gal
Wing	2	2884
Fuselage	4	4225
	Total	7109
Grade		JP-6
Specification		MIL-F-25656
OIL		
Fuselage	2	(tot)10.2
Specification		MIL-L-9236

ELECTRONICS

- UHF Command
- UHF Emergency
- HF Command (voice & digital)
- Intercom
- BROFICON
- Marker Beacon
- Localizer
- Glide Slope
- UHF Data Link (receiver)
- TACAN
- Identification Air-to-Air
- Identification Air-by-Ground

MISSILES

Nr.	Type	Location
3	GAR-9	Fuselage

NOTE

For detailed characteristics and performance of GAR-9 refer to Missile Section.

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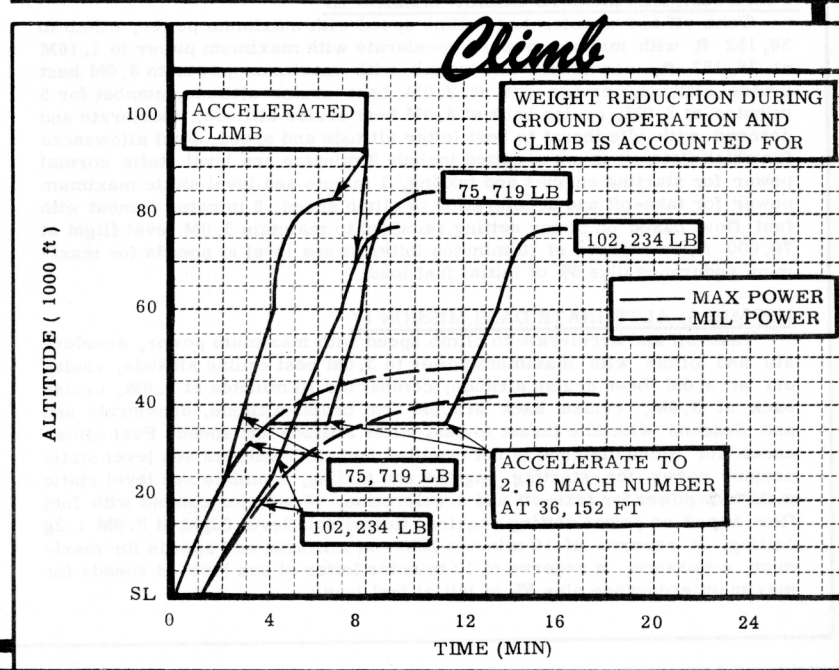
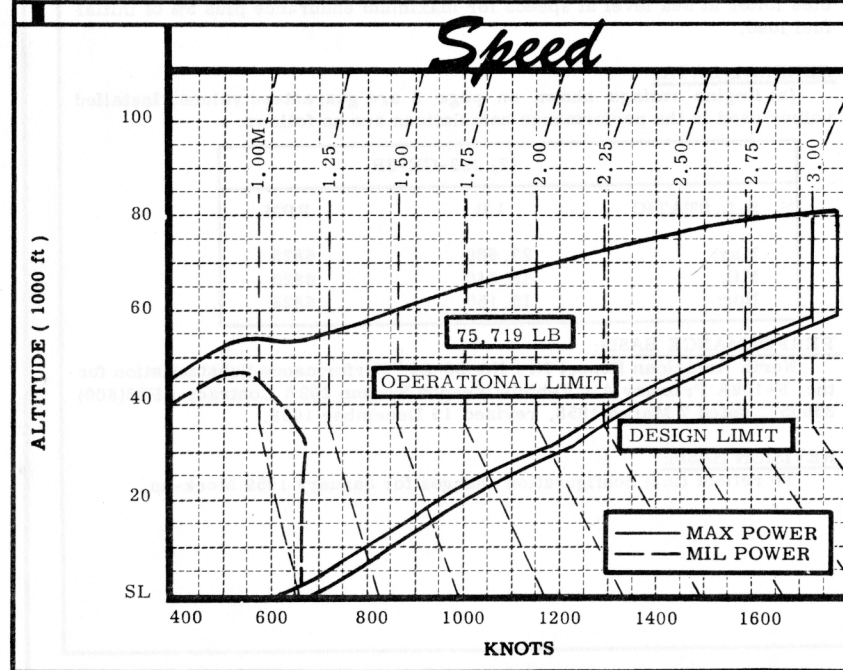
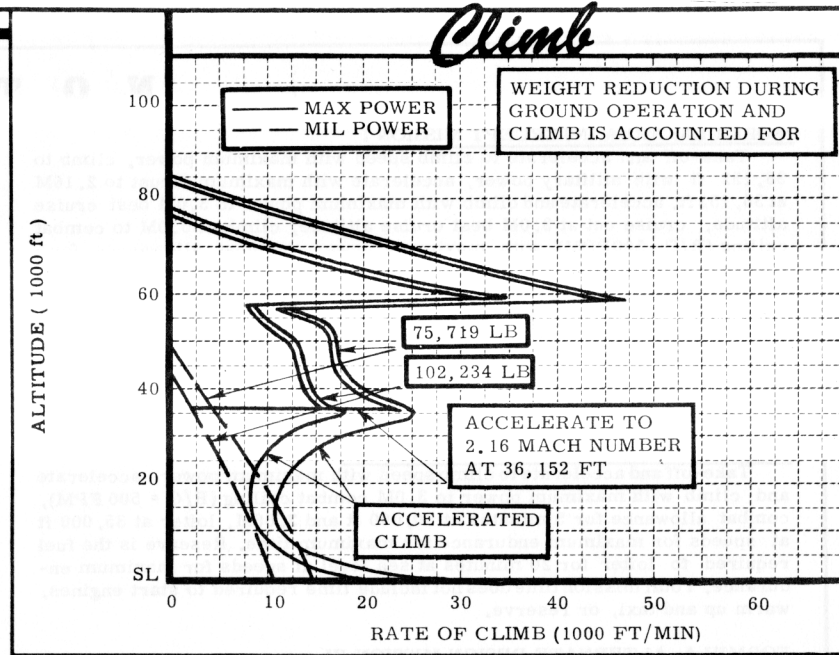
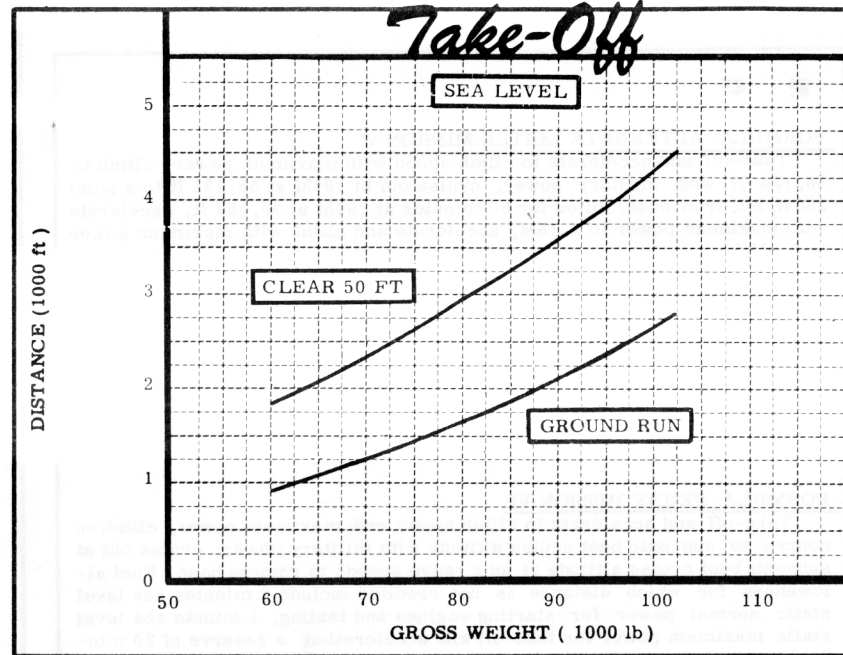
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Loading and Performance - Typical Mission

C O N D I T I O N S			INTERCEPTOR MISSIONS					FERRY RANGE VI
			BASIC		ALTERNATE			
			AREA I	POINT II	DESIGN III	DASH IV	LOITER V	
TAKE-OFF WEIGHT	(lb)	102,234	102,234	102,234	82,373	102,234	99,780	
Fuel at 6.7 lb/gal (grade JP-6)	(lb)	47,632	47,632	47,632	27,771	47,632	47,632	
Payload (missiles)	(lb)	2454	2454	2454	2454	2454	None	
Wing loading	(psf)	54.9	54.9	54.9	44.1	54.9	53.5	
Stall speed (power off)	(kn)	128.0	128.0	128.0	115.5	128.0	126.5	
Take-off ground roll at SL	(ft)	2800	2800	2800	1760	2800	2650	
Take-off to clear 50 ft	(ft)	4510	4510	4510	3080	4510	4290	
Rate of climb at SL	(fpm)	29,750	29,750	29,750	37,500	29,750	30,500	
Rate of climb at SL (one eng out)	(fpm)	5150	5150	5150	6830	5150	5320	
Time: SL to 40,000 ft	(min)	5.1 (6)	5.1 (6)	5.1 (6)	3.9 (5)	5.1 (6)	4.9 (6)	
Time: SL to 50,000 ft	(min)	5.9 (6)	5.9 (6)	5.9 (6)	4.5 (5)	5.9 (6)	5.7 (6)	
Service ceiling (100 fpm)	(ft)	74,000	74,000	74,000	78,500	74,000	74,500	
Service ceiling (one eng out)	(ft)	33,900	33,900	33,900	39,000	33,900	34,600	
COMBAT RANGE	(n mi)	—	—	—	—	—	2184	
COMBAT RADIUS	(n mi)	887	—	1009	350	640	—	
Average speed	(kn)	1721	—	1721	1721	1200	550	
Initial cruising altitude	(ft)	69,100	—	69,100	73,800	72,200	36,100	
Final cruising altitude	(ft)	76,200	—	76,200	76,500	76,200	46,600	
Total mission time	(hr)	1.24	—	1.46	.69	2.35	4.01	
TOTAL MISSION TIME	(hr)	—	3.34	—	—	—	—	
Interception altitude	(ft)	—	77,600	—	—	—	—	
COMBAT WEIGHT	(lb)	75,719	85,327	74,084	65,801	70,869	57,950	
Combat altitude	(ft)	80,000 (1)	77,600 (1)	72,500 (1)	74,700 (1)	73,400 (1)	46,600 (2)	
Combat speed	(kn)	1721	1721	1721	1721	1721	1455	
Combat climb	(fpm)	500	500	14,450	14,800	14,500	74,500	
Combat ceiling (500 fpm)	(ft)	80,000	77,600	80,400	82,600	81,200	84,700	
Combat ceiling (1.2g)	(ft)	76,600	74,100	77,000	79,450	77,900	81,800	
Service ceiling (100 fpm)	(ft)	80,150	77,800	80,550	82,750	81,400	84,800	
Service ceiling (one engine out)	(ft)	40,700	38,250	41,150	43,400	42,000	45,700	
Max rate of climb at SL	(fpm)	40,000	35,500	41,000	46,500	43,000	53,000	
Time: 36,152 ft & .94M to 70,000 ft & 3.0M	(min)	4.3	5.1	4.2	3.7	4.0	3.2	
Max speed at optimum altitude	(kn/ft)	1721/76,600	1721/74,100	1721/77,000	1721/79,450	1721/77,900	1721/81,800	
Basic speed at 50,000 ft	(kn)	1526	1526	1526	1526	1526	1526	
LANDING WEIGHT	(lb)	60,484	58,022	58,716	57,711	58,716	57,950	
Ground roll at SL	(ft)	2010	1930	1950	1920	1950	1930	
Total from 50 ft	(ft)	3330	3215	3245	3200	3245	3215	
Touchdown speed	(kn)	132.0	130.0	130.5	129.5	130.5	130.0	
Stall speed	(kn)	92.5	90.5	91.0	90.0	91.0	90.5	
Wing loading	(psf)	32.4	31.1	31.5	31.0	31.5	31.1	

<p>N O T E S</p>	<p>(1) Maximum power operations and climb</p> <p>(2) Military power</p> <p>(3) Detailed descriptions of RADIUS and RANGE missions given on page 6.</p> <p>(4) Allows for weight reduction during ground</p>	<p>(5) Allows 0.8 min for take-off and acceleration to best climb speed</p> <p>(6) Allows 1.2 min for take-off and acceleration to best climb speed</p> <p>(7) With 36.5% military thrust reverser</p> <p>(8) Instantaneous values</p>	<p>PERFORMANCE BASIS:</p> <p>(a) Data source: Estimated</p> <p>(b) Performance is based on powers shown on page 6</p>
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N O T E S

FORMULA: AREA INTERCEPT MISSION I

Take-off and accelerate to climb speed with maximum power, climb to 36,152 ft with military power, accelerate with maximum thrust to 2.16M at 36,152 ft, accelerate and climb with maximum power to 3.0M best cruise altitude, cruise out at 3.0M best cruise altitude, climb at 3.0M to combat ceiling (R/C- 500FPM) with maximum power, combat allowances for 5 minutes at 50,000 ft and 2.66M, cruise back at 3.0M best cruise altitude, Fuel allowances for which distance is not credited include 2 minutes sea level static normal power for starting engines and taxiing, 1 minute sea level static maximum power for take-off and acceleration to climb speed, 5 minutes combat with fuel flow based on power required at 50,000 ft to maintain operational limit speed (2.66M), and a reserve of 20 minutes loiter at sea level at speeds for maximum endurance plus 5% of initial fuel

FORMULA: POINT-INTERCEPT MISSION II

Take-off and accelerate to climb speed with maximum power, accelerate and climb with maximum power to 3.0M combat ceiling (R/C = 500 FPM), combat allowance for 5 minutes at 50,000 ft and 2.66M, loiter at 35,000 ft at speeds for maximum endurance for maximum time. Reserve is the fuel required to loiter for 20 minutes at sea level at speeds for maximum endurance. Total mission time does not include time required to start engines, warm up and taxi, or reserve.

FORMULA: ALTERNATE DESIGN MISSION III

Take-off and accelerate to climb speed with maximum power, climb to 36,152 ft with military power, accelerate with maximum power to 2.16M at 36,152 ft, accelerate and climb with maximum power to 3.0M best cruise altitude, cruise out at 3.0M best cruise altitude, combat for 5 minutes at 3.0M, cruise back at 3.0M best cruise altitude, decelerate and descend with idle thrust to best loiter altitude and speed. Fuel allowances for which distance is not credited include 2 minutes sea level static normal power for starting engines and taxiing, 1 minute sea level static maximum power for take-off and acceleration to climb speed, 5 minutes combat with fuel flow based on power setting required to maintain 3.0M level flight at 70,000 ft, a reserve of 10 minutes loiter at sea level at speeds for maximum endurance plus 5% of initial fuel load.

FORMULA: ALTERNATE DASH MISSION IV

Take-off and accelerate to climb speed with maximum power, accelerate and climb with maximum power to 3.0M best cruise altitude, cruise out at 3.0M best cruise altitude, combat for 10 minutes at 3.0M, cruise back at 3.0M, cruise back at 3.0M best cruise altitude, decelerate and descend with idle thrust to best loiter altitude and speed. Fuel allowances for which distance is not credited include 2 minutes sea level static normal power for starting engines and taxiing, 1 minute sea level static maximum power for take-off and acceleration, 10 minutes combat with fuel flow based on power setting required to maintain level flight at 3.0M 1,2g ceiling, a reserve of 10 minutes loiter at altitudes and speeds for maximum endurance, a reserve of 10 minutes loiter at sea level at speeds for maximum endurance plus 5% of initial fuel load.

FORMULA: ALTERNATE LOITER MISSION V

Take-off and accelerate to climb speed with maximum power, climb to 36,152 ft with military power, cruise out at .94M at 36,152 ft to a point 250 N.Mi. from base, loiter for 60 minutes at .94M at 36,152 ft, accelerate with maximum power to 2.16M, accelerate and climb with maximum power to 3.0M best cruise altitude, cruise out at 3.0M best cruise altitude, combat for 10 minutes at 3.0M, cruise back at 3.0M best cruise altitude, decelerate and descend with idle thrust to best loiter altitude and speed. Fuel allowances for which distance is not credited include 2 minutes sea level static normal power for starting engines and taxiing, 1 minute sea level static maximum power for take-off and acceleration, 10 minutes combat with fuel flow based on power setting required to maintain 3.0M level flight at 70,000 ft, a reserve of 10 minutes loiter at altitudes and speeds for maximum endurance, a reserve of 10 minutes loiter at sea level at speeds for maximum endurance plus 5% of initial fuel load.

FORMULA: FERRY MISSION VI

Take-off and accelerate to climb speed with maximum power, climb on course to subsonic best cruise altitude with military power, cruise out at subsonic best cruise altitude at long range speeds to remote base. Fuel allowances for which distance is not credited include 5 minutes sea level static normal power for starting engines and taxiing, 1 minute sea level static maximum power for take-off and acceleration, a reserve of 20 minutes loiter at sea level at speeds for maximum endurance plus 5% of initial fuel load.

GENERAL DATA:

(a) Engine ratings shown on page 3 are guaranteed values. Installed values used in the performance calculations are as follows:

(2) J93-GE-3R		
S. L. STATIC	LB	RPM
Max:	23,680	6825
Mil:	15,640	6825
Nor:	15,150	6825

PERFORMANCE BASIS:

North American Report Nr. NA-58-84 "Performance Substantiation for the F-108A Primary Air Vehicle Weapon System 202A Contract AF33(600) 33605", dated 7 March 1958, revised 15 December 1958.

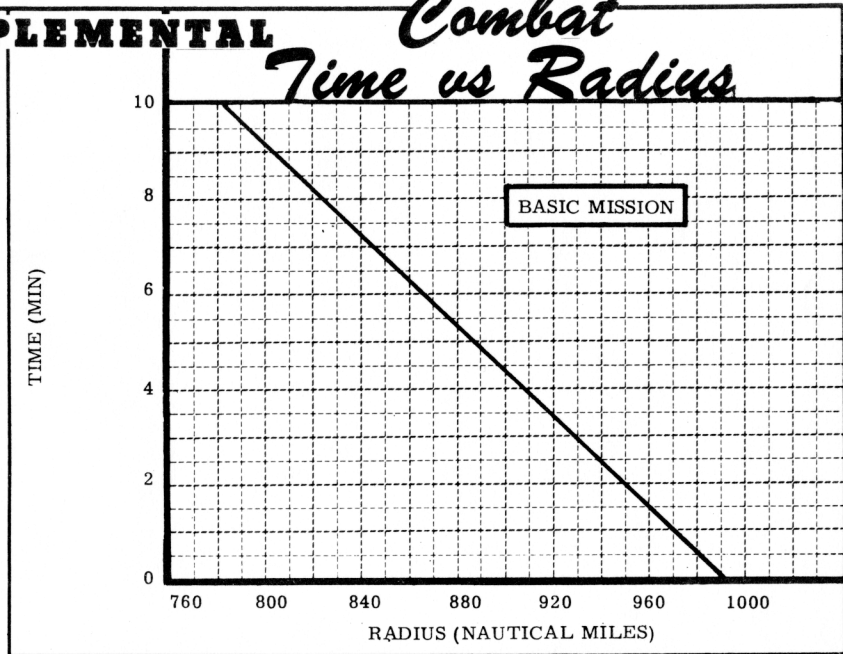
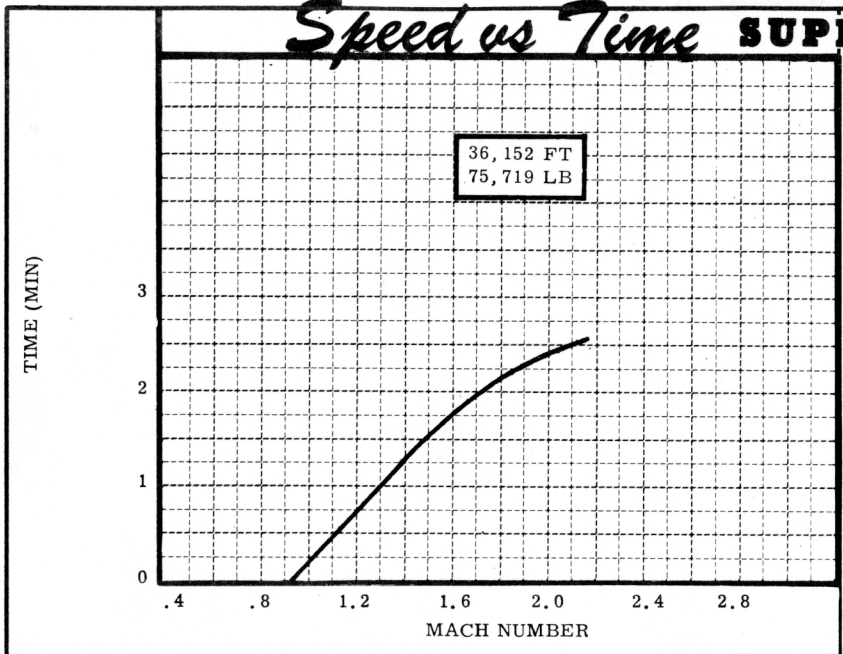
REVISION BASIS:

To reflect final configuration changes for January 1959 Mock-up.

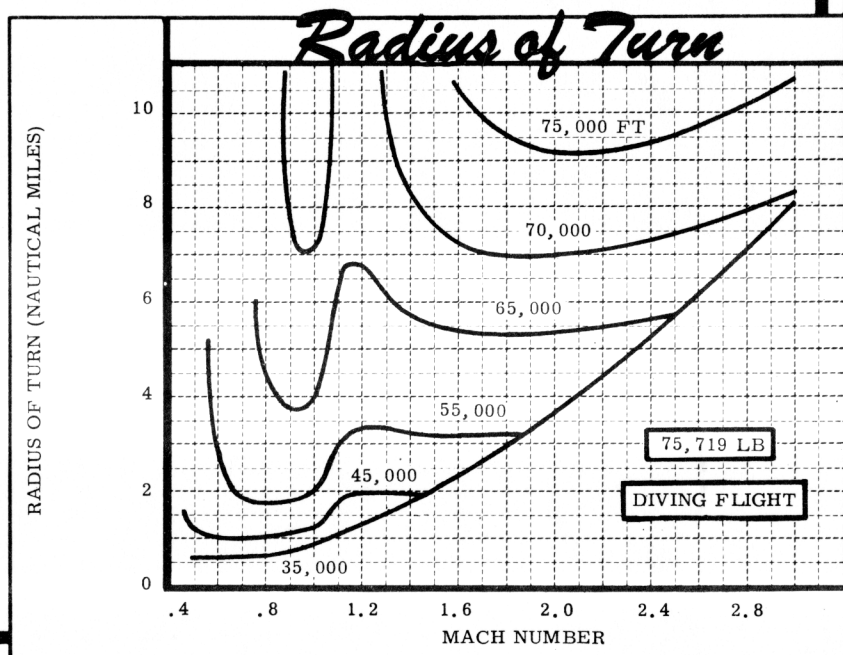
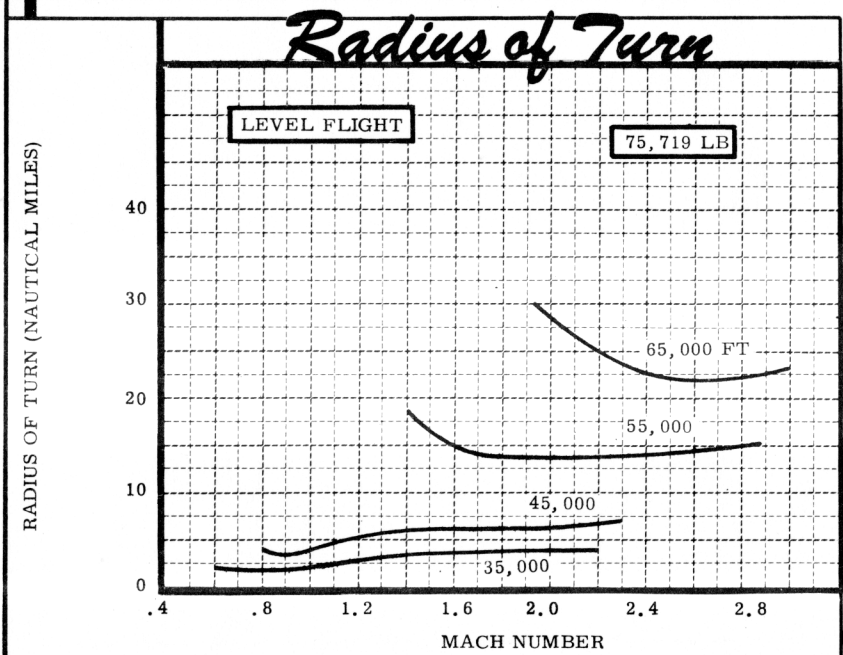
Speed vs Time

SUPPLEMENTAL

Combat Time vs Radius



Radius of Turn



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