

~~Unclassified~~  
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A-1  
F-108A/char

MOCKUP

Classification cancelled  
or changed to Unclassified

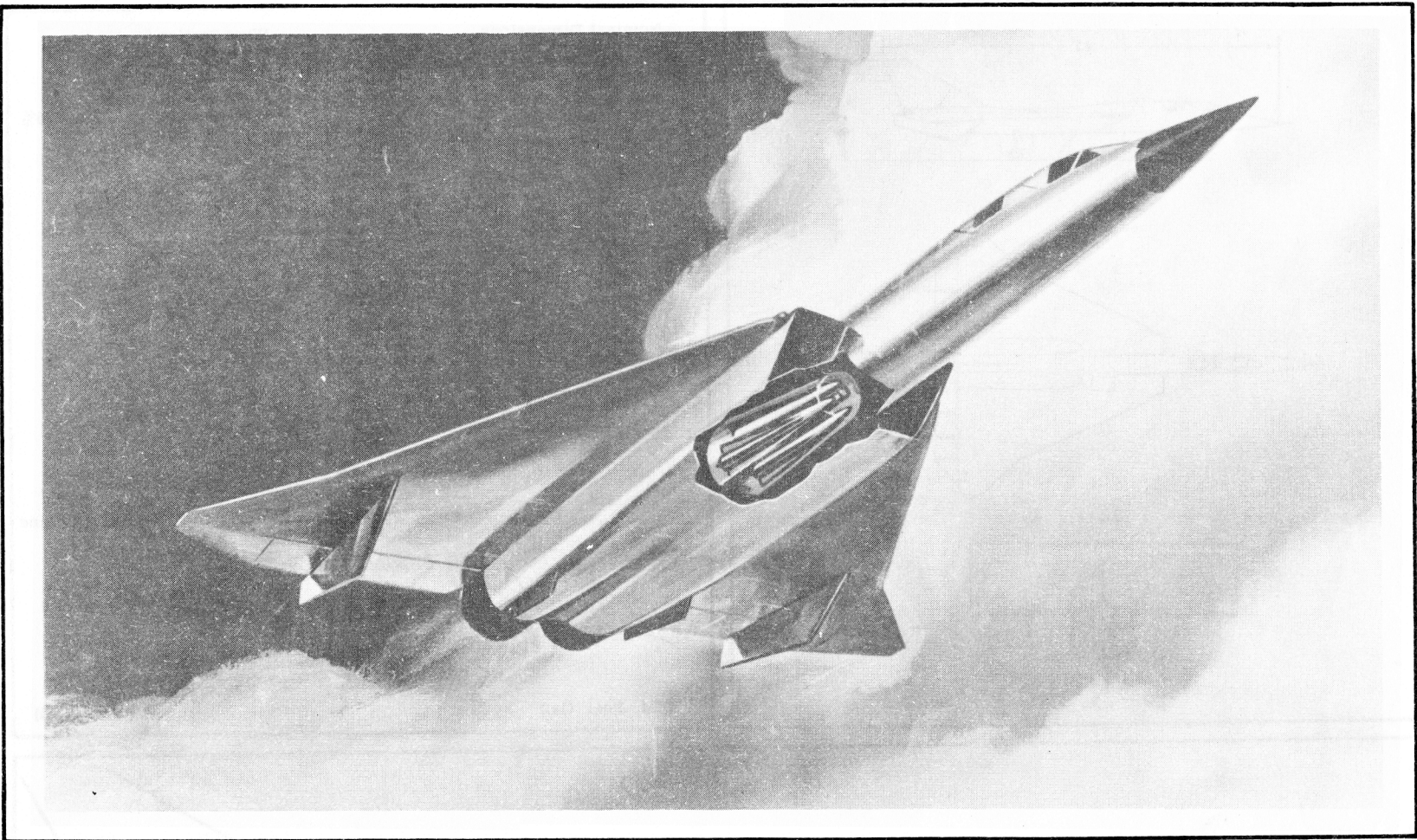
AUTH: DOD DIR 5200.10

By William M White 23 Jan 78  
Signature and Grade

DOWNGRADED AT 3 YEAR INTERVALS,  
DECLASSIFIED AFTER 12 YEARS

DOD DIR 5200.10

a. R. Donohoe  
31 Mar 67



# Standard Aircraft Characteristics

BY AUTHORITY OF  
THE SECRETARY  
OF THE AIR FORCE

## F-108 A

**RAPIER**

**North American**

TWO J93-GE-3AR

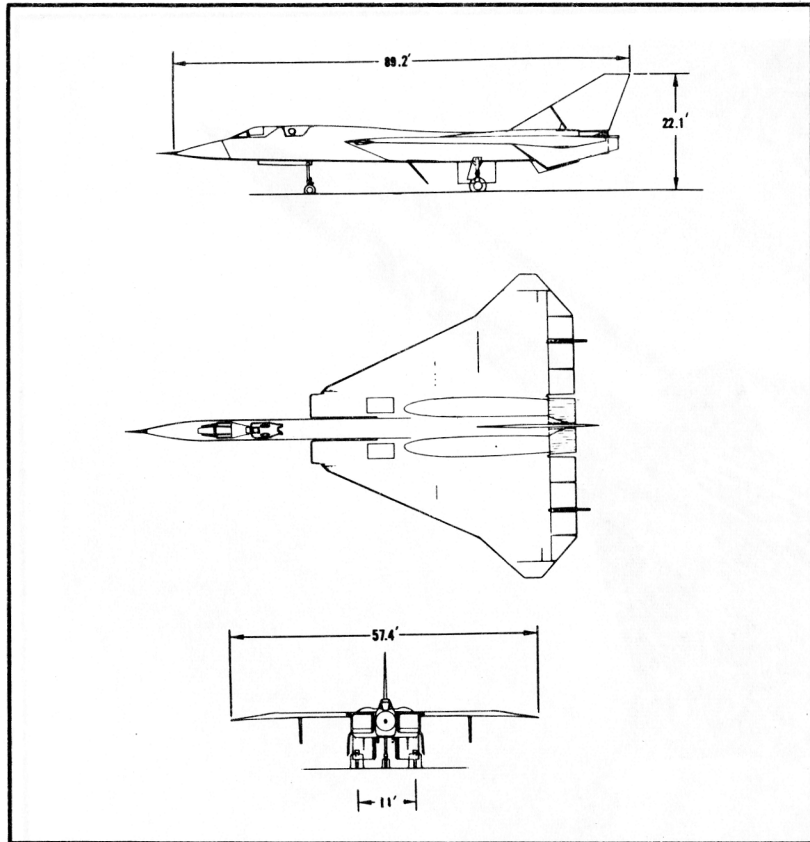
GENERAL ELECTRIC

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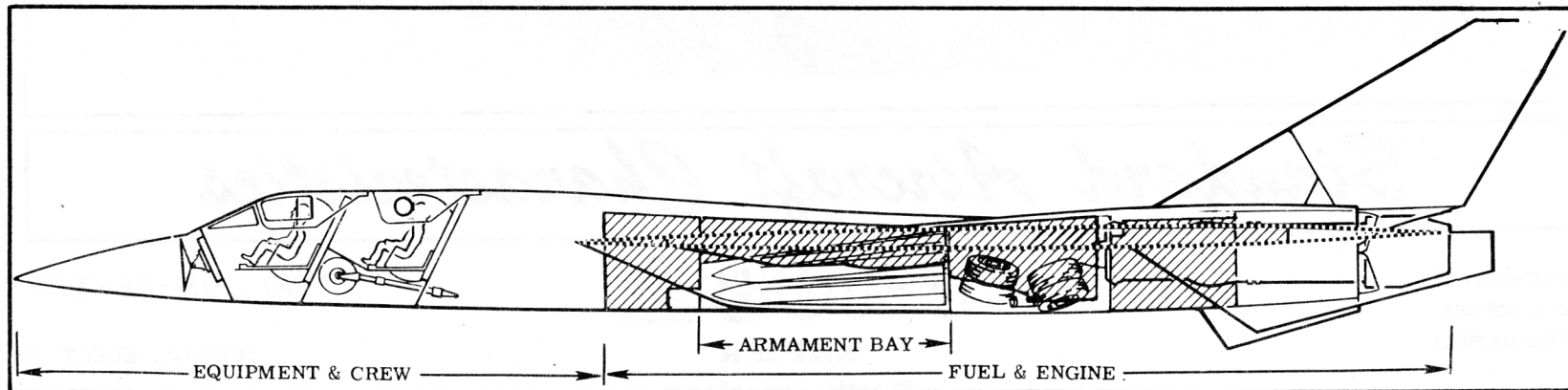
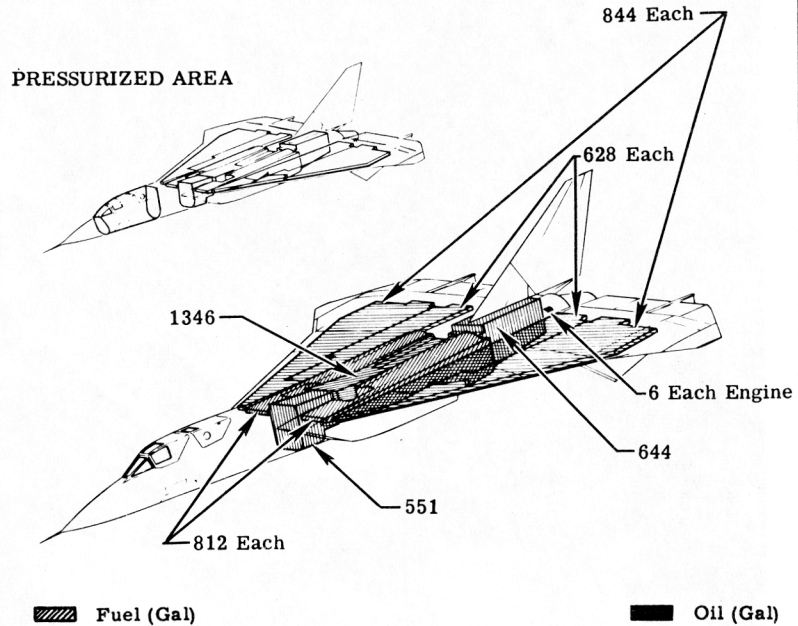
F-108 A

57WC-4984



Nominal Dimensions  
 Wing Area . . . . . 1865 sq ft  
 Aspect Ratio . . . . . 1.68  
 M. A. C. . . . . 507.9 in.

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





# Loading and Performance - Typical Mission

| C O N D I T I O N S                                 | INTERCEPT MISSIONS |             |             |             |             |             | FERRY MISSION VI |
|---|--------------------|-------------|-------------|-------------|-------------|-------------|------------------|
|   | BASIC              |             | ALTERNATE   |             |             |             |                  |
|   | AREA I             | POINT II    | DESIGN III  | DASH IV     | LOITER V    |             |                  |
| TAKE-OFF WEIGHT (lb)                                | 102,533            | 102,533     | 102,533     | 82,250      | 102,533     | 100,094     |                  |
| Fuel at 6,7 lb/gal (grade JP-6) (lb)                | 47,632             | 47,632      | 47,632      | 27,349      | 47,632      | 47,632      |                  |
| Payload (missiles) (lb)                             | 2439               | 2439        | 2439        | 2439        | 2439        | None        |                  |
| Wing loading (psf)                                  | 55.0               | 55.0        | 55.0        | 44.1        | 55.0        | 53.6        |                  |
| Stall speed (power off) (kn)                        | 128                | 128         | 128         | 115         | 128         | 127         |                  |
| Take-off ground roll at SL (1) (ft)                 | 2660               | 2660        | 2660        | 1680        | 2660        | 2530        |                  |
| Take-off to clear 50 ft (1) (ft)                    | 4275               | 4275        | 4275        | 2930        | 4275        | 4090        |                  |
| Rate of climb at SL (1) (fpm)                       | 32,600             | 32,600      | 32,600      | 40,800      | 32,600      | 33,500      |                  |
| Rate of climb at SL(one eng out) (1) (fpm)          | 6090               | 6090        | 6090        | 8080        | 6090        | 6280        |                  |
| Time: SL to 40,000 ft (1) (4) (min)                 | 4.6 (6)            | 4.6 (6)     | 4.6 (6)     | 3.5 (5)     | 4.6 (6)     | 4.5 (6)     |                  |
| Time: SL to 50,000 ft (1) (4) (min)                 | 5.4 (6)            | 5.4 (6)     | 5.4 (6)     | 4.1 (5)     | 5.4 (6)     | 5.2 (6)     |                  |
| Service ceiling (100 fpm) (1) (ft)                  | 73,950             | 73,950      | 73,950      | 78,550      | 73,950      | 74,450      |                  |
| Service ceiling (one engine out) (1) (ft)           | 34,900             | 34,900      | 34,900      | 40,300      | 34,900      | 35,500      |                  |
| COMBAT RANGE (3) (n mi)                             | —                  | —           | —           | —           | —           | 2161        |                  |
| COMBAT RADIUS (3) (n mi)                            | 887                | —           | 1010        | 350         | 642         | —           |                  |
| Average speed (kn)                                  | 1721               | —           | 1721        | 1721        | 1185        | 550         |                  |
| Initial cruising altitude (ft)                      | 69,000             | —           | 69,000      | 73,500      | 72,000      | 37,100      |                  |
| Final cruising altitude (ft)                        | 76,000             | —           | 76,000      | 76,400      | 76,000      | 45,300      |                  |
| Total mission time (hr)                             | 1.20               | —           | 1.43        | 0.68        | 2.34        | 3.92        |                  |
| TOTAL MISSION TIME (3) (hr)                         | —                  | 3.2         | —           | —           | —           | —           |                  |
| Interception altitude (ft)                          | —                  | 77,400      | —           | —           | —           | —           |                  |
| COMBAT WEIGHT (lb)                                  | 76,118             | 86,253      | 74,543      | 66,190      | 71,283      | 58,274      |                  |
| Combat altitude (ft)                                | 79,400 (1)         | 77,400 (1)  | 72,300 (1)  | 74,500 (1)  | 73,100 (1)  | 45,300 (2)  |                  |
| Combat speed (1) (kn)                               | 1721               | 1721        | 1721        | 1721        | 1721        | 1435        |                  |
| Combat climb (1) (fpm)                              | 500                | 500         | 14,350      | 14,750      | 14,500      | 74,450      |                  |
| Combat ceiling (500 fpm) (1) (ft)                   | 79,400             | 77,400      | 80,250      | 82,350      | 81,050      | 84,400      |                  |
| Combat ceiling (1.2g) (1) (ft)                      | 76,550             | 73,900      | 77,000      | 79,350      | 77,900      | 81,650      |                  |
| Service ceiling (100 fpm) (1) (ft)                  | 80,100             | 77,500      | 80,400      | 82,500      | 81,200      | 84,600      |                  |
| Service ceiling (one engine out) (1) (ft)           | 42,000             | 39,200      | 42,500      | 44,800      | 43,400      | 47,000      |                  |
| Max rate of climb at SL (1) (fpm)                   | 44,000             | 39,600      | 45,000      | 50,700      | 47,000      | 57,500      |                  |
| Time: 36,152 ft & 94M to 70,000 ft & 3.0M (1) (min) | 4.1                | 4.9         | 4.0         | 3.5         | 3.8         | 3.0         |                  |
| Max speed at optimum altitude (1) (kn/ft)           | 1721/76,550        | 1721/73,900 | 1721/77,000 | 1721/79,350 | 1721/77,900 | 1721/81,650 |                  |
| Basic speed at 50,000 ft (1) (kn)                   | 1526               | 1526        | 1526        | 1526        | 1526        | 1526        |                  |
| LANDING WEIGHT (lb)                                 | 60,803             | 58,331      | 59,018      | 57,995      | 59,018      | 58,274      |                  |
| Ground roll at SL (7) (ft)                          | 2030               | 1940        | 1960        | 1930        | 1960        | 1940        |                  |
| Total from 50 ft (7) (ft)                           | 3350               | 3230        | 3260        | 3220        | 3260        | 3230        |                  |
| Touchdown speed (kn)                                | 133                | 130         | 131         | 130         | 131         | 130         |                  |
| Stall speed (kn)                                    | 93                 | 91          | 91          | 90          | 91          | 91          |                  |
| Wing loading (psf)                                  | 32.6               | 31.3        | 31.7        | 31.1        | 31.7        | 31.3        |                  |

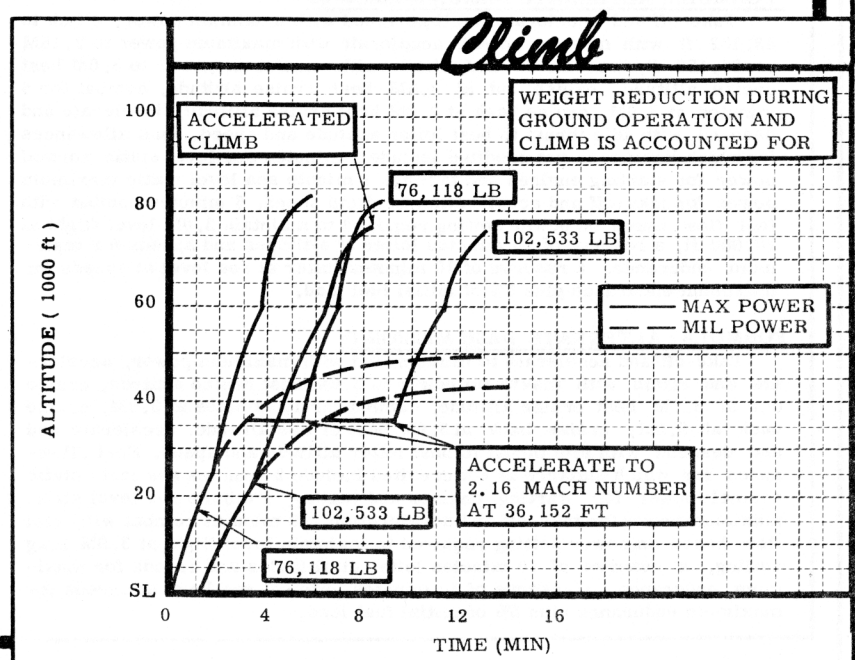
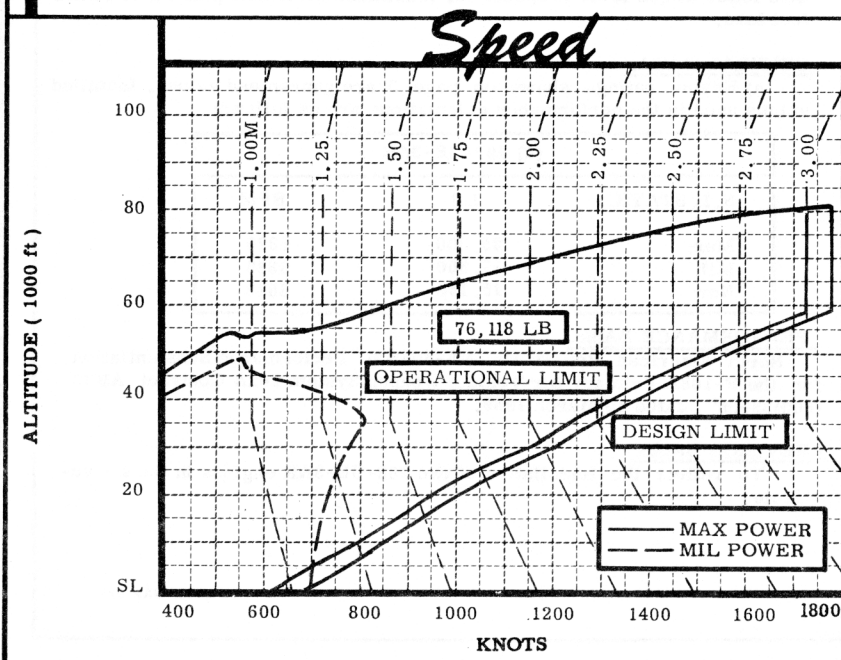
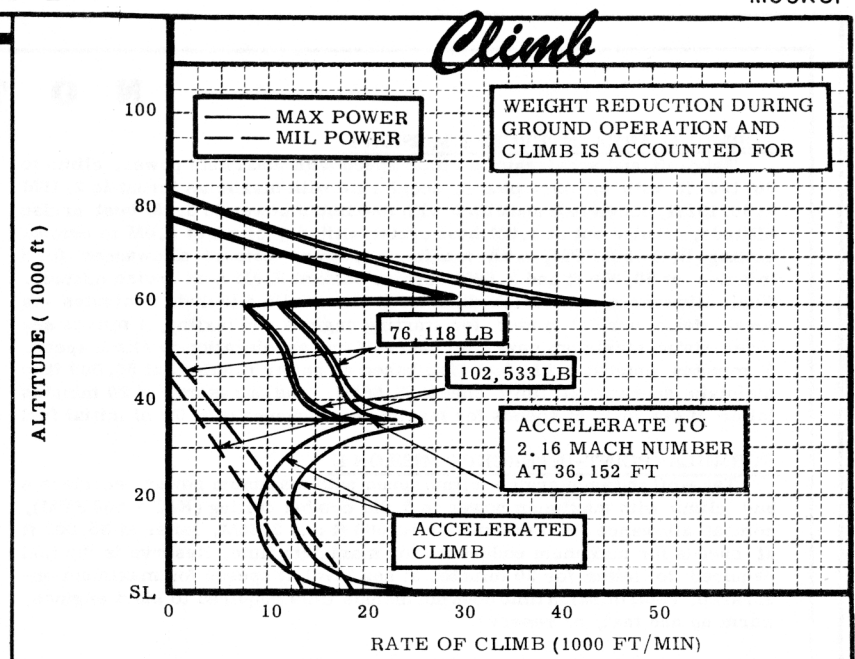
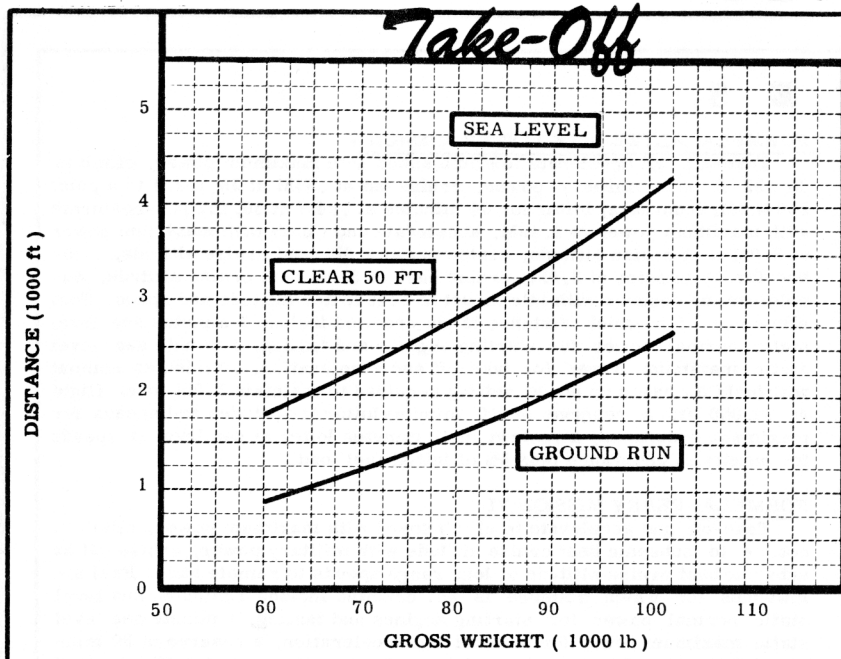
**NOTES**

(1) Maximum power ground operation and climb. (7) With 32.5% military thrust reverser.

(2) Military power (5) Allows 0.8 min for take-off and acceleration to best climb speed. PERFORMANCE BASIS:

(3) Detailed descriptions of RADIUS and RANGE missions given on page 6. (6) Allows 1.2 min for take-off and acceleration to best climb speed. (a) Data source: Estimated

(4) Allows for weight reduction during (b) Performance is based on powers shown on page 6.



**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 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 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-3AR |        |      |
|----------------|--------|------|
| S. L. STATIC   | LB     | RPM  |
| Max:           | 25,300 | 6825 |
| Mil:           | 17,600 | 6825 |
| Nor:           | 15,150 | 6825 |

PERFORMANCE BASIS:

North American Report Nr. NA-59-506 "Performance Substantiation for the F-108A Primary Air Vehicle Weapon System 202A Contract AF33 (600)35605", dated 15 March 1959.

REVISION BASIS:

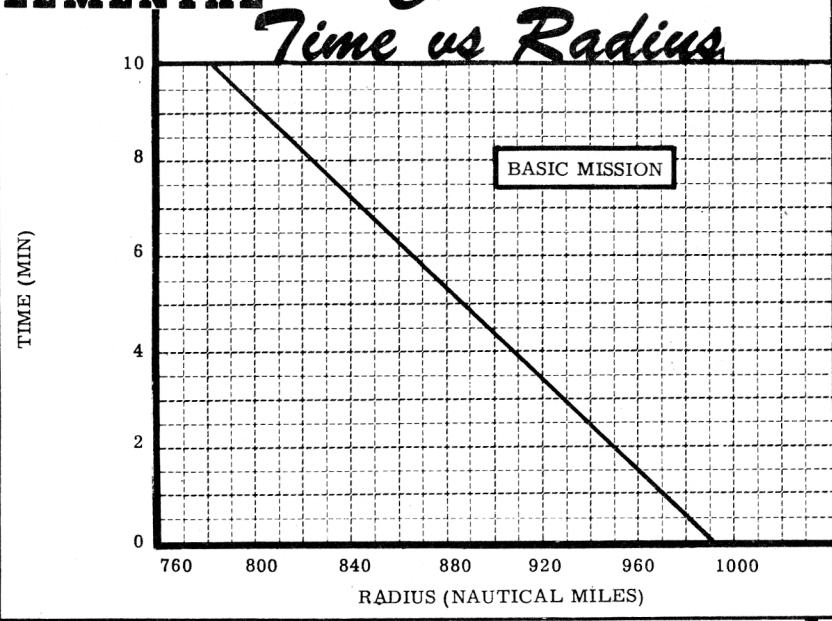
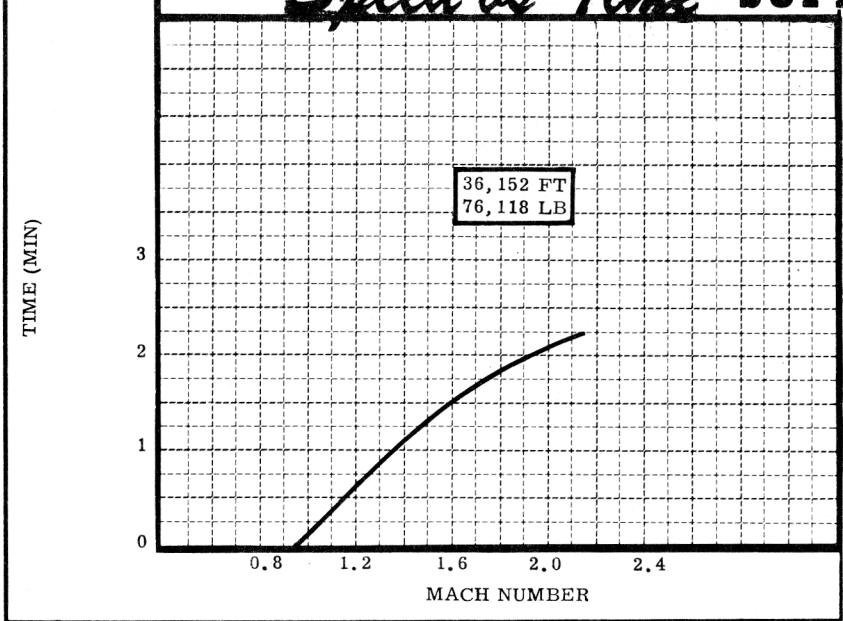
To reflect the installation of two J93-GE-3AR engines in the air vehicle.

(15 MAR 59)

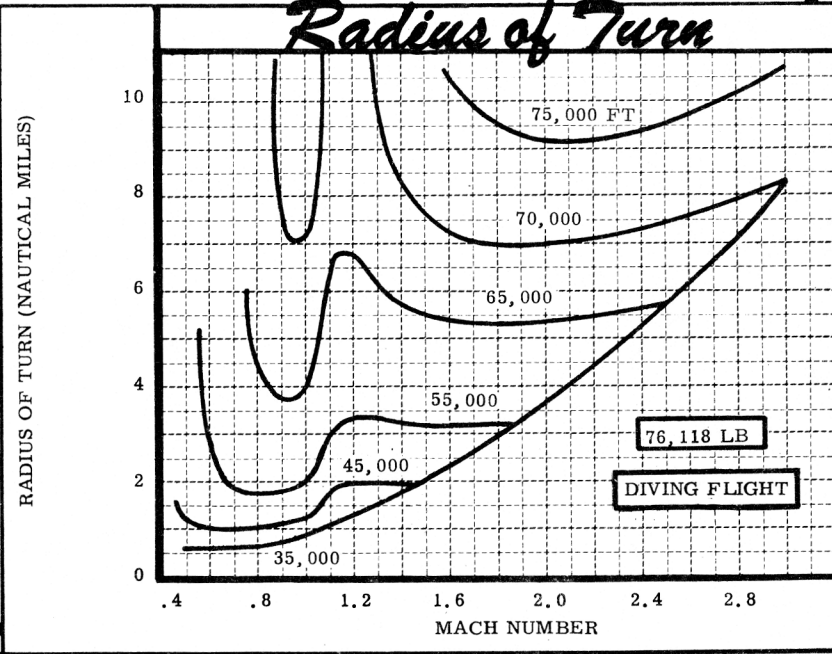
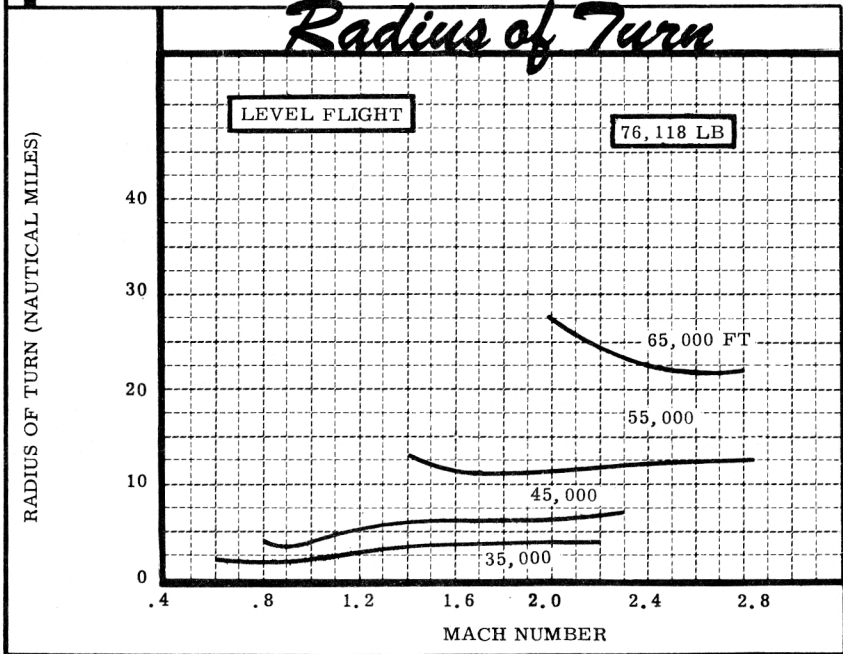
# Speed vs Time

## SUPPLEMENTAL

# Combat Time vs Radius



# Radius of Turn



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