Standard Aircraft Characteristics

B-70

VALKYRIE

North American

SECRET

SIX J93-GE-3

GENERAL ELECTRIC

8 JUN 60

B-70

5 Ed addn #18
POWER PLANT

Nr & Model ........ (6) J33-GE-8
Mfr ............... General Electric
Engine Spec Nr .... R584QT228G
Type ............. Axial Turbo Jet
Length ........... 232.9"
Diameter .......... 52.6"
Weight (dry) ...... 4707 lb
Tail Pipe Mech, Variable C/D Augmentation .......... Afterburner

MISSION AND DESCRIPTION

The principal mission of this aircraft is to destroy the military, logistic, industrial, economic, control and psychological strengths of the enemy.

Special features of this airplane are selective placement of wing, body and inlet duct for obtaining high lift-to-drag ratios, a canard configuration, variable area inlet with mechanically controlled convergent-divergent nozzle, and airframe construction of steel and titanium.

The crew of four consists of the pilot, co-pilot, bombardier-navigator and defense operator.

A Bombing and Navigation, Missile Guidance System (B & N & MG) is provided for the release of special stores and missiles.

An air defense system based on electronic countermeasures and chaff dispensing is employed.

DEVELOPMENT

Design initiated .......... Nov 55
Date of Contract .......... Dec 57
Mock-up .......... Mar 59
First Flight .......... (est) Jan 62
First Flight (XB-70) ....... (est) Dec 62

ENGINE RATINGS

S.L.S. LB - RPM - MIN
Max: 29,500 - 6825 - cont
Mil: 20,900 - 6825 - cont
Nor: 18,600 - 6825 - cont

DIMENSIONS

Wing
Span ............ 105.0"
Incidence (root) ....... 0°
(tip) ............ -5.0°
Dihedral ........... 0°
Sweepback (25% chord) . 58.8°
Length ............ 185.8"
Height ............. 30.7"
Tread .............. 23.2"

BOMBS

Nr \ Weight
1 \ Special Weapons
2 \ Class A ........ 25,000
1 \ Class B ........ 20,000
1 \ Class C (FUFO) . 17,000
4 \ Class D .......... 8000
Max Bomb Load .......... 25,000

Alternate Loadings
2 ASM's, external plus 1 Class B
2 ASM's, external plus 4 Class D
* Space provisions only

ELECTRONICS

Bomb-Nav & Missile Guidance Sys,
Digital Computer Equipment
Interconnection Equipment
Control & Display Equipment
Radar Display Equipment
Stellar Inertial Equipment
Radar Sighting Equipment
Doppler Radar Equipment
Electronic Power Supply
Flight Control Subsystem Group
Primary Flight Control
Secondary Flight Control
Automatic Flight Control
Central Air Data
Auxiliary Gyro Platform
Flight & Engine Display

ELECTRONICS

Defensive Subsystem
Central Intelligence Control
Electromagnetic Countermeasure
Surveillance
Electromagnetic and Thermal
Thermal & Chaff Countermeasures
Penetration Aids
Active Defense
Mission & Traffic Control Subsys
Digital Data Terminal Equipment
Recorder
Approach and Landing
Radio Navigation Aids
Station Keeping & Rendezvous
Identification - A/G and A/G
Air Traffic Control Signalling

WEIGHTS

Loading ............ Lb
Empty ............. 185,326(E)
Basic ............. 189,862(E)
Design ............ 240,892
Combat ............ 270,236
Max T.O. .......... 255,560
Max in Fit ....... 1554,690
Max Landing .......... 283,510

FUEL

Location Nr. Tanks Gal
Fuselage ........ 5 . . 28.955
Wing & Duct ........ 8 . . 19.492
Aux Armament Bay. 1 . . 3.450
51,897
Grade ............. JP-6
Specification .......... MIL-F-25656

OIL

Fuselage ........ 6 . . 38
 Specification .......... MIL-L-9236A

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<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>BASIC MISSION I</th>
<th>DESIGN MISSION II</th>
<th>ALTERNATE MISSIONS REFUELED HIGH ALTITUDE III</th>
<th>REFUELED S.L. PENETRATION IV</th>
<th>FERRY RANGE V</th>
</tr>
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<tbody>
<tr>
<td>TAKE-OFF WEIGHT</td>
<td>(lb) 554,609</td>
<td>(lb) 347,710</td>
<td>(lb) 554,609</td>
<td>(lb) 554,609</td>
<td>(lb) 543,709</td>
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<tr>
<td>Fuel at 6.7 lb/gal (grade JP-6)</td>
<td>(lb) 347,710</td>
<td>(lb) 347,710</td>
<td>(lb) 347,710</td>
<td>(lb) 347,710</td>
<td>(lb) 347,710</td>
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<tr>
<td>Payload (bombs &amp; IRCM)</td>
<td>(lb) 10,900</td>
<td>(lb) 10,900</td>
<td>(lb) 10,900</td>
<td>(lb) 10,900</td>
<td>(lb) None</td>
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<tr>
<td>Wing loading (psf)</td>
<td>88.0</td>
<td>88.0</td>
<td>88.0</td>
<td>88.0</td>
<td>86.3</td>
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<tr>
<td>Stall speed (power off) (kn)</td>
<td>147.5</td>
<td>147.5</td>
<td>147.5</td>
<td>147.5</td>
<td>146.0</td>
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<tr>
<td>Time to clear 50 ft (min) (ft)</td>
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<td>3.4</td>
<td>3.4</td>
<td>3.4</td>
<td>2.3</td>
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<tr>
<td>Time to acceleration altitude (min) (ft)</td>
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<td>68,000</td>
<td>68,000</td>
<td>68,000</td>
<td>68,000</td>
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<tr>
<td>COMBAT RANGE (n mi)</td>
<td>5309</td>
<td>6522</td>
<td>7826</td>
<td>5362</td>
<td>5461</td>
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<tr>
<td>Recovery distance (n mi)</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td>1181</td>
<td>1181</td>
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<tr>
<td>Average cruise speed (subsonic/supersonic) (kn/ kn)</td>
<td>—/1721</td>
<td>—/1721</td>
<td>551/1721</td>
<td>551/1721</td>
<td>—/1721</td>
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<tr>
<td>Initial supersonic cruise altitude (ft)</td>
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<td>65,000</td>
<td>65,000</td>
<td>65,000</td>
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<tr>
<td>Final supersonic cruise altitude (ft)</td>
<td>76,100</td>
<td>77,700</td>
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<td>76,100</td>
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<tr>
<td>Refuel speed (kn)</td>
<td>—</td>
<td>—</td>
<td>500</td>
<td>500</td>
<td>500</td>
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<tr>
<td>Total mission time (hr)</td>
<td>3.18</td>
<td>4.60</td>
<td>6.73</td>
<td>6.48</td>
<td>3.37</td>
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<tr>
<td>COMBAT WEIGHT</td>
<td>(lb) 272,236</td>
<td>(lb) 240,892</td>
<td>(lb) 240,892</td>
<td>(lb) 264,712</td>
<td>(lb) 231,986</td>
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<td>Combat altitude (ft)</td>
<td>72,700</td>
<td>74,900</td>
<td>74,900</td>
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<tr>
<td>Combat speed (kn)</td>
<td>1721</td>
<td>1721</td>
<td>1721</td>
<td>1721</td>
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<tr>
<td>Combat climb (fpm)</td>
<td>19,100</td>
<td>19,600</td>
<td>19,600</td>
<td>19,600</td>
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<tr>
<td>Combat ceiling (500 fpm) (ft)</td>
<td>83,300</td>
<td>84,900</td>
<td>84,900</td>
<td>84,900</td>
<td>84,900</td>
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<tr>
<td>Service ceiling (100 fpm) (ft)</td>
<td>83,500</td>
<td>85,100</td>
<td>85,100</td>
<td>85,100</td>
<td>85,100</td>
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<tr>
<td>Max rate of climb at SL (fpm)</td>
<td>24,550</td>
<td>26,100</td>
<td>26,100</td>
<td>26,100</td>
<td>26,100</td>
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<tr>
<td>Max speed at optimum altitude (kn/ft)</td>
<td>1724/83,300</td>
<td>1731/85,100</td>
<td>1731/85,100</td>
<td>1727/84,000</td>
<td>1735/86,300</td>
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<tr>
<td>Basic speed at 35,000 ft (kn)</td>
<td>1089</td>
<td>1089</td>
<td>1089</td>
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<tr>
<td>LANDING WEIGHT</td>
<td>(lb) 231,986</td>
<td>(lb) 204,342</td>
<td>(lb) 204,342</td>
<td>(lb) 204,342</td>
<td>(lb) 231,986</td>
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<tr>
<td>Ground roll at SL (ft)</td>
<td>6280</td>
<td>5440</td>
<td>5440</td>
<td>5440</td>
<td>6290</td>
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<tr>
<td>Ground roll (auxiliary brake) (ft)</td>
<td>3590</td>
<td>3160</td>
<td>3160</td>
<td>3160</td>
<td>3590</td>
</tr>
<tr>
<td>Total from 50 ft (auxiliary brake) (ft)</td>
<td>7930</td>
<td>7030</td>
<td>7030</td>
<td>7030</td>
<td>7930</td>
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<tr>
<td>Stall speed (power off) (kn)</td>
<td>95.0</td>
<td>89.0</td>
<td>89.0</td>
<td>89.0</td>
<td>95.0</td>
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**NOTES**
- Maximum power
- Military power
- Allows for weight reduction during ground operation and climb
- Detailed description of RANGE missions given on page 6
- With drag chute
- Performance basis:
  - (a) Data source: Estimated (Not substantiated by WADD)
  - (b) Performance is based on powers on page 7
  - (c) Fuel flow data used in computing BASIC and FERRY missions are increased 35%
FORMULA: RANGE MISSION I

Take-off and accelerate to climb speed with maximum power, climb on course to 25,000 ft with maximum power, accelerate to Mach 1.37 at 25,000 ft, accelerated climb from 25,000 ft to Mach 3.0 cruise altitude, cruise out at Mach 3.0 expanding IRM 300 n miles prior to bomb release, drop bomb, cruise on course 1200 n miles at Mach 3.0. Range free allowances include 5 minutes normal power for starting engines, 1 minute maximum power for take-off and acceleration, and a fuel reserve equal to 30 minutes loiter at SL alt at speeds for maximum endurance plus 5% of initial fuel.

FORMULA: RANGE MISSION II

Alert concept take-off, accelerate to climb speed with maximum power, climb on course to 25,000 ft with maximum power, accelerate to Mach 1.37 at 25,000 ft, accelerated climb from 25,000 ft to Mach 3.0 cruise altitude, cruise out at Mach 3.0 expanding IRM 300 n miles prior to bomb release, drop bomb 1200 n miles from end of mission, cruise on course at Mach 3.0, make level flight deceleration with military power, descend to 20,000 ft with idle power, loiter 16 minutes at 20,000 ft at speeds for maximum endurance, descend to SL with idle power. Credit is taken for distance covered during deceleration and descent from Mach 3.0 cruise altitude to 20,000 ft. Range free allowances include alert concept take-off, 16 minutes loiter at 20,000 ft, descent from 20,000 ft to SL and a fuel reserve equal to 1 minute military power plus 9 minutes loiter at SL.

FORMULA: RANGE MISSION III

Alert concept take-off, accelerate to climb speed with maximum power, climb on course to 25,000 ft with military power, cruise at Mach .83 at 25,000 ft to rendezvous point, loiter at Mach .83 at 25,000 ft until rendezvous with tanker is accomplished, buddy cruise at Mach .83 at 25,000 ft, make constant altitude refuel (tanker recovery distance equals 1000 n miles), accelerate to Mach 1.37 at 25,000 ft, accelerated climb from 25,000 ft to Mach 3.0 cruise altitude, cruise out at Mach 3.0 expanding IRM 300 n miles prior to bomb release, drop bomb 1200 n miles from end of mission, cruise on course at Mach 3.0, make level flight deceleration with military power, descend to 20,000 ft with idle power, loiter 16 minutes at 20,000 ft at speeds for maximum endurance, descend to SL with idle power. Credit is taken for distance covered during deceleration and descent from Mach 3.0 cruise altitude to 20,000 ft. Range free allowances include alert concept take-off, 5.3 minutes loiter at 25,000 ft for tanker rendezvous, 16 minutes loiter at 20,000 ft, descent from 20,000 ft to SL, and a fuel reserve equal to 1 minute military power plus 9 minutes loiter at SL.

FORMULA: RANGE MISSION IV

Alert concept take-off, accelerate to climb speed with maximum power, climb on course to 25,000 ft with military power, cruise at Mach .83 at 25,000 ft to rendezvous point, loiter at Mach .83 at 25,000 ft, until rendezvous with tanker is accomplished, buddy cruise at Mach .83 at 25,000 ft, make constant altitude refuel (tanker recovery distance equals 1000 n miles), accelerate to Mach 1.37 at 25,000 ft, accelerated climb from 25,000 ft to Mach 3.0 cruise altitude, cruise out at Mach 3.0, descend to SL with idle power, total distance from take-off equals 3300 n miles, cruise at best cruise speed at SL for 300 n miles, accelerate to Mach .95 and continue SL penetration expanding IRM 300 n miles prior to bomb release, drop bomb at a distance from end of mission equal to 200 n miles plus sea level penetration, climb on course to 25,000 ft with maximum power, accelerate to Mach 1.37 at 25,000 ft, accelerated climb from 25,000 ft to Mach 3.0 cruise altitude, cruise out at Mach 3.0 make level flight deceleration with military power, descend to 20,000 ft with idle power, loiter 16 minutes at 20,000 ft at speeds for maximum endurance, descend to SL with idle power. Credit is taken for distance covered during deceleration and descent from Mach 3.0 cruise altitude to 20,000 ft. Range free allowances include alert concept take-off, 5.3 minutes loiter at 25,000 ft for tanker rendezvous, 16 minutes loiter at 20,000 ft, descent from 20,000 ft to SL and a fuel reserve equal to 1 minute military power plus 9 minutes loiter at SL.

FORMULA: RANGE MISSION V

Take-off and accelerate to climb speed with maximum power, climb on course to 25,000 ft with maximum power, accelerate to Mach 1.37 at 25,000 ft, accelerated climb to Mach 3.0 cruise altitude, cruise out at Mach 3.0. Range free allowances include 5 minutes normal power for starting engines, 1 minute maximum power for take-off and acceleration, and a fuel reserve equal to 30 minutes loiter at SL at speeds for maximum endurance plus 5% of initial fuel.
NOTES

GENERAL DATA:

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

<table>
<thead>
<tr>
<th>(c) J93-GE-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.L. Static</td>
</tr>
<tr>
<td>Max: 26,723</td>
</tr>
<tr>
<td>Mil: 18,963</td>
</tr>
<tr>
<td>Nor: 17,021</td>
</tr>
<tr>
<td>RPM 6825</td>
</tr>
</tbody>
</table>

(b) Wing Section:

W.S. 186 ......... 2.0% .... 30-.70 Hex (Mod)
W.S. 460 to W.S. 630 .... 2.5% .... 30-.70 Hex (Mod)

Leading Edge Droop Deflection Angle:

In the Airstream ......... -5.0°
Normal to Hingeline ......... -15.0°
Sweepback of Droop Foldline ......... 67.8°

PERFORMANCE BASIS:


REVISION BASIS:

To reflect change from J93-GE-5 engines to J93-GE-3 engines, Air vehicle performance data are predicated on the J93-GE-5 engine. However, installation of the J93-GE-3 engines and the associated weight and fuel capacity changes will result in less than 1% variation from the quoted performance. Therefore, the performance data contained herein are representative of the B-70 Air Vehicle with the J93-GE-3 engines installed.