Standard Aircraft Characteristics

XB-70
VALKYRIE
North American

BY AUTHORITY OF
THE SECRETARY
OF THE AIR FORCE

SIX YJ93-GE-3
GENERAL ELECTRIC

1 Sep 61 (AFG 2, Vol. 1, Addn 25)
(43 of 88)
WING AREA.... 6297 SQ FT
ASPECT RATIO..... 1.75
M. A. C. .. ....... 942.4 IN.

PRESSURIZED AREA

5070
4474
6131
12004
6313
5450
4837
3429

7.07 EACH ENGINE

Fuel (Gal)

Oil (Gal)

CREW & EQUIPMENT

FUEL & BOMB BAY

ENGINE

XB-70 (Air Vehicle Nr 3)
POWER PLANT
Nr and Model ............... (6) YF90-GE-3
Mfr .................... General Electric
Engine Spec Nr ............. E757F
Type .................... Axial Turbo Jet
Length ................... 336.3"
Diameter .................. 54.15"
Weight (dry) .............. 5084 Lb
Tail Pipe ............... Mech, Variable C/D
Augmentation ............. Afterburner

MISSION AND DESCRIPTION
Navy Equivalent: None
Mfr's Model: NA-278

The primary purpose of this Air Vehicle is to demonstrate the technical feasibility of the B-70 configuration and the functional operation of a prototype bomb-naveigation system in a sustained Mach 3 high altitude environment.

Special features include 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. A bombing and navigation system is provided for release of test weapons and navigational demonstration.

The crew consists of a pilot, co-pilot, bombing-navigation operator, and flight observer.

ENGINE RATINGS
SLS 1B - RPM - MIN
Max 26,000 - 6825 - Cont
Mil 19,900 - 6825 - Cont
Nor 17,700 - 6825 - Cont

WEIGHTS
Loading Lb L.F.
Empty .................. 206,654 (E)
Basic .................. 212,608 (E)
Design .................. 534,782
Combat ................. *305,967
Max T.O. .................. **542,029
Max in flight .......... 534,782
Max landing ............ -396,292
(E) Estimated
* For basic mission
** Limited by mission
+ Limited by structure

FUEL
Location Nr Tanks Gal
Puselage ................. 5 ........ 27,740
Wing and duct .......... 6 ........ 19,528
47,768
Grade .................... JP-6
Specification .......... MIL-F-28556A

OIL
Fuselage .................. 6 ........ 42.4
Specification ........... MIL-L-9236B

DIMENSIONS
Wing
Span ...................... 105.0'
Incidence (root) ........ 0'
(10) .................. -3.0'
Dihedral .............. 0'
Sweepback (25% chord) 55.7'
Length .................. 186.8'
Height ................... 30.7'
Trend ................... 23.4'

BOMBS
Nr Special Weapons*
1 Class A .................. 25,000
2 Class B .................. 20,000

*Space provisions only

DEVELOPMENT
Design initiated ........ Nov 55
Date of contract .......... Dec 57
Mock-up .................. Mar 59
First flight ............. (est) Dec 62

ELECTRONICS
Glide path/localizer marker beacon receivers, AN/ARN-58
IFF transponder, AN/APX-46
UHF command radio set, AN/ARC-50
Intercommunications set, AN/AIC-18
Tactical aid to navigation (TACAN), AN/ARN-66
Flight control system
Bomb nav subsystem, AN/ASQ-28
# Loading and Performance—Typical Mission

## Conditions

<table>
<thead>
<tr>
<th></th>
<th>Basic Mission I</th>
<th>Design Mission II</th>
<th>Ferry Mission III</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Takeoff Weight</strong></td>
<td>(lb) 542,029</td>
<td>(lb) 542,029</td>
<td>(lb) 542,029</td>
</tr>
<tr>
<td>Fuel at 6.7 lb/gal (grade JP-6)</td>
<td>(lb) 319,644</td>
<td>(lb) 319,644</td>
<td>(lb) 319,644</td>
</tr>
<tr>
<td>Payload</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Wing loading (psf)</td>
<td>86.1</td>
<td>86.1</td>
<td>86.1</td>
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<tr>
<td>Minimum speed (kn)</td>
<td>163.3</td>
<td>163.3</td>
<td>163.3</td>
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<tr>
<td>Takeoff speed (kn)</td>
<td>207.5</td>
<td>207.5</td>
<td>207.5</td>
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<tr>
<td>Takeoff ground run at SL (ft)</td>
<td>7,940</td>
<td>7,940</td>
<td>7,940</td>
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<tr>
<td>Takeoff to clear 50 ft (ft)</td>
<td>11,400</td>
<td>11,400</td>
<td>11,400</td>
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<tr>
<td>Rate of climb at SL (fpm)</td>
<td>15,600</td>
<td>15,600</td>
<td>15,600</td>
</tr>
<tr>
<td>Time: SL to 20,000 ft (min)</td>
<td>2.57</td>
<td>2.57</td>
<td>2.57</td>
</tr>
<tr>
<td>Time: SL to acceleration altitude (min)</td>
<td>3.57</td>
<td>3.57</td>
<td>3.57</td>
</tr>
<tr>
<td>Service ceiling (100 fpm) (ft)</td>
<td>66,750</td>
<td>66,750</td>
<td>66,750</td>
</tr>
<tr>
<td><strong>Combat Range</strong></td>
<td>(n mi) 4038</td>
<td>(n mi) 5010</td>
<td>(n mi) 4038</td>
</tr>
<tr>
<td>Recovery distance</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
</tr>
<tr>
<td>Average cruise speed (subsonic/supersonic) (kn/kt)</td>
<td>1721/1721</td>
<td>1721/1721</td>
<td>1721/1721</td>
</tr>
<tr>
<td>Initial supersonic cruise altitude (ft)</td>
<td>65,000</td>
<td>65,000</td>
<td>65,000</td>
</tr>
<tr>
<td>Final supersonic cruise altitude (ft)</td>
<td>71,800</td>
<td>71,800</td>
<td>71,800</td>
</tr>
<tr>
<td>Refuel speed (kn)</td>
<td></td>
<td>3.73</td>
<td>3.73</td>
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<tr>
<td>Total mission time (hr)</td>
<td>2.47</td>
<td></td>
<td>2.47</td>
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## Combat Weight

<table>
<thead>
<tr>
<th></th>
<th>(lb) 305,967</th>
<th>(lb) 274,557</th>
<th>(lb) 257,367</th>
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<tbody>
<tr>
<td><strong>Combat Weight</strong></td>
<td>(ft) 68,700</td>
<td>(ft) 70,700</td>
<td>(ft) 71,800</td>
</tr>
<tr>
<td>Combat altitude</td>
<td>1721</td>
<td>1721</td>
<td>1721</td>
</tr>
<tr>
<td>Combat speed (kn)</td>
<td>16,000</td>
<td>16,700</td>
<td>17,200</td>
</tr>
<tr>
<td>Combat ceiling (500 fpm)</td>
<td>78,450</td>
<td>80,700</td>
<td>82,000</td>
</tr>
<tr>
<td>Service ceiling (100 fpm)</td>
<td>78,700</td>
<td>80,950</td>
<td>82,250</td>
</tr>
<tr>
<td>Max rate of climb at SL (fpm)</td>
<td>29,900</td>
<td>33,300</td>
<td>35,600</td>
</tr>
<tr>
<td>Max speed at optimum altitude (kn/ft)</td>
<td>1721/78,750</td>
<td>1721/81,000</td>
<td>1721/82,300</td>
</tr>
<tr>
<td>Basic speed at 35,000 ft (kn)</td>
<td>1089</td>
<td>1089</td>
<td>1089</td>
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## Landing Weight

<table>
<thead>
<tr>
<th></th>
<th>(lb) 257,367</th>
<th>(lb) 229,367</th>
<th>(lb) 257,367</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landing Weight</strong></td>
<td>(tu) 5850</td>
<td>(tu) 5360</td>
<td>(tu) 5850</td>
</tr>
<tr>
<td>Ground roll at SL</td>
<td>3650</td>
<td>3650</td>
<td>4060</td>
</tr>
<tr>
<td>Ground roll (auxiliary brake) (ft)</td>
<td>4060</td>
<td>3650</td>
<td>4060</td>
</tr>
<tr>
<td>Total from 50 ft</td>
<td>(ft) 7510</td>
<td>(ft) 6880</td>
<td>(ft) 7510</td>
</tr>
<tr>
<td>Total from 50 ft (auxiliary brake) (ft)</td>
<td>5710</td>
<td>5210</td>
<td>5710</td>
</tr>
<tr>
<td>Minimum speed (kn)</td>
<td>112.6</td>
<td>106.1</td>
<td>112.6</td>
</tr>
<tr>
<td>Touchdown speed (kn)</td>
<td>152.2</td>
<td>144.3</td>
<td>152.2</td>
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</tbody>
</table>

### Notes

- * Space provisions only
- ** Maximum power
- ⚠ Allows for weight reduction during ground operation and climb
- ⚠ With drag chute

### Performance Basis:

- (a) Data source: Estimated
- (b) Performance is based on powers shown on page 6
- (c) Fuel flow data used in computing BASIC and FERRY missions are increased 5%.

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XB-70 (Air Vehicle Nr 3)

[AFG 2, Vol. 1, Addn 25] 1 Sep 61

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Take-Off

Climb

SEA LEVEL

CLEAR 50 FT

GROUND RUN

DISTANCE (1000 ft)

GROSS WEIGHT (1000 lb)

542,029 LB

305,967 LB

SL

0 10 20 30 40 50 60

RATE OF CLimb (1000' / min)

542,029 LB

305,967 LB

NOT APPLICABLE

OPERATING LIMIT SPEED

MAX POWER

MIL POWER

OPERATING AIR INDUCTION SYSTEM PRESSURE LIMIT

TEMPERATURE LIMIT FOR STABILIZED FLIGHT

0 400 800 1200 1600 2000 2400

KNOTS

ALITUDE (1000 ft)

0 20 40 60 80 100

4 Sep 61 (AFG 2, Vol-1, Addn 25)

XB-70 (Air Vehicle No 3)

SECRET

(47 of 88)
FORMULA: RANGE MISSION I AND III

Take-off and accelerate to climb speed with maximum power, climb on course to 25,000 feet with maximum power, accelerate to Mach 1.37 at 25,000 feet, accelerated climb from 25,000 feet to Mach 3.0 cruise altitude, cruise 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 sea level at speeds for maximum endurance plus 2% of initial fuel.

FORMULA: RANGE MISSION II

Alert concept take-off, accelerate to climb speed with maximum power, climb on course to 25,000 feet with maximum power, accelerate to Mach 1.27 at 25,000 feet, accelerated climb from 25,000 feet to Mach 3.0 cruise altitude, cruise out at Mach 3.0. Decelerate with military power, descend to 20,000 feet with idle power, loiter 16 minutes at 20,000 feet at speeds for maximum endurance, descend to sea level with idle power, credit is taken for distance covered during deceleration and descent from Mach 3.0 cruise altitude to 20,000 feet. Range free allowances include alert concept take-off, 16 minutes loiter at 20,000 feet, descent from 20,000 feet to sea level and a fuel reserve equal to 1 minute military power plus 9 minutes loiter at sea level.

REVISION BASIS:

To reflect the effect on performance of incorporating a Bombing-Navigation System and provisions for simulated stores.

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>Engine</th>
<th>SLS</th>
<th>LB</th>
<th>RPM</th>
</tr>
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<tbody>
<tr>
<td>YJ93-GE-3</td>
<td>24,520</td>
<td>17,542</td>
<td>6825</td>
</tr>
<tr>
<td>Max</td>
<td>24,520</td>
<td>17,542</td>
<td>6825</td>
</tr>
<tr>
<td>Nor</td>
<td>15,714</td>
<td>15,714</td>
<td>6825</td>
</tr>
</tbody>
</table>

(b) Wing Section:

- Root to W.S. 180 × 2.0% = 30-70 Hex (Mod)
- W.S. 460 to W.S. 630 × 2.5% = 30-70 Hex (Mod)

Mean Camber (Leading Edge)

<table>
<thead>
<tr>
<th>B.P.</th>
<th>B.P.</th>
<th>B.P.</th>
<th>B.P.</th>
<th>B.P.</th>
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<tbody>
<tr>
<td>0.75</td>
<td>1.07</td>
<td>1.53</td>
<td>2.07</td>
<td>3.67</td>
</tr>
<tr>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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</table>