Standard Aircraft Characteristics

NAVY MODEL

F-6A

AIRCRAFT

(TITLE UNCLASSIFIED)

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PUBLISHED BY DIRECTION OF THE
COMMANDER OF THE NAVAL AIR SYSTEMS COMMAND

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1 JULY 1967
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NAVAIR 00-110AF6-1

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UNCLASSIFIED
STANDARD AIRCRAFT CHARACTERISTICS

F-6A SKYRAY

DOUGLAS
POWER PLANT

No. & Model: (1)J57-P-4 or -4B
Mfr.: Pratt & Whitney
Eng. Spec.: N-169B (Rev. 5-16-55)
Type: Turbojet
Compressor: Multi-Stage, Axial Flow
Augmentation: Afterburner
Tail Pipe Nozzle: Two-Position
Length: 250 in.
Diameter: 40.5 in.

RATINGS

Sea Level Static Thrust:
Lbs. RPM
Normal: 8700 5700
Military: 10200 6000
Maximum (with A/B): 16000 6000

MISSION AND DESCRIPTION

The primary mission of the Model F-6A
(F4D-1) airplane is that of an all-weather
general purpose fighter. The airplane is
capable of controlled diving flight at
supersonic speeds at medium and high alti-
tudes. The airplane is designed to operate
from aircraft carriers or from

The design of the airplane is based on a
tailless low aspect ratio planform with
 provision for the power plant within the
wing structure. The cockpit is located
forward of the wing. Flight control is
provided by means of power-operated ele-
vators which perform the functions of con-
ventional elevators and ailerons. Electron-
cally actuated trimming surfaces are pro-
vided inboard of the elevons for longi-
itudinal trim. Lateral trim is provided by
displacing the control stick neutral point
with a small electric actuator. Direc-
tional trim is accomplished with the upper
section of the split rudder by means of a
hydraulic servo-cylinder.

DEVELOPMENT

First Flight: June 1954
Service Use: June 1956

WEIGHTS

Loadings:
Empty (A): 16,024
Basis: 16,667
Ft Design: 18,215 6.3
Combat: 22,648 5.1
Max. T.O (Field): 25,000 4.1
(Catapult): 28,000
Max. Land (Field): 21,000 5.1

FUEL AND OIL

Gal. No. Tanks Location
640 2 Inner Wing
600 2 Ext. Droppable
Maximum Usable Fuel: 1240 Gal.
Fuel Grade: JP-4
Fuel Spec.: MIL-F-5624
Self-Sealing

Capacity: 3 gal. (integral
with engine)

Electronics

VHF NAV: AN/ARN-14
Marker Beacon: AN/ARN-12
Fire Control: Aero 33-P System
Consisting of:
Radar: AN/APQ-50
Arm. Contr. Dir.: Aero 55
Opt. Sight: MK-16 Mod. 11

DIMENSIONS

Wing:
Area: 527 sq. ft.
Span: 33.5 ft.
M.A.C.: 219 in.
Sweepback (lead edge): 56.5°
Length: 40.4 ft.
Height: 13 ft.
Tread: 10.1 ft.
# PERFORMANCE SUMMARY

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T.L.</strong></td>
<td><strong>22,116</strong></td>
<td><strong>22,837</strong></td>
<td><strong>22,517</strong></td>
<td><strong>24,910</strong></td>
<td><strong>22,529</strong></td>
</tr>
<tr>
<td>Fuel internal/external (JP-5) lb./l.</td>
<td>4396/4080</td>
<td>4396/4080</td>
<td>4396/4080</td>
<td>4396/4080</td>
<td>4396/4080</td>
</tr>
<tr>
<td>Payload lb.</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
<td>320</td>
</tr>
<tr>
<td>Wing loading lb./sq. ft.</td>
<td>48.7</td>
<td>50.2</td>
<td>49.4</td>
<td>44.7</td>
<td>47.6</td>
</tr>
<tr>
<td>Stall speed-power off ft.</td>
<td>112</td>
<td>112</td>
<td>112</td>
<td>112</td>
<td>112</td>
</tr>
<tr>
<td>Take-off run at S.L. - calm ft.</td>
<td>3516</td>
<td>3516</td>
<td>3516</td>
<td>3516</td>
<td>3516</td>
</tr>
<tr>
<td>Take-off run at S.L. - 25 km/wind ft.</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Take-off to clear 50 ft. - calm ft.</td>
<td>5596</td>
<td>5596</td>
<td>5596</td>
<td>5596</td>
<td>5596</td>
</tr>
<tr>
<td>Max. speed/altitude (A) km./hr.</td>
<td>529/15,000</td>
<td>506/15,000</td>
<td>514/15,000</td>
<td>540/15,000</td>
<td>528/20,000</td>
</tr>
<tr>
<td>Rate of climb at S.L. (A) ft.</td>
<td>940</td>
<td>940</td>
<td>940</td>
<td>940</td>
<td>940</td>
</tr>
<tr>
<td>Time: S.L. to 20,000 ft. (A) min.</td>
<td>5.1</td>
<td>5.1</td>
<td>5.1</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Service ceiling (100 fps) (A) ft.</td>
<td>37,600</td>
<td>37,600</td>
<td>37,600</td>
<td>37,600</td>
<td>37,600</td>
</tr>
<tr>
<td>Combat range n.mi.</td>
<td>975</td>
<td>975</td>
<td>975</td>
<td>975</td>
<td>975</td>
</tr>
<tr>
<td>Average cruising speed (A) kn.</td>
<td>447</td>
<td>447</td>
<td>447</td>
<td>447</td>
<td>447</td>
</tr>
<tr>
<td>Cruising altitude (A) ft.</td>
<td>34,900</td>
<td>34,900</td>
<td>34,900</td>
<td>34,900</td>
<td>34,900</td>
</tr>
<tr>
<td>Combat radius n.mi./hr.</td>
<td>306/1.7</td>
<td>306/1.7</td>
<td>306/1.7</td>
<td>306/1.7</td>
<td>306/1.7</td>
</tr>
<tr>
<td>Average cruising speed km./hr.</td>
<td>456</td>
<td>456</td>
<td>456</td>
<td>456</td>
<td>456</td>
</tr>
<tr>
<td>CAP loiter time/mission time hr./hr.</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>CAP loiter altitude ft.</td>
<td>22,000</td>
<td>22,000</td>
<td>22,000</td>
<td>22,000</td>
<td>22,000</td>
</tr>
</tbody>
</table>

### COMBAT LOADING CONDITION

<table>
<thead>
<tr>
<th><strong>TAKES OFF MISSILES ON</strong></th>
<th>2. TAKES OFF ROCKETS ON</th>
<th>3. TAKES OFF ROCKETS ON, MISSILES OFF</th>
<th>4. TAKES OFF MISSILES OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMBAT WEIGHT</strong></td>
<td>28,448</td>
<td>25,449</td>
<td>22,000</td>
</tr>
<tr>
<td><strong>Engine power</strong></td>
<td>MAXIMUM</td>
<td>MAXIMUM</td>
<td>MILITARY</td>
</tr>
<tr>
<td><strong>Fuel</strong></td>
<td>FULL INTERNAL</td>
<td>FULL INTERNAL</td>
<td>FULL INTERNAL</td>
</tr>
<tr>
<td>Combat speed/combat altitude km./hr.</td>
<td>565/36/30,000</td>
<td>557/32/35,000</td>
<td>551/26/30,000</td>
</tr>
<tr>
<td>Rate of climb/combat altitude ft./hr.</td>
<td>8400/55,000</td>
<td>7300/50,000</td>
<td>5400/35,000</td>
</tr>
<tr>
<td>Combat ceiling (500 fps) km./hr.</td>
<td>51,000</td>
<td>49,000</td>
<td>49,000</td>
</tr>
<tr>
<td>Rate of climb at S.L. fps</td>
<td>17,300</td>
<td>15,900</td>
<td>15,900</td>
</tr>
<tr>
<td>Max. speed/altitude km./hr.</td>
<td>528/94</td>
<td>512/77</td>
<td>512/77</td>
</tr>
</tbody>
</table>

### LANDING WEIGHT

| **T.L.** | 18,902                   | 18,694                   | 18,920                   | 18,877                   | 19,446                   |
| **Fuel** | 12,356                   | 12,356                   | 12,356                   | 12,356                   | 12,356                   |
| Stall speed-power off/appr. km./hr. | 100/100                   | 100/100                   | 100/100                   | 100/100                   | 100/100                   |
| **Distance-gr. run over 50 ft. obst. ft.** | 5420/6145                  | 5410/6128                  | 5410/6128                  | 5410/6128                  | 5410/6128                  |

### NOTES

(A) Military threat.  
(B) For effect of JP-4 fuel on combat radius and mission time see Notes page.  
(C) All loadings include 4-30mm guns and ammunition.  
(D) Mission Time: Any time where fuel is used and distance gained, including CAP loiter and combat time.  
(E) Performance Basis: Contractor and NATTECH flight test data. Combat range and radius are based on fuel consumption of Pratt and Whitney J57-P-6B engine derived from contractor and NATTECH flight tests.  
(F) Tanks dropped when empty  
(G) Operational Spoting: A total of 94 airplanes (wings folded) can be accommodated in a landing spot on the flight and hangar deck of a CVA-19 class angled-deck carrier.  

30 May 1963
CARRIER SUITABILITY

DECK WIND REQUIRED
FOR CATAPULTING

- CATAPULT AND SPEED LIMITED BY
  - CATAPULT CHARACTERISTICS
  - AIRPLANE STRUCTURE
  - MILITARY THRUST

MINIMUM WIND OVER DECK-KNOTS

- 40
- 30
- 20
- 10
- 0
- -10
- -20

TAKE-OFF WEIGHT - 1000 LB.

- 14
- 16
- 18
- 20
- 22
- 24
- 26
- 28

DECK WIND REQUIRED
FOR LANDING

- ENGAGING SPEED LIMITED BY
  - ARRESTING GEAR CHARACTERISTICS
  - AIRPLANE STRUCTURE

MINIMUM WIND OVER DECK-KNOTS

- 40
- 30
- 20
- 10
- 0
- -10
- -20

LANDING WEIGHT - 1000 LB.

- 10
- 15
- 20
- 25
- 30
- 35
- 40

1. Take-off speed is based on NATC recommended minimums.

2. Airplane structural limits for catapult take-off are:
   Horizontal hook load = 107,000 lb.; maximum acceleration = 5.17g.

3. Approach speed equals 1.2 times power off stalling speed.

4. Airplane structural limits for arrested landing are:
   Horizontal hook load = 100,000 lb.; maximum deceleration = 6.04g; ultimate sinking speed based on 20.8 ft./sec. at 21,000 lb. and 6.25° angle between flight path and carrier deck.
### NOTES

<table>
<thead>
<tr>
<th>LOADING (ALL DATA BASED ON JP-4 FUEL)</th>
<th>TAKE-OFF WEIGHT (Lb.)</th>
<th>GENERAL PURPOSE FIGHTER</th>
<th>COMBAT AIR PATROL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>COMBAT RADIUS (N.MI.) (HR.)</td>
<td>MISSION TIME (HR.)</td>
</tr>
<tr>
<td>4-Sidewinders plus 2-500 gal. tanks</td>
<td>26,774</td>
<td>271</td>
<td>1.6</td>
</tr>
<tr>
<td>4-19 shot rkt. pkgs. plus 2-500 gal. tanks</td>
<td>27,565</td>
<td>263</td>
<td>1.6</td>
</tr>
<tr>
<td>2-Sidewinders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-19 Shot rkt. pkgs. plus 2-500 gal. tanks</td>
<td>27,145</td>
<td>272</td>
<td>1.6</td>
</tr>
<tr>
<td>4-Sidewinders plus 2-150 gal. tanks</td>
<td>24,628</td>
<td>126</td>
<td>0.9</td>
</tr>
</tbody>
</table>

### GENERAL PURPOSE FIGHTER

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Engine, T.O. &amp; Accelerate</td>
<td>5 minutes with normal power at sea level</td>
</tr>
<tr>
<td>Climb-Out</td>
<td>On course to cruise altitude with military thrust</td>
</tr>
<tr>
<td>Cruise-Out</td>
<td>At speed and altitude for max. range, drop tanks when empty.</td>
</tr>
<tr>
<td>Combat</td>
<td>At 35,000 ft. 5 minutes with maximum thrust, plus 15 minutes with military thrust, no distance covered. Fire rockets and/or missiles</td>
</tr>
<tr>
<td>Cruise-Back</td>
<td>At speed and altitude for max. range</td>
</tr>
<tr>
<td>Descend</td>
<td>To sea level (no fuel consumed - no distance covered)</td>
</tr>
<tr>
<td>Reserve</td>
<td>5% initial fuel plus 20 minutes at speed for maximum endurance at sea level</td>
</tr>
</tbody>
</table>

### COMBAT AIR PATROL

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Engine, T.O. &amp; Accelerate</td>
<td>5 minutes with normal power at sea level</td>
</tr>
<tr>
<td>Climb-Out</td>
<td>On course to cruise altitude with military thrust</td>
</tr>
<tr>
<td>Cruise-Out</td>
<td>To patrol station 150 n. miles from base at speeds and altitudes for max. range</td>
</tr>
<tr>
<td>Loiter</td>
<td>On station at altitude and speed for maximum endurance. Drop tanks when empty.</td>
</tr>
<tr>
<td>Combat</td>
<td>At 35,000 ft. 5 minutes with maximum thrust, plus 15 minutes with military thrust, no distance covered. Fire rockets and/or missiles</td>
</tr>
<tr>
<td>Cruise-Back</td>
<td>150 nautical miles to base at speed and altitude for max. range</td>
</tr>
<tr>
<td>Descend</td>
<td>To sea level (no fuel used - no distance covered)</td>
</tr>
<tr>
<td>Reserve</td>
<td>5% initial fuel plus 20 minutes at speed for maximum endurance at sea level</td>
</tr>
</tbody>
</table>

**MISSION TIME: EXCLUDES WARMUP, TAKE-OFF & RESERVE FUEL**

**CYCLE TIME: EXCLUDES WARMUP & TAKE-OFF FUEL**

![Diagram](image-url)