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NAVAIR 00-110AA3-5

DECLASSIFIED

Standard Aircraft Characteristics

NAVY MODEL
RA-3B
AIRCRAFT
(TITLE UNCLASSIFIED)

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RA-38

1 JULY 1967
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STANDARD AIRCRAFT CHARACTERISTICS
RA-3B SKYWARRIOR
DOUGLAS
NAVARC 00-110AA3-5

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POWER PLANT

No. & Model: (2) J57-P-10
Mfr. Pratt & Whitney
Engine Spec. No. N-1700-A
(Rev. 2 February 1955)
Type Turbojet Compressor: Dual Rotor, Ax. Flow
Length: 158 in.
Diameter: 41 in.
No. & Type Assist: 12-360A4500 JATO Tail Pipe Nozzle: Conal Exit Area Rating

Sea Level Static

Thrust Lb. RPM **
Max: 10500 6150 9900
Military: 10500 6150 9900
Normal: 9000 5900 9500

* N 1: speed of low-pressure compressor
** N 2: speed of high-pressure compressor

MISSION AND DESCRIPTION

The A-39-2P airplane is a long range, high performance photographic-reconnaissance airplane for day and night missions. The airplane operates from land bases and from carriers.

It is a conventional, swept-wing airplane with two turbo-jet engines enclosed in under-wing nacelles. Normal crew consists of three: a pilot, a photo-navigator-assistant pilot and a photo technician-gunner.

The tricycle landing gear, arresting gear, wing-fold and tail-fold mechanisms, single-slotted wing flaps, fuselage speed brakes, and power mechanisms for rudder, elevator and ailerons are operated by hydraulic power. The horizontal stabilizer is adjustable for trim in-flight. Leading-edge slats are actuated automatically by aerodynamic loads. Air-break braking is provided. The JATO installation accommodates twelve bottles. The cockpit and camera compartment are pressurized to 7.5 P.S.I. differential. Photographic provisions consist of the pressurized camera compartment with twelve camera stations. The compartment also houses camera controls, camera door controls and storage for spare film magazines. The bomb bay accommodates photo-flash bombs and/or cartridges. Sighting equipment and viewfinders are located in the cockpit. Autopilot kits (ASC 268) with skid turn feature and UCOM kits (BCM 6100) will be delivered in the future. Cambered wing for improved performance will be delivered on the last two aircraft of Contract 57-181.

DEVELOPMENT

Contract: No(s) 55-8205. 5 Airplanes
First Flight: July 1956
Contract: No(s) 57-181. 25 Airplanes
First Fleet Delivery: August 1959

PHOTO EQUIPMENT

K-17C, 6"x12"x24" focal length camera
K-38, 24"x36" focal length camera
K-47, 12" focal length camera
CMS-2A-100mm, 7", 12", 20" focal length camera (or ABC lens cones)
T-11, 6" focal length camera
T-12, 6" focal length camera
Forward Oblique Cameras:
EF-8 35mm movie camera,
2", 4", 6" focal length
K-38 case drive with DCG 24" or 35" bent lens cone
A-6A magazines (for the K-38)
A-9A magazines (for the K-17C)
BA-10A magazines (for the K-17C)
CMS-2A casettes
16 M-120 or M-122 photo-flash bombs
4 B-4 ejectors with Mk. 123 cart. or 4 A-6 ejectors with Mk. 122 cart.

FUEL AND OIL

Fuel Grade: JP-4 or JP-5
Fuel Spec: MIL-F-5624
Self-sealing Oil: MIL-F-7808

ELECTRONICS

UHF Homing: AN/ARR-25 & AN/ARR-40
VHF Trans-Receiver: AN/ARC-29A
IHF Transponder: AN/ARK-6B & ANR-89
Radio Altimeter: AN/AFN-22
TACAN: AN/ARC-26
HF Receiver: AN/ARC-6
Radio Compass: AN/ARN-6
Search Radar: AN/ASB-1B
NAY: AN/AN-6
VOR: AN/ARQ-18
VHF: AN/ARC-1
Tape Recorder: (G.E.)

WEIGHTS

Loading Lbs. L.F.
Empty: 40,600
Basic: 41,617
Combat: 61,608
Max. T.O. (Land): 78,000
Max. T.O. (Cat): 78,000
Max. Land (Land): 56,000
Max. Land (Cat): 49,000

DIMENSIONS

Wing:
Area: 779 sq. ft.
Span: 72.5 ft.
MAC: 140.34 in.
Sweepback: 35°
Length: 74.7 ft.
Height: 22.8 ft.
Tread: 10.4 ft.

ORDNANCE

JUNS/AMM.
2-30mm (M2) / 500 rds. per gun
Tail Turret System Aero 21B

RA-3
### PERFORMANCE SUMMARY

<table>
<thead>
<tr>
<th>TAKE-OFF LOADING CONDITION</th>
<th>(1) Limit Carrier T.O. Wt.</th>
<th>(2) Full Fuel High Altitude Reconnaissance</th>
<th>(3) Full Fuel Night Reconnaissance</th>
<th>(7) Full Fuel Photo Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAKE-OFF WEIGHT (A)</td>
<td>lb.</td>
<td>73,000</td>
<td>74,152</td>
<td>75,450</td>
</tr>
<tr>
<td>Fuel (JP-8)</td>
<td>lb.</td>
<td>39,079</td>
<td>39,001</td>
<td>39,001</td>
</tr>
<tr>
<td>Payload</td>
<td>lb.</td>
<td>1455</td>
<td>1455</td>
<td>1455</td>
</tr>
<tr>
<td>Wing loading</td>
<td>lb./sq. ft.</td>
<td>29.7</td>
<td>29.7</td>
<td>29.7</td>
</tr>
<tr>
<td>Stall speed - power-off (p)</td>
<td>kn.</td>
<td>132</td>
<td>132</td>
<td>132</td>
</tr>
<tr>
<td>Take-off run at S.L. - calm (B) ft.</td>
<td></td>
<td>4480</td>
<td>4700</td>
<td>5000</td>
</tr>
<tr>
<td>Take-off run at S.L. 25 km/wind (B) ft.</td>
<td></td>
<td>2940</td>
<td>3150</td>
<td>3400</td>
</tr>
<tr>
<td>Take-off to clear 50 ft. - calm (B) ft.</td>
<td></td>
<td>6720</td>
<td>6880</td>
<td>7000</td>
</tr>
<tr>
<td>Max. speed/altitude</td>
<td>kn./ft.</td>
<td>556/SL</td>
<td>556/SL</td>
<td>556/SL</td>
</tr>
<tr>
<td>Rate of climb at S.L.</td>
<td>fpm</td>
<td>5020</td>
<td>4900</td>
<td>4750</td>
</tr>
<tr>
<td>Time: S.L. to 20,000 ft.</td>
<td>min.</td>
<td>5.2</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Time: S.L. to 30,000 ft.</td>
<td>min.</td>
<td>9.3</td>
<td>9.6</td>
<td>10.0</td>
</tr>
<tr>
<td>Service ceiling (100 fpm)</td>
<td>ft.</td>
<td>38,500</td>
<td>38,500</td>
<td>38,500</td>
</tr>
<tr>
<td>Combat range</td>
<td>n.mi.</td>
<td>2240</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Average cruising speed</td>
<td>kn./M</td>
<td>459/80</td>
<td>459/80</td>
<td>459/80</td>
</tr>
<tr>
<td>Cruising altitude(s)</td>
<td>ft.</td>
<td>35,400-43,300</td>
<td>35,400-43,300</td>
<td>35,400-43,300</td>
</tr>
<tr>
<td>Combat radius/Mission Time</td>
<td>n.mi./hr.</td>
<td>111/0.6/8.8</td>
<td>110/0.6</td>
<td>104/0.6</td>
</tr>
<tr>
<td>Average cruising speed</td>
<td>kn./M</td>
<td>459/80</td>
<td>459/80</td>
<td>459/80</td>
</tr>
<tr>
<td>IFR-Radius/Mission Time</td>
<td>p mi/hr.</td>
<td>15/0.6/9.2</td>
<td>15/0.6/9.2</td>
<td>15/0.6/9.2</td>
</tr>
<tr>
<td>IFR-Fuel Trans/Distance</td>
<td>lb./n mi.</td>
<td>10,560/645</td>
<td>11,160/685</td>
<td>11,560/815</td>
</tr>
</tbody>
</table>

### COMBAT LOADING CONDITION

<table>
<thead>
<tr>
<th>COMBAT LOAD (60% Fuel)</th>
<th>(2) 60% Fuel</th>
<th>(4) 60% Fuel</th>
<th>(6) 60% Fuel</th>
<th>(8) 60% Fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMBAT LOAD (60% Fuel)</td>
<td>lb.</td>
<td>61,608</td>
<td>62,858</td>
<td>64,405</td>
</tr>
<tr>
<td>Engine power</td>
<td>MILITARY</td>
<td>MILITARY</td>
<td>MILITARY</td>
<td>MILITARY</td>
</tr>
<tr>
<td>Fuel</td>
<td>lb.</td>
<td>17,087</td>
<td>16,000</td>
<td>16,000</td>
</tr>
<tr>
<td>Combat speed/combat altitude</td>
<td>kn./ft.</td>
<td>438/11,400</td>
<td>438/11,400</td>
<td>438/11,400</td>
</tr>
<tr>
<td>Rate of climb/combat altitude</td>
<td>fpm/ft.</td>
<td>41,600</td>
<td>40,900</td>
<td>40,500</td>
</tr>
<tr>
<td>Combat ceiling (500 fpm)</td>
<td>ft.</td>
<td>31,800</td>
<td>41,600</td>
<td>41,600</td>
</tr>
<tr>
<td>Rate of climb at S.L.</td>
<td>fpm</td>
<td>6150</td>
<td>6150</td>
<td>6150</td>
</tr>
<tr>
<td>Max. speed at S.L.</td>
<td>kn./M</td>
<td>556/84</td>
<td>556/84</td>
<td>556/84</td>
</tr>
<tr>
<td>Max. speed at 25,000 ft.</td>
<td>kn./M</td>
<td>513/88</td>
<td>509/88</td>
<td>509/88</td>
</tr>
</tbody>
</table>

### LANDING WEIGHT

<table>
<thead>
<tr>
<th>LANDING WEIGHT</th>
<th>(B) 60% Fuel</th>
<th>(D) 60% Fuel</th>
</tr>
</thead>
<tbody>
<tr>
<td>LANDING WEIGHT</td>
<td>lb.</td>
<td>47,536</td>
</tr>
<tr>
<td>Stall speed - power-off/Appr Pwr kn./kn.</td>
<td>lb.</td>
<td>3338</td>
</tr>
<tr>
<td>Landed Dist. Gr. Run/Over 50 ft (E) ft.</td>
<td>ft.</td>
<td>5315/6030</td>
</tr>
</tbody>
</table>

### NOTES

(A) The limit catapult take-off weight of 73,000 pounds is consistent with current operating bulletins. Under emergency conditions increased take-off weights may be utilized.

(B) Full maps

(C) One refueling from A2D-2 cambered wing tanker. (Tanker T.O. Wt. = 73,000 lb)

(D) One refueling from A2D-2 cambered wing tanker. (Tanker T.O. Wt. = 73,000 lb)

(E) Without chute. With chute, landing distance is decreased approximately 3400 ft.

(F) All loadings include IFR probe

(G) Performance Basis: NAVC and Contractor's flight test of A2D-2 and A2D-3P. Range and radii based on flight test fuel consumptions.

(H) Spotting: A total of 27 aircraft can be accommodated in the landing spot of the flight and hangar decks of a CVA-19 class angle-deck carrier.
# CARRIER SUITABILITY

## DECK WIND REQUIRED FOR CATAPULTING

<table>
<thead>
<tr>
<th>MINIMUM WIND OVER DECK-KNOTS</th>
<th>TAKE-OFF WEIGHT-1000 LB.</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>50</td>
</tr>
<tr>
<td>30</td>
<td>55</td>
</tr>
<tr>
<td>25</td>
<td>60</td>
</tr>
<tr>
<td>20</td>
<td>65</td>
</tr>
<tr>
<td>15</td>
<td>70</td>
</tr>
<tr>
<td>10</td>
<td>75</td>
</tr>
<tr>
<td>5</td>
<td>80</td>
</tr>
</tbody>
</table>

Catapult take-off speed is based on Launching Bulletin No. 6-49.

Catapult end speed limited by aircraft strength below 60,700 lbs. on C2 Catapult and below 64,200 lbs. on the C7 Catapult. Above these weights catapult end speed is limited by catapult capacity.

## DECK WIND REQUIRED FOR LANDING

<table>
<thead>
<tr>
<th>MINIMUM WIND OVER DECK-KNOTS</th>
<th>LANDING WEIGHT-1000 LB.</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>25</td>
<td>45</td>
</tr>
<tr>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>15</td>
<td>55</td>
</tr>
<tr>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>65</td>
</tr>
</tbody>
</table>

Approach speed is based on NAVAIR recommended minimum.

Engaging speed limited by airplane strength limit as determined by maximum rate of sink.
HIGH ALTITUDE RECONNAISSANCE

WARM UP, TAKE-OFF, AND ACCELERATE: 5 minutes at normal thrust at sea level.
CLIMB: On course to optimum cruise altitude with military thrust.
CRUISE OUT: At altitudes and speeds for maximum range.
CLIMB: With maximum thrust on course to cruise ceiling.
RUN IN: 15 minutes at normal thrust at combat altitude.

Evasive Action: 2 minutes with normal thrust at combat altitude (no distance gained).
RUN IN: 5 minutes with normal thrust (assume escape ends at optimum cruising altitude).
CRUISE BACK: At altitudes and speeds for maximum range.
RESERVE: 30 minutes at speed for maximum endurance at sea level plus 5% of the initial fuel load.

Combat Radius = Climb + Cruise Out + Climb + Run In + Escape + Cruise Back.

Mission Time = Time required for climb + cruise out + climb + run in + evasive action + escape + cruise back.

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LOW ALTITUDE PHOTOGRAPHIC

WARM UP, TAKE-OFF, AND ACCELERATE: 5 minutes at normal thrust at sea level.
CLIMB: On course to optimum cruise altitude with military thrust.
CRUISE OUT: At altitudes and speeds for maximum range.
DESCEND: To sea level (no fuel used and no distance gained).
RUN IN: For 50 miles with military thrust at sea level.
FUEL ALLOWANCE AT TARGET: 8 minutes with normal thrust at sea level (no distance gained).
Evasive Action: 5 minutes with military thrust at sea level (no distance gained).
RUN OUT: For 50 miles with military thrust at sea level.
CLIMB: On course to optimum cruise altitude with military thrust.
CRUISE BACK: At altitudes and speeds for maximum range.
RESERVE: 30 minutes at speed for maximum endurance at sea level plus 5% of initial fuel load.

Combat Radius = Climb + cruise out + run in = run out + Climb + cruise back.

Mission Time = Time required for climb + cruise out + run in + target time + evasive action + run out + Climb + cruise back.

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HIGH ALTITUDE PHOTOGRAPHIC

WARM UP, TAKE-OFF, AND ACCELERATE: 5 minutes at normal thrust at sea level.
CLIMB: On course to optimum cruise altitude with military thrust.
CRUISE OUT: At altitudes and speeds for maximum range.
DESCEND: To 35,000 feet (no fuel used, no distance gained).
RUN IN: For 50 miles with military thrust at 35,000 feet.
FUEL ALLOWANCE AT TARGET: 12 minutes with normal thrust at 35,000 feet (no distance gained).
Evasive Action: 5 minutes with military thrust at 35,000 feet (no distance gained).
RUN OUT: For 50 miles with military thrust at 35,000 feet.
CLIMB: On course to optimum cruise altitude with military thrust.
CRUISE BACK: At altitudes and speeds for maximum range.
RESERVE: 30 minutes at speed for maximum endurance at sea level plus 5% of initial fuel load.

Combat Radius = Climb + cruise + run in = run out + Climb + cruise back.

Mission Time = Time required for climb + cruise out + run in + target time + evasive action + run out + Climb + cruise back.