Standard Aircraft Characteristics

NAVY MODEL
YQH-50E
AIRCRAFT

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JANUARY 1970
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STANDARD AIRCRAFT CHARACTERISTICS

YQH-50E

GYRODYNE COMPANY OF AMERICA, INC.
ST. JAMES, LONG ISLAND, NEW YORK
NAVAL AIR SYSTEMS COMMAND
NAVY DEPARTMENT

**ROTOR DATA**

DISC AREA - 314.2 SQ. FT.
BLADE AREA 32.5 SQ. FT.
BLADE SECTION NASA 0017 TO 0012
ROTOR SCHAR RATIO - 9.836 TO 1

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**NON SELF-SEALING TANKS**

52.0 GALS. (FULL FUEL CAPACITY)
36.3 GALS. (OPERATIONAL FUEL CAPACITY)
1.5 GALS. (OIL)
1.6 GALS. (OIL)

**2-MK44 TORPEDOES**

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**DESCRIPTIVE ARRANGEMENT**

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**ARMAMENT AND TANKAGE**

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YOH-50E
### POWER PLANT

<table>
<thead>
<tr>
<th>ENGINE</th>
<th>Allison Model 250-C19A</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFR.</td>
<td>Allison Division, General Motors Corp.</td>
</tr>
<tr>
<td>TYPE</td>
<td>Turboshaft</td>
</tr>
</tbody>
</table>

#### RATINGS

<table>
<thead>
<tr>
<th></th>
<th>BHP</th>
<th>RPM</th>
<th>ALT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MILITARY</td>
<td>317</td>
<td>6000</td>
<td>SSL</td>
</tr>
<tr>
<td>NORMAL</td>
<td>270</td>
<td>6000</td>
<td>SSL</td>
</tr>
</tbody>
</table>

Model Spec. No. C731-C, Appendix F
Dated: 1 Nov. 1968

#### ELECTRONICS

- One (1) Each
- AN/ARW-78 Radio Receiving Set
- AN/ASW-20 Automatic Flight Control Set

### MISSION AND DESCRIPTION

The Model YQH-50E Vehicle is a remotely controlled rotary-wing 443 lb weapon carrier designed to deliver alternate weapon loads of 556 lb, 529 lb or 700 lb.

The vehicle incorporates two (2) two-bladed counter-rotating coaxial rotors of the semi-rigid (one-saw) type. The blades are constructed of laminated fiberglass cloth layered in planform and thickness with 10° negative twist. The vehicle is completely controllable through the rotors. Rotor controls are operated by the automatic stabilization and remote control equipment.

Control in pitch and roll is obtained through conventional cyclic pitch control. Control in yaw is achieved by means of rotor blade tip air (drag) brakes, which provide positive directional control in all flight regimes.

The Model YQH-50E Vehicle is similar to the Model QH-50E Vehicle except that the power plant is the 317 hp T63-A-54 (250-C19A) gas turbine engine manufactured by the Allison Division of General Motors Corp. The engine is located aft of the rotor mast and the avionics equipment is mounted fwd of the rotor mast.

### DEVELOPMENT

The first flight of the Model YQH-50E Vehicle occurred in September 1969.

### DIMENSIONS

- DISC AREA: 314.2 sq ft
- BLADE AREA: 32.5 sq ft
- ROTOR DIAMETER: 20 ft 0 in
- LENGTH: 20 ft 0 in
- HEIGHT: 9 ft 8.5 in
- TREAD: 5 ft 0 in

### WEIGHS

<table>
<thead>
<tr>
<th>LOADINGS</th>
<th>Lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPTY</td>
<td>993.3</td>
</tr>
<tr>
<td>NORMAL GROSS WEIGHT (2 MK44)</td>
<td>2184.3</td>
</tr>
<tr>
<td>OVERLOAD GROSS WEIGHT (2 MK44)</td>
<td>2288.3</td>
</tr>
</tbody>
</table>

### FUEL AND OIL

- NO. OF TANKS: 1
- CAP. (GAL.): 36.3 (operational) 52.0 (full)
- LOCATION: Fwd of Transmission
- Specification MIL-J-5624F(2), Grade JP-4

### OIL

- CAPACITY: 3.1 gal.
- SPEC: MIL-L-23699

### ORDNANCE

<table>
<thead>
<tr>
<th>Weights</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK 44 Torpedo</td>
<td>2</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>MK 46 Torpedo</td>
<td>1</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>700 lb</td>
<td>1</td>
</tr>
</tbody>
</table>
## PERFORMANCE SUMMARY

<table>
<thead>
<tr>
<th>TAKE-OFF LOADING CONDITION</th>
<th>(1) ASW ATTACK Two (2) MK44 TORPEDOES</th>
<th>(2) ASW ATTACK One (1) MK16 TORPEDO</th>
<th>(3) ASW ATTACK One (1) 700 LB WEAPON</th>
<th>(4) ASW ATTACK Two (2) MK44 TORPEDOES</th>
<th>(5) ASW ATTACK One (1) MK16 TORPEDO</th>
<th>(6) ASW ATTACK One (1) 700 LB WEAPON</th>
<th>(7) ASW ATTACK Two (2) MK44 TORPEDOES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAKE-OFF WEIGHT</td>
<td>2184.3</td>
<td>1041.6</td>
<td>2006.3</td>
<td>2184.3</td>
<td>2286.3</td>
<td>1945.6</td>
<td>2110.3</td>
</tr>
<tr>
<td>Fuel (Usable)</td>
<td>(A)</td>
<td>lb.</td>
<td>lb.</td>
<td>(A)</td>
<td>lb.</td>
<td>lb.</td>
<td>(A)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>244.0</td>
<td>244.0</td>
<td></td>
<td>244.0</td>
<td>244.0</td>
<td></td>
</tr>
<tr>
<td>Payload</td>
<td></td>
<td>866.5</td>
<td>700.0</td>
<td></td>
<td>866.5</td>
<td>529.5</td>
<td></td>
</tr>
<tr>
<td>Disc loading</td>
<td></td>
<td>6.95</td>
<td>6.39</td>
<td></td>
<td>6.95</td>
<td>6.29</td>
<td></td>
</tr>
<tr>
<td>Vertical rate of climb at S.L.</td>
<td>(B)</td>
<td>1545</td>
<td>2480</td>
<td></td>
<td>1545</td>
<td>1255</td>
<td></td>
</tr>
<tr>
<td>Absolute hovering ceiling</td>
<td></td>
<td>7850</td>
<td>13300</td>
<td></td>
<td>7850</td>
<td>6250</td>
<td></td>
</tr>
<tr>
<td>Max. rate of climb at S.L.</td>
<td>(9)</td>
<td>2065</td>
<td>2800</td>
<td></td>
<td>2065</td>
<td>1800</td>
<td></td>
</tr>
<tr>
<td>Vert. rate of climb at S.L.</td>
<td>90°</td>
<td>560</td>
<td>1840</td>
<td></td>
<td>560</td>
<td>1120</td>
<td></td>
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<tr>
<td>Speed at S.L.</td>
<td>(C)</td>
<td>80.0</td>
<td>80.0</td>
<td></td>
<td>80.0</td>
<td>80.0</td>
<td></td>
</tr>
<tr>
<td>Max. speed/altitude</td>
<td>(C)</td>
<td>80.0</td>
<td>80.0</td>
<td></td>
<td>80.0</td>
<td>80.0</td>
<td></td>
</tr>
<tr>
<td>Combat range</td>
<td>(D)</td>
<td>110.0</td>
<td>115.0</td>
<td></td>
<td>110.0</td>
<td>115.5</td>
<td></td>
</tr>
<tr>
<td>Average cruising speed</td>
<td>(D)</td>
<td>80.0</td>
<td>80.0</td>
<td></td>
<td>80.0</td>
<td>80.0</td>
<td></td>
</tr>
<tr>
<td>Cruising altitude</td>
<td>(E)</td>
<td>S.L.</td>
<td>S.L.</td>
<td></td>
<td>S.L.</td>
<td>S.L.</td>
<td></td>
</tr>
<tr>
<td>Combat radius</td>
<td>(E)</td>
<td>42.1</td>
<td>-</td>
<td></td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Average cruising speed</td>
<td>(E)</td>
<td>80.0</td>
<td>80.0</td>
<td></td>
<td>80.0</td>
<td>80.0</td>
<td></td>
</tr>
<tr>
<td>Combat radius</td>
<td>(F)</td>
<td>-</td>
<td>-</td>
<td></td>
<td>50.0</td>
<td>73.8</td>
<td>76.7</td>
</tr>
</tbody>
</table>

## NOTES

(A) Prototype YQH-50E will incorporate QH-50D 52-cyl. fuel tank. However, in the highest payload configuration, with two (2) MK44 torpedoes, acceptable vertical performance can only be obtained when a maximum of 70% of this capacity is utilized, as shown in Loading Conditions (1) and (4).

(B) Military Power, adjusted for estimated installation losses.

(C) V\_{\text{max}} is restricted to 80 knots.

(D) Calculation of Combat Range and Combat Radius is based on engine specification fuel flow data increased by 5%.

(E) Based on Detail Specification (SD-359-3-3) Combat Radius Mission.

(F) Based on Optional Combat Radius Mission.

PERFORMANCE is determined from calculations based on power required test data obtained during Contractor's Flight Demonstration Program for the Model QH-50D with fiberglass rotor blades at NATC, Patuxent River, Md.

All performance is out of ground effect.
NOTES

DETAIL SPECIFICATION (SD 559-3-3)

COMBAT RADIUS MISSION

(a) Warm-up and take-off allowance, 0.5 minute at Normal Rated Power.

(b) Cruise out at 80 knots at Sea Level.

(c) Loiter over target at speed for maximum endurance for \[ T = \frac{2}{V_{\text{max}}} \times 35 \]

(d) Cruise back at 80 knots at Sea Level retaining weapons.

(e) Land.

80 kn

40+ n.mi.

Lotter

\[ T = 37.5 \text{ min.} \]

COMBAT RANGE MISSION

WARM-UP AND TAKE-OFF: 1/2 minute at Normal Rated Power.

CRUISE: At sea level at average cruising speed (speed for maximum range.)

RESERVE: 10 per cent of initial fuel load.

WARM-UP AND TAKE-OFF: 1/2 minute at Normal Rated Power.

CRUISE OUT: At \[ V_{\text{max}} \] at sea level.

HOVER: 12 minutes out of ground effect at sea level at objective.

DROP WEAPON: No fuel used, no distance gained.

CRUISE BACK: At \[ V_{\text{max}} \] at sea level.

RESERVE: 10 per cent of initial fuel load.