**POWER PLANT**

<table>
<thead>
<tr>
<th>No. &amp; Model</th>
<th>(1) YLR 67-BA-9</th>
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<tbody>
<tr>
<td>Mfr</td>
<td>Bell Aircraft Corp.</td>
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<tr>
<td>Engine Spec No.</td>
<td>56-947-328</td>
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<tr>
<td>Fuel Type</td>
<td>JP-4 and IWFNA</td>
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<td>Nr. of Chambers</td>
<td>3</td>
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<tr>
<td>Propellant Feed</td>
<td>Turbine Pump</td>
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**MISSION AND DESCRIPTION**

Navy Equivalent: None  Mfr's Model: 56F

The RASCAL is a supersonic guided aircraft missile capable of carrying a 3000 to 5000 lb warhead at speeds of Mach 1.2 to 3.3 through all weather conditions to any one of the radar targets within a range of 90 nautical miles of the launching point.

The design of the RASCAL is a canard cruciform arrangement. The fuselage is fabricated in sections from stretch-formed aluminum frames and rolled aluminum skin. Wings are of multiple rib tapered skin construction.

The RASCAL will be launched from DB-47 aircraft at altitudes from 40,000 to 60,000 feet. It will climb to between 60,000 and 70,000 feet, cruise in about 10 miles of target and then dive at an angle of 40° to target.

The most serious countermeasure faced is the destruction of the director aircraft during the time of flight of the guided aircraft missile, as this will be dependent upon a human operator for course corrections on its way to the burst point. An air-to-air jamming station between the director aircraft and the guided aircraft missile could probably neutralize its operation.

**DEVELOPMENT**

Project No. R-448-48 Approved  29 Apr 46

Completion 1st Guided Article   23 Sep 53

Launching 1st Guided Article  23 Oct 53

Completion of suitability tests is scheduled for Feb 56.

Thirty-eight (38) powered GAM-63 test vehicles have been launched to date, Twenty-three (23) GAM-63s are scheduled to be launched between 1 Aug 56 and 30 Apr 57, when R & D on the production configuration of the GAM-63 weapon system is scheduled to be completed. DEIs on the director aircraft, missile, and ground support equipment as well as all major systems of the Weapon System have been conducted. A CTCL on the GST director aircraft has been accomplished.

**WEIGHTS**

- Loading: 3500 Lb
- Empty: 5900 Lb
- Max Launch: 18,200 Lb

**FUEL**

- Location No. Tanks
- Fuselage: 1
- Grade: JP-4
- Specification: MIL-F-5624A

**OXIDIZER**

- Fuselage: 1
- Type: IWFNA
- Specification: MIL-N-2754

**PRESSURIZATION**

- Type: Nitrogen
- Weight (lb): 91.5
- Specification: MIL-N-6011

**DIMENSIONS**

- Wing Span: 32.0 ft
- Incidence: 0°
- Dihedral: 0°
- sweepback (LE): 29.05°

**GUIDANCE**

- (a) INITIAL: Standard navigation procedures using mod. K series equipment, up to launch ching point.
- (b) MID-COURSE: Single-axis inertial guidance system in the GAM-63.
- (c) TERMINAL DIVE: Remote radar relay command link. Radar target information is relayed from XGM-63 to director aircraft. Observer relays command corrections to XGM-63.
- TERMINAL ACCURACY:
  - Surface target CEP = 1500 ft
  - Air burst: CEP = 1500 ft
  - Vertical standard deviation 5000 ft

**LAUNCHING**

**METHOD**

Dropped externally from DB-47.

**PREPARATION & LAUNCH TIME**

2 to 3 minutes

**WARHEAD**

- Type: Nuclear
- Gross Weight (lb): 3000
- Max Alternate (lb): 5000

**FUZE**

- Type: Altitude Sensing
- and crystal impact devices
- Arming Method: Barometric
The RASCAL guidance system combines a non-emanating inertial guidance system which directs the guided aircraft missile to the initiation of terminal dive and a remote radar relay command system for course corrections. During terminal dive, a radar set in the RASCAL relays to the director aircraft a radar picture of the target area, which enables the operator to relay commands to the XGAM-63 with increasing precision as the target is approached thus insuring a high degree of accuracy.

The director aircraft is navigated to the launch point with its conventional navigation equipment. Immediately prior to launch, information regarding director aircraft velocity, range to target, and bearing of the target is supplied to the XGAM-63 inertial system. The RASCAL is launched and during the midcourse phase, it is normally under the control of the single-axis (longitudinal) inertial system, operating in conjunction with a directional gyro and altimeter, for control in azimuth and altitude, respectively. In addition, the servo-pilot system provides roll stabilized flight and controls the XGAM-63 about the pitch and yaw axes in compliance with command signals. Two gyroscopes furnish the basic reference axes for the electro-hydraulic system which actuates the control surfaces.

Should the guidance operator desire to observe the progress of the guided aircraft missile toward the target area, he can transmit a command which will energize the search radar system located in the nose. The area ahead of the bomber is scanned over a 150° sector by this search radar, and video return information is transmitted to the director aircraft by means of a microwave relay link. This information is presented on a radar indicator in the director aircraft. Should the guidance operator conclude from observation of the indicator that the guided aircraft missile is not on the correct course to the target, he can override the inertial system in azimuth. The operator can also control the dive point. Should the operator decide only to monitor the progress of the guided missile aircraft, the inertial guidance system retains control and, at a predetermined range from the target, it will cause the initiation of a 40° terminal dive path.

During the terminal dive phase of the XGAM-63 the operator in the director aircraft accomplishes guidance by positioning range and azimuth cursors over the target return on the indicator through the use of a tracking stick located at the terminal guidance control station. The position of the tracking stick determines the guidance command signals which are sent to the missile.