Aircraft Engine Characteristics Summary

**FEATURES**

A supersonic fixed geometry internally mounted Ram-jet with turbine-driven fuel pump, power controls, and ignition system located externally around the inlet bell mouth. (SEE NOTE 1).

**AVAILABILITY**

<table>
<thead>
<tr>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Engine</td>
<td>Sep 1951*</td>
</tr>
<tr>
<td>Prototype Flight Engine</td>
<td>May 1954</td>
</tr>
<tr>
<td>Installation Engine</td>
<td>Sep 1955</td>
</tr>
<tr>
<td>Prel. Flight Rating Test</td>
<td>Jul 1956</td>
</tr>
<tr>
<td>Qualification Test</td>
<td>None</td>
</tr>
</tbody>
</table>

*Burner only

**CONTRACTUAL**

<table>
<thead>
<tr>
<th>Contract</th>
<th>Funds</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF-9000</td>
<td>$1,184,831</td>
<td>1951</td>
</tr>
<tr>
<td>AF-8723</td>
<td>4,864,390</td>
<td>1952</td>
</tr>
<tr>
<td>AF-22980</td>
<td>3,919,007**</td>
<td>1953</td>
</tr>
<tr>
<td>AF-22980</td>
<td>2,192,000**</td>
<td>1954</td>
</tr>
<tr>
<td>AF-22980</td>
<td>4,294,380**</td>
<td>1955</td>
</tr>
<tr>
<td>AF-30241*</td>
<td>2,625,185**</td>
<td>1955</td>
</tr>
<tr>
<td>AF-30266</td>
<td>12,200,000</td>
<td>1956</td>
</tr>
</tbody>
</table>

*Includes both -5, -7 and -9 engines.

**STATUS**

All engines have been delivered to North American for installation and flight testing. The PFRT has been completed except for penalty run on hydrogen fuel controller.

**GENERAL**

- Diffuser: Side entry, single oblique shock (SEE NOTE 1)
- Area Variable
- D.P. Total Pressure Recovery: 53%
- Combustion Chamber: Single-pilot gutters Inside Dia at Combustion Chamber
- Entrance: (max) 48 in
- Ignition Limits
- D.P. Combustion Efficiency: 85%
- Exhaust Nozzle: Fixed, throat area = 7.8 sq ft
- D.P. Nozzle Efficiency: 96%
- Ignition: Special fuel
- Fuel Injection: Variable area nozzles
- Accessory Drive Provisions: Fuel pump

*Aluminum Trimethyl/Aluminum Triethyl (80/20%)

**SIZE & WEIGHT**

- Length (Ram-jet plus ducting and diffuser): 390.0 in.
- Length (Removable portion): 132.0 in.
- Diameter (outside): 50.8 in.
- Weight (with access, and special fuel cartridge): 1011 lb

**UTILIZATION**

XSM-64 "NAVAHO" Missile.

Declassification Date: 1 APR 57

Classified by: Wright Aero Spec. 901-C 24 Oct 55 (Approved)
ESTIMATED DESIGN POINT PERFORMANCE

Mach number ............................................. 2.75
Altitude ............................................... 55,000 ft.
Net internal thrust ................................. 7750/8150 lb.
Specific fuel consumption ...................... 2.65/2.52 lb/hr/lb.

NACA STANDARD TEMPERATURE & PRESSURE
55,000 FEET ALTITUDE

Critical diffuser operation shown by line marked "probable limit of stable operation"

Installed engine performance in XSM-64
(Angle of Attack = 6.29°)

PROBABLE LIMIT OF
STABLE OPERATION

NOTES

NOTE 1: The supersonic diffuser is an integral part of the missile, therefore, weights and
dimensions refer to the removable portion of the ram-jet, and include burner,
combustion chamber, nozzle, engine accessories and controls.
Responsibility for design and fabrication of the diffuser and inlet ducting lies
with the airframe contractor. The engine contractor, however, will coordinate
diffuser and ducting changes with the airframe contractor.

NOTE 2: These funds include procurement of outside test time at test facilities operated
by the Army and Navy.