Standard Missile Characteristics

**XSM-65A**

**Consolidated-Vultee**

Two booster engines
two vernier engines

By authority of the Secretary of the Air Force

26 Nov 56

Declassified after 12 years.

30 Oct 69
**Mission and Description**

The XSM-65A is an experimental version of the Atlas ballistic pilotless spacecraft. The mission is to establish design data concerning the propulsion system and missile characteristics. The duration of powered flight approximates that of the first stage of the operational spacecraft. The airframe consists of a nose section, a body section and a propulsion section. There are no external aerodynamic control surfaces. The nose section contains instrumentation. The body section consists of a cylinder divided by a bulkhead to form the propellant tanks. The tanks are thin-walled stainless steel shells, without internal stiffeners. These shells are pressurized for ability to carry shear, bending moments, and axial loads. Two pods, diametrically opposite each other, which contain electronic and control equipment, are mounted on the outside of the body section. The propulsion section contains the rocket engines, pressurizing and auxiliary equipment. The XSM-65A is designated a surface-to-surface spacecraft.

The XSM-65A is a one stage spacecraft. Both booster and vernier engines are started on the ground. The flights will be initiated for test purposes. With a gross weight of 181,000 pounds and using booster engines with a combined sea level thrust of 270,000 pounds the approximate range is 452 nautical miles and the velocity at burnout is approximately 9321 feet per second. Using booster engines with a combined sea level thrust of 300,000 pounds and a gross weight of 201,254 pounds the range is approximately 472 nautical miles and the approximate velocity at burnout is 9431 feet per second.

**WEIGHTS**

<table>
<thead>
<tr>
<th>Empty</th>
<th>Early Series</th>
<th>Later Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Incl. N. C.)</td>
<td>15,613 lbs</td>
<td>18,898 lbs</td>
</tr>
<tr>
<td>Propellant</td>
<td>165,387 lbs</td>
<td>182,356 lbs</td>
</tr>
<tr>
<td>Nose Cone</td>
<td>155 lbs</td>
<td>3500 lbs</td>
</tr>
<tr>
<td>Launching</td>
<td>181,000 lbs</td>
<td>201,254 lbs</td>
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**PROPELLANT**

- Fuel: Hydrocarbon Type
- Tank Capacity: 76,570 lbs
- Oxidizer: Liquid Oxygen
- Tank Capacity: 162,380 lbs

**G U I D A N C E**

Guidance and control are performed during powered flight by a self contained preset programmed guidance system in conjunction with hydraulically powered control systems. A government furnished guidance subsystem is carried for evaluation purposes.

**C O N T R O L**

The automatic pilot controls flow to hydraulic actuators. These actuators position the appropriate rocket engines to eliminate deviations from the flight path.

**A C C U R A C Y**

A theoretical CEP shall be less than 50 nautical miles. A CEP cannot be demonstrated because of probable missile structural failure following the termination of powered flight.

**L A U N C H I N G**

The spacecraft is hoisted to a vertical position at the launching site. The missile trailer is used to prevent stress to the body of the missile while it is being hoisted into position. After the missile is in position the trailer is lowered and removed from the launching site. The required amount of propellant is then pumped into the tanks. After a checkout of instrumentation the spacecraft is ready for launching.

**N O S E C O N E**

The XSM-65A is a test vehicle and therefore does not carry a warhead. A nose cone carrying either instrumentation, ballast or both is used to simulate the warhead during test flight but will not include nose cone operation.

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**DEVELOPMENT**

- XSM-65A Mockup (Mockup Inspection Board) ........... Oct 1955
- Initial Design Complete, XSM-65A .................... May 1956
- Static Test, Start of, XSM-65A ..................... Oct 1956
- First Flight (Test Vehicle) XSM-65A .................. April 1957
**Typical Mission**

All engines are started on the ground. When the rated thrust is reached, the spacecraft is released and rises vertically. An automatic pilot controls the attitude of the missile throughout powered flight by positioning the gimbaled engines. The guidance system is a self-contained programmed automatic pilot and hydraulic powered control system. This type guidance is used during test flights.

**Performance Data**

1. All engines started on the ground.
2. Vertical launch with initial acceleration of one and one-half "G" net,
3. Pre-set programming control during powered flight.
4. Powered flight 125 seconds, simulating first stage of operational flight.
5. Guidance ends with termination of powered flight but command destruct is available,
6. Apogee - 250 seconds, 386,000 feet altitude. Apogee based on theoretical flight path assuming non destruction of missile body at termination of powered flight.

PERFORMANCE BASIS:
(a) Data Source: Contractor's Estimated Data
(Not substantiated by WADC)
Performance Data
(TYPICAL MISSION)

135,000 POUND THRUST CHAMBERS

RANGE
ALTITUDE
VELOCITY

ACCELERATION
MACH NO.
FLIGHT PATH ANGLE

POWERED FLIGHT
Performance Data
150,000 POUND THRUST CHAMBERS

RANGE

ALTITUDE

VELOCITY

ACCELERATION

MACH NO.

FLIGHT PATH ANGLE

POWERED FLIGHT

XSM-65A

SECRET

26 NOV 56