Standard Aircraft Characteristics

MX-1593

ATLAS

Consolidated-Vultee

By Authority of the Secretary of the Air Force

20 Aug 53

SECRET

MX-1593

PILOTLESS SPACECRAFT

(X) B-65
**PROPULSION**

**SUSTAINER**
- No. & Type: 4 [Rocket Motors]
- Mfr: North American

**THRUST**
- Booster Stage-Jettisoned Rated Thrust (lb ea): 133,200
- One rocket motor - Gimballed Rated Thrust (lb ea): 123,300
- Max Thrust (lb): 656,100
- Duration (sec): 300

**FUEL**
- Type: (JP-4)
- Capacity (lb): 134,900

**OXIDIZER**
- Type: Liquid Oxygen
- Capacity (lb): 275,000

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**WEIGHTS**

**PILOTLESS SPACECRAFT**
- Empty (incl. warhead - lb): 31,190
- Propellants (lb): 409,000
- Warhead (lb): 4300
- Launching (lb): 440,100
- This warhead is for 5500 n.mile range mission. Warhead varies with range. (See Below)

**ALTERNATE WARHEAD WEIGHTS**
- Range (n.mi): 2000 to 3250, 3250 to 4250
- Weight (lb): 7000, 4500

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**MISSION AND DESCRIPTION**

The ATLAS is a long-range operational ballistic pilotless spacecraft utilizing 1 1/2 stages and capable of destroying a target at long ranges.

The airframe design is a simple cone-shaped nose and cylindrical fuselage with no external aerodynamic control surfaces. The nose cone is separated from the tanks and propulsion section early in flight and is usually slightly greater in weight than the warhead. The propellant tanks are unshielded thin walled part aluminum and part stainless steel shells, which are pressurized for stability to carry body shears, bending moments, and axial loads. The propulsion section houses the rocket motors, pressurizing and auxiliary equipment while the warhead is housed in a heat dissipating nose cone to protect it from the aerodynamic heat generated upon re-entering the atmosphere. All rocket motors are started on the ground to insure the highest possible operating reliability.

Approximately 93% of the time in flight the spacecraft is above the appreciable atmosphere, traversing an unperturbed free-fall ballistic trajectory to the target. The high point of this trajectory may vary with individual flight plan but is nominally 500 nautical miles for a 5500 nautical mile range target. Speeds of 23,000 ft/sec., Mach 23, are attained as the spacecraft re-enters the atmosphere. This speed is diminished by atmospheric friction so that impact speeds of approximately 6700 ft/sec, are realized.

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**DEVELOPMENT**

- Design Initiated: 19 Jan 51
- First Flight (Test Vehicle)*: Dec 55
- First Flight (Prototype): Jul 58
- First Production Article: 61

*Test Vehicles will be used to obtain essential guidance, aerodynamic, and thermodynamic information that is beyond the scope of laboratory testing. Such information will be required to complete the design of the ultimate weapon.

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**GUIDANCE**

- Airborne
  - Inertial Autopilot
  - Transponder-Receiver
- Ground Based
  - Command Transmitter
  - Radar Tracker
  - Computer

**ACCURACY**

- Terminal Accuracy for 50% Hits
  - 3000 ft for 5500 n.mile range
  - 2500 ft for 4000 n.mile range
  - 2200 ft for 3500 n.mile range

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**LAUNCHING**

Launched vertically from concrete pad. Spacecraft sits vertically on tail cone and launch supports.

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**WARHEAD**

- Type: Special

**FUZE**

Electronic timer set by command control from guidance station after end of powered flight.
GUIDANCE & CONTROL

A gyro-controlled stabilization system, acting through servos to control the gimbaled rocket motor, controls the pilotless spacecraft through-out powered flight. The vehicle takes off vertically. At approximately 15,000 ft altitude the stabilization system causes it to execute a programmed turn in order to place the spacecraft on a ballistic flight path. A radio guidance station approximately 230 miles down range picks up and tracks the craft as soon as it rises above the radio horizon. After about 120 seconds, the four first stage rocket motors are jettisoned. The ground based guidance station now assumes supervisory control of the stabilization system. Tracking information is analyzed in the ground based computer and corrections required to place the spacecraft on a target intersecting course are relayed to the airborne stabilization system. Second stage rocket motor power cut-off occurs after approximately 260 seconds and vernier rocket motors then trim the final velocity during the final 30 seconds of powered flight while the spacecraft is still under command of the guidance station. The nose cone is separated after vernier rocket motor power cut-off. At this time (approximately 290 seconds from launching) the nose cone has been provided with the correct velocity to make it follow a free-fall path that intercepts the target without further guidance. The time fuse is set and the warhead is armed by a final command from the guidance station immediately preceding separation. The nose cone intercepts the target at an angle of about 20 degrees from the tangent to the surface.