Standard Aircraft Characteristics

XB-64

NAVaho

NORTH AMERICAN

BY AUTHORITY OF
THE SECRETARY
OF THE AIR FORCE

12 AUG 53

SECRET

PILOTLESS AIRCRAFT
PROPULSION

SUSTAINER
No. & Type .......... (2) XRJ47-W-5
Mfr. ............... Wright Aero, Corp.
Design Alt. .......... 37,000 ft
FUEL
Grade ............... Kerosene (JP-5)
Capacity (gal) ........... 6670
BOOSTER
No. & Type ............ (1) XLR71-NA-1
Mfr. ........... North American Aviation
Max Thrust .......... 240,000 lb
Thrust Duration ....... 65 sec
PROPELLANT
Type .................. Alcohol
Capacity (gal) .......... 4330
OXIDIZER
Type .................. Liquid Oxygen
Capacity (gal) .......... 4193

WEIGHTS

PILOTLESS AIRCRAFT
Empty (lb) .............. 16,850
Power Plant (lb) ......... 2100
Fuel (lb) ............... 41,700
Gross (lb) .............. 65,000

BOOSTER
Empty (lb) .............. 7050
Propellant (lb) ........ 27,250
Oxidizer (lb) .......... 37,400
Gross (lb) .............. 71,700

TOTAL
Launching (lb) .......... 136,700

Mission and Description

The XB-64 is a ram-jet powered supersonic pilotless aircraft which is capable of carrying a large atomic warhead at speeds of at least Mach 2.75 to a range of 3100 nautical miles.

The basic design is a low wing canard configuration with side air inlets. The entire forward surface is movable for pitch control and trim while the two vertical stabilizers are equipped with trailing edge rudders to provide directional control. The forward half of the body has an ogive shape which is faired aft between the two engine nacelles. The wing has a modified delta plan form and incorporates an integrated tip and flap type elevator for roll and additional pitch control. This configuration is similar for all phases of the program, difference being principally in power plant, internal arrangement and structure.

DEVELOPMENT

Project Initiated ................. Feb 46
First Flight (X-19) .......... Aug 53
First Flight (XB-64) .......... Apr 55
Completion of development of XB-64 is programmed for December 1957.

The MX-776 program consists of two phases. (1) Development of the X-19. Fabrication has been initiated on seven. A total of thirteen will be constructed and flown for a total of thirty-nine flights. (2) Development of the XB-64. Fabrication has been initiated on two pilotless aircraft and three boosters. A total of sixty-six will be constructed and flown for a total of 121 flights. The XB-64A is the later model which will incorporate sufficient improvements to achieve the full 5500 nautical mile range.

GUIDANCE

SYSTEM
Inertial - Celestial
TERMINAL ACCURACY
50% Hits within 1500 ft of Target.
CONTROL
System: Auto-navigator & Auto-pilot

LAUNCHING

Launched vertically from ground using booster which will separate at approximately 60,000 feet altitude.

PREPARATION & LAUNCH TIME
Approximately 2 Hours

WARHEAD

Type ........ Atomic; BW; CW
fuze
Barometric
GUIDANCE AND CONTROL

The guidance system for the XB-64 employs a stellar-supervised inertial autonavigator as its basic element. During the boost phase roll and yaw of the pilotless aircraft booster combination is stabilized by rate and position signals obtained from single degree of freedom rate gyro with associated integrators. Pitch is controlled along a time program attitude using an integrated rate gyro signal. When booster drag exceeds its thrust due to the thrust cut-off, the booster automatically disengages from the pilotless aircraft. This action energizes necessary relays for entering the climb phase of autopilot control. The large change in moments experienced by the pilotless aircraft during separation necessitates converting the forward control surfaces from trimmers to fact acting surfaces.

During the climb phase of flight, the ramjets are started and a gradual transition to cruising condition is made until, at a pre-set flight time, the climb phase ends and cruise phase is initiated. During this phase, a constant Mach number is maintained by the horizontal control surfaces. The autonavigator continuously indicates position which is used in connection with a maneuver programmer so that the pilotless aircraft follows a pre-set course to the target. The only restriction on this pre-set course is that it be contained within a 700 nautical mile band about a chosen great circle. At a pre-set "range to go" sensed by the autonavigator, the pilotless aircraft noses down to make final approach to target. Continuous dive-in control is maintained until impact. The autonavigator corrects errors in the integrated gyro signal prior to the dive-in. The pilotless aircraft is roll and yaw stabilized during the dive by single degree of freedom rate gyro, the terminal trajectory consists of a sharply increasing dive from approximately 81,000 ft becoming vertical over target at approximately 10,000 ft altitude.