

Pershing 1

US Army Tactical Missile

by Mark Pescovitz

The Pershing missile was conceived in 1957 to replace the Redstone missile. A contract was awarded to Martin Marietta in 1958. Twenty-two months later the first Pershing-1 was launched from Cape Canaveral.

The Pershing-1 missile system went into Europe in 1964. Now the Pershing-1 is being replaced by the Pershing 1-A, an improved system, through project swap.

Guidance

The Pershing missile is a two-stage, ballistic weapon with all inertial guidance. The missile is placed on a preselected ballistic trajectory using data put into the computer

before firing. Thus, once airborne, it is impossible to change the course.

An airborne computer detects any deviation from the flight path and corrects it using hydraulically controlled vanes.

Missile Design

The Pershing is 3.3 feet in diameter and 34.6 feet long. It weighs 10,000 lb., and is divided into four sections.

The main thrust is provided by the first stage. The main structure of this section is high-strength steel.

The second stage is much like the first, with the addition of large control vanes.

This stage also has impulse control ports to terminate the thrust at the right time.

The guidance equipment is in an airtight aluminum alloy cone.

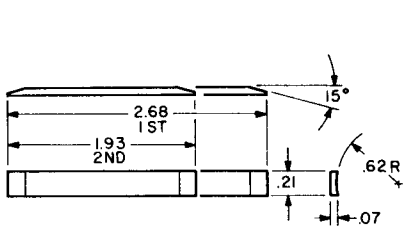
The warhead is a conical re-entry vehicle coated with an ablative material. Splice bands join the four sections of the missile.

Launcher

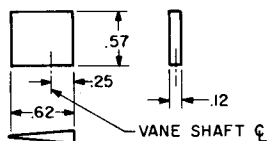
The Pershing-1 launch group consists of four tracked vehicles. The first holds the missile and erector launcher; the second the warhead and azimuth laying set; the third the programmer-test station and power station, and the fourth, the radio terminal



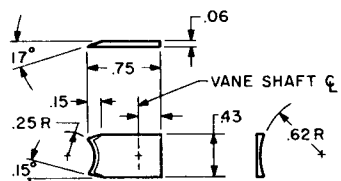
Pershing 1 missile firing battery on station in Germany. Note the operational missile is painted flat olive drab, with "U S Army" painted vertically down the side in white.



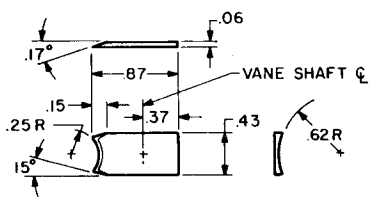
CABLE COVERS
1ST & 2ND STAGES



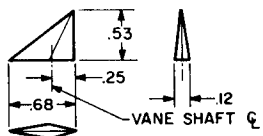
VANE, 2ND STAGE
3 REQUIRED



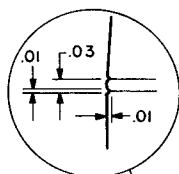
VANE PAD, 2ND STAGE
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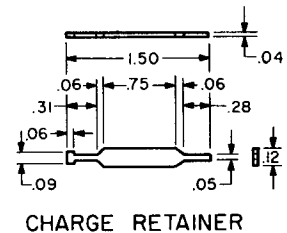
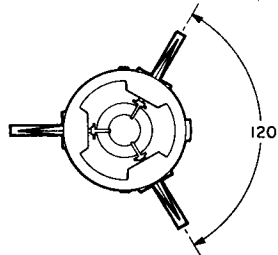
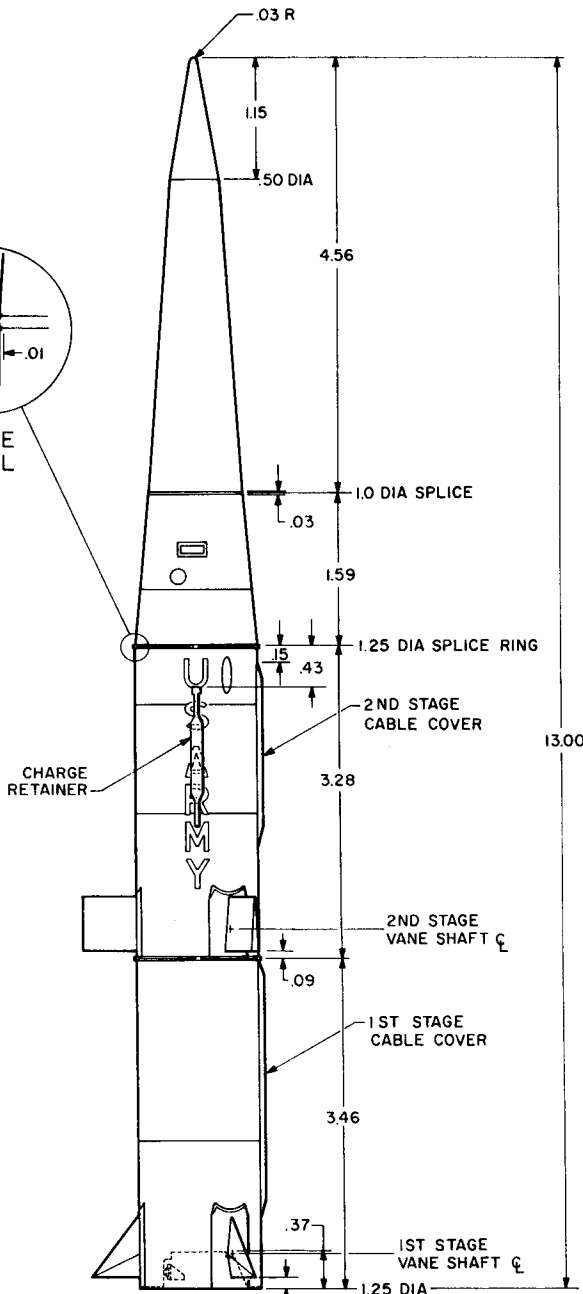
VANE PAD, 1ST STAGE
3 REQUIRED



VANE, 1ST STAGE
3 REQUIRED



SPLICE
DETAIL



CHARGE RETAINER

NOTE: ALL DIMENSIONS ARE IN INCHES.

MARTIN MARIETTA CORPORATION
ORLANDO DIVISION

set.

The main difference in the Pershing-1A's launcher is that the tracks were replaced by wheels. The Pershing 1-A missile is on the same truck as the warhead, but is not hooked up. The Programmer-Test Station automatically counts down and test the vehicle. A radio terminal set with an inflatable antenna provides communication with high command. New to the system is the Battery Control Center which commands all missiles at the firing site.

Flight Path

When the fire button is pushed, the missile springs up on its launcher and the first stage ignites. At the first stage burnout the missile coasts for a preset time after which the first stage falls away and the second stage ignites. The second stage burns until terminated by the computer. When the second stage is shut off the warhead separates and heads on a ballistic trajectory toward the target several minutes and up to 400 miles away.

Paint Scheme

The production model of the Pershing is flat olive drab. U.S. Army is painted on both sides as shown in the plan. Earlier test models launched from White Sands and Cape Kennedy were painted in white and black for tracking purposes.

Model Construction

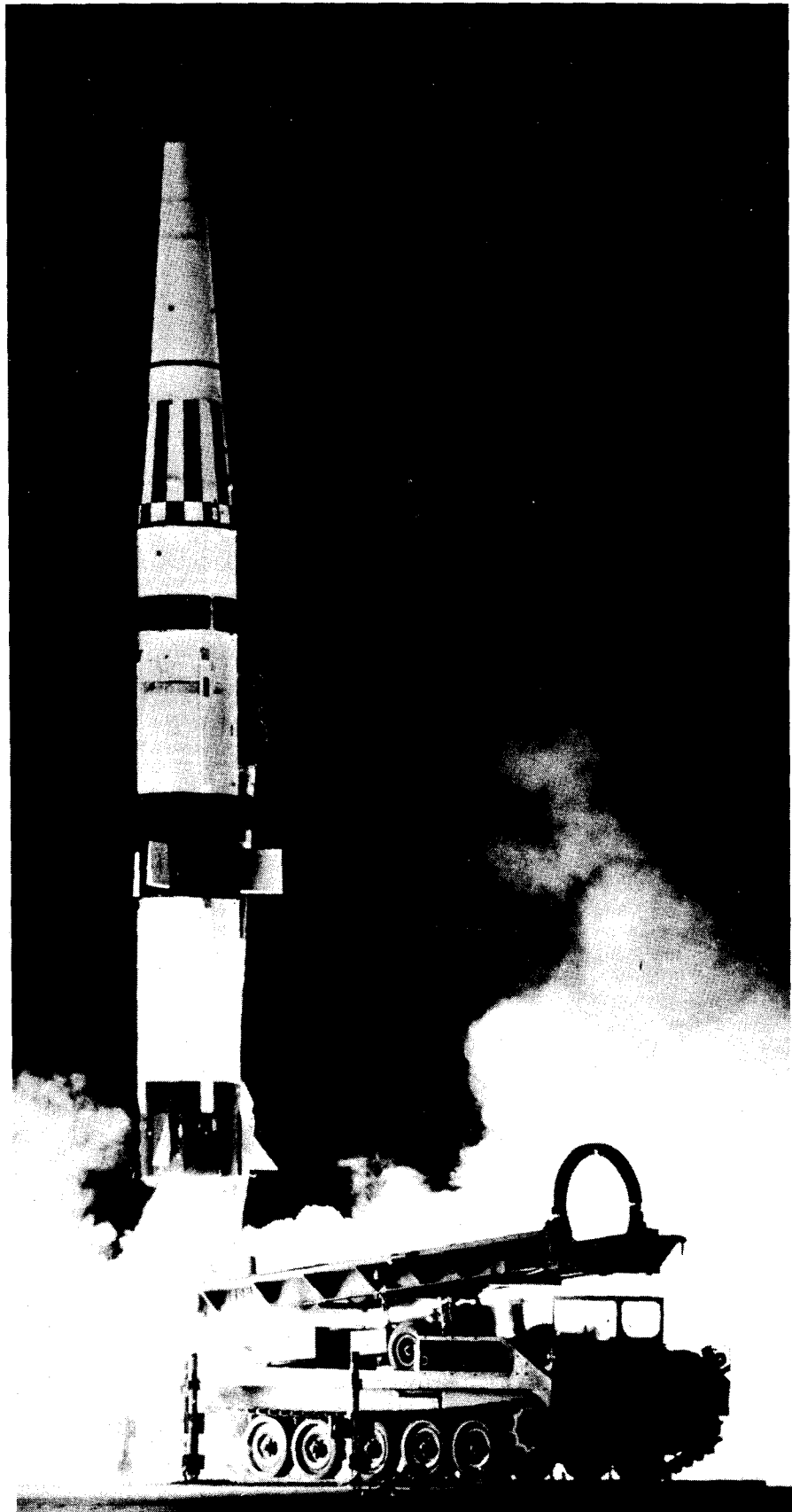
Since no Pershing nose cone is available commercially, you will have to turn this part on a lathe. Since 50% of the rocket length is nose cone, you may find it easier to turn the entire rocket from balsa. In this case a solid balsa nose cone from the 1.25 inch diameter splice ring forward is advisable. Even with the solid balsa cone, additional nose weight will be necessary to assure stable flight.

All dimensions in the drawing are scaled for a 1.25 inch body diameter. You can either turn the body from balsa (then hollow out the center to accept a BT-20 tube for the engine and chute), roll your own body tube (as described in the November 1969 MRm), or rescale the data to a commercial tube.

If you scale your Pershing to a 1.00 inch body diameter (i.e. divide all the scale dimensions by 1.25), the first stage length is approximately 70mm. This allows an operational second stage with standard 18x70mm engines. But watch out, you will need plenty of nose weight to successfully fly a two-stage Pershing.

References

U.S. Army Pershing Weapons System, Martin Orlando Division, Ordnance, September-October 1968, Lt. Col. Edwin A. Bud. Pictures, Pamphlets, and Plans obtained from Martin Company, Orlando Division.



Pershing 1 firing from the tracked launcher during a night test launching. Test missiles are painted for ease of tracking.