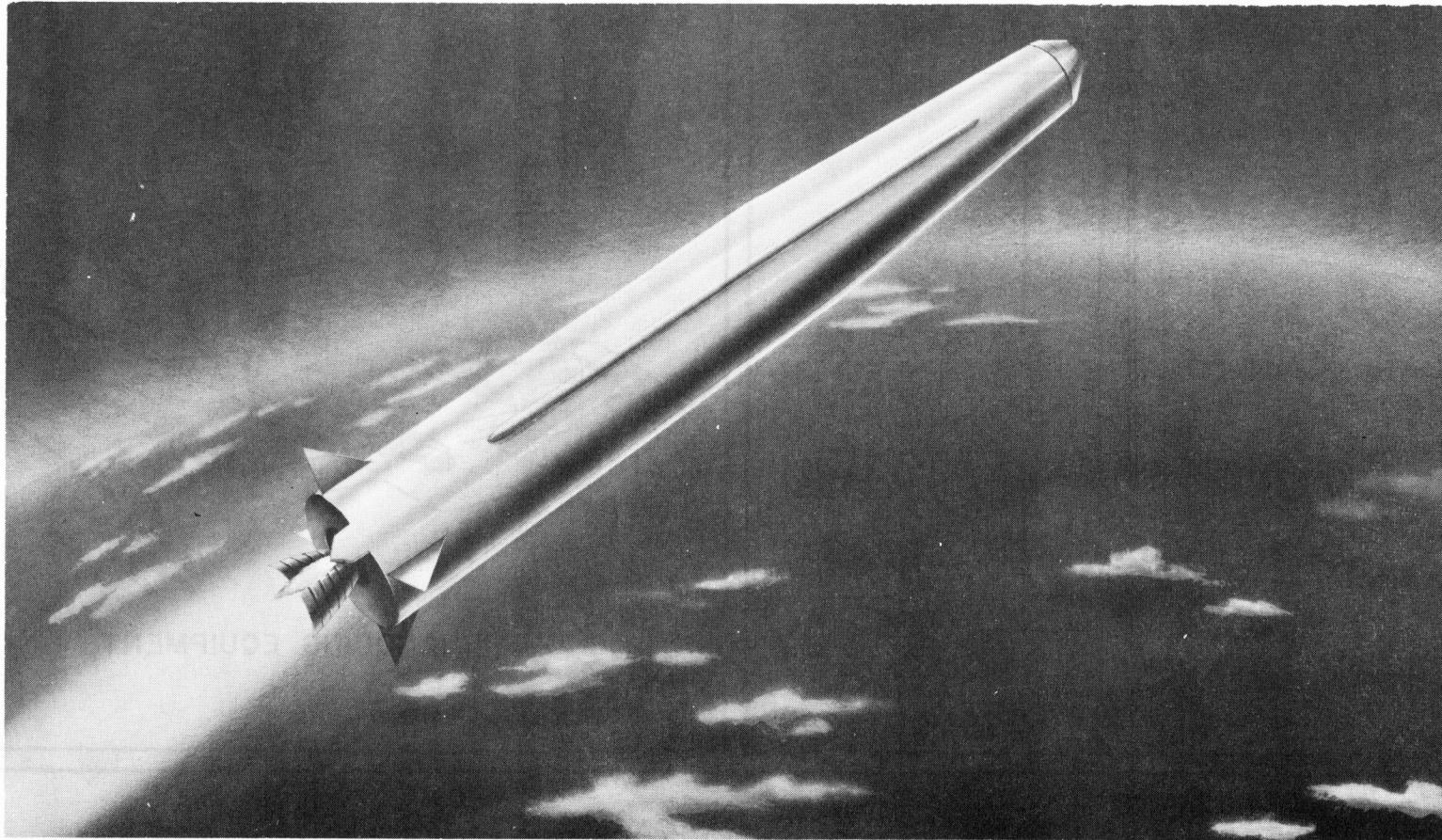


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ATOMIC ENERGY ACT 1954**

Standard Missile Characteristics

XSM-75
THOR
DOUGLAS

ONE MB-1
NORTH AMERICAN

BY AUTHORITY OF
THE SECRETARY
OF THE AIR FORCE

8 JUL 58

~~SECRET~~

JUL 21 1958

533

XSM-75

57WC-4984

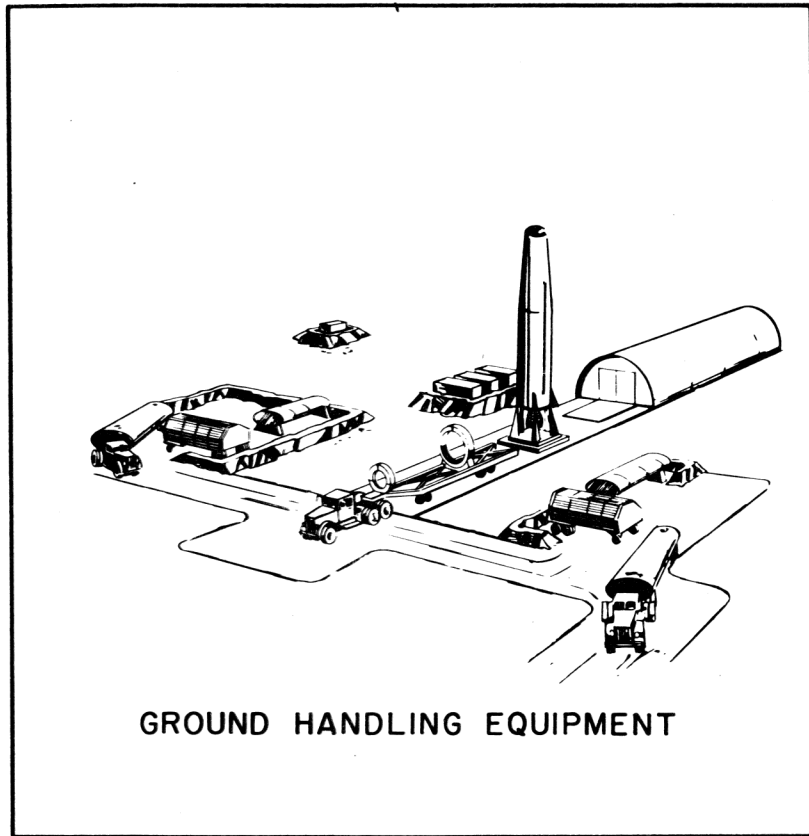
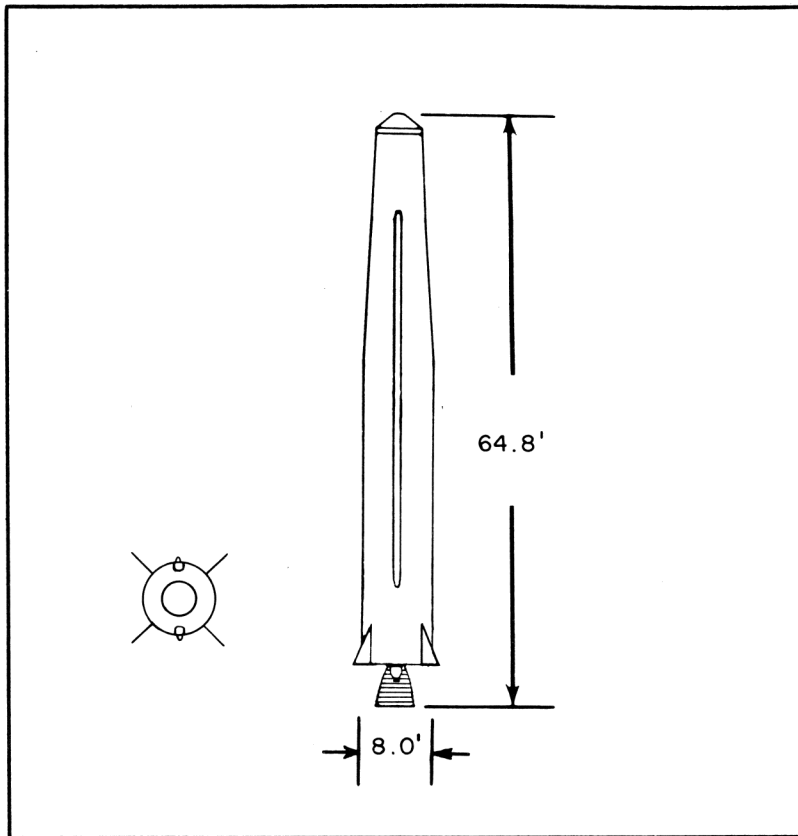
Downgraded
DOWNGRADED AT 3 YEAR INTERVALS;
DECLASSIFIED AFTER 12 YEARS

DOD DIR 5200.10

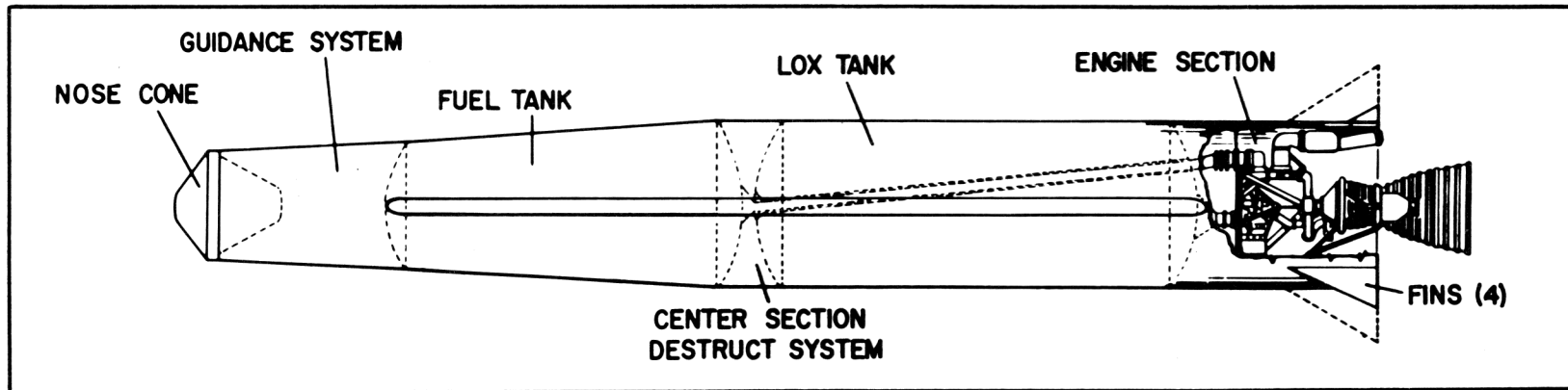
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Inspector 8/1 July 70

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POWER PLANT

Nr & Model (1) MB 1*
 Mfr North American
 Specification R-141aS
 Type Liquid Rocket
 Weight 2090 lb

Gimbaling:
 Main-Pitch & Yaw $\pm 7^\circ$, $\pm 1^\circ$
 overtravel
 Vernier-Pitch $\pm 45^\circ$; Yaw -8° to 34°

*MB-1 is a complete propulsion system comprised of an XLR79-NA 5 liquid rocket engine and 2 vernier thrust chambers. The verniers are fed initially from the main chamber turbine pump drive assembly and from pressurized tanks after main chamber cut-off.

ENGINE RATINGS

Main		
S. L. Static - LB	-	SEC
Max:	150,000	- 157
Vernier		
Max:	- 1000	- 9*

* After Main engine burnout

DIMENSIONS

Length 64.8'
 Diameter 8.0'

LAUNCHING

A transporter-erector is used to vertically position the missile on the launcher. The missile is secured in the launch position. The required amount of propellant is pumped into the tanks. The erector credit is lowered. final guidance and control checks completed, engines started and the missile is launched.

Mission and Description

Navy Equivalent: None

Mfr's Model: ---

The principal mission of the XSM-75 is to deliver a ballistic nose cone over a distance of 1500 nautical miles to a surface target. Range control is variable between the limits of 300 and 1500 nautical miles. The nose cone is separated from the missile by retro rockets at thrust termination.

The XSM-75 is single staged and is designated intermediate range, surface to surface missile.

The missile is air and ground transportable and is capable of operating from overseas bases under severe weather and environmental conditions.

The airframe consists of a guidance section, propellant tanks and center body section, and engine and accessories section. The propellant tanks are waffle patterned and identical in construction. The four fins reduce aerodynamic instability resulting in more acceptable control deflection margins for most severe wind shear design conditions.

The center body area structurally joins the LOX and fuel tanks and accommodates the various antennas, vents and separation retro-rockets.

The guidance system commences guiding the missile at approximately 108 seconds after launch and issues a pre-arm signal to the warhead when the predicted impact point is within a prescribed area about the target point.

Development

First Flight Test with Programmed Autopilot to Full Range Jan 57
 First Captive Test of Airframe Engine and Autopilot Jan 58
 First Flight Test with All-Inertial Guidance Dec 57
 First Flight Test with Instrumented Nose Cone Feb 58
 First Operational Ground Support Equipment Jul 58
 Complete Initial Development Test Program Jun 59
 Provide First Operational Prototype Missile May 58

The following are projected estimates of warhead weight vs. yield based on a combined nose cone and warhead weight of 3500 pounds:

Warhead Wt (lb)	Yield (megatons)	Date Available
1600	1.75 to 2	1959
2200	4 to 5	1963*
1600	3	
2200	8	1965

*The 2200 lb warhead is associated with the new, lighter nose cone expected in this time period.

WEIGHTS

Loading	R&D Lb	Tactical
Empty	7916*	6444*
Propellant	96,740	96,740
Nose Cone	**3500	**3500
Misc Fuel, Gas	2143	2085
Launching	110,299	109,769

* Less Nose Cone
 ** Includes Warhead

FUEL

Location	Nr Tanks	Gal
Ctr Body 1 (tot)		4438
Grade		RP 1
Specification		MIL-F-25576
		Oxidizer
Ctr Body (tot)		7028
Type		Liquid Oxygen

NOSE CONE

The nose cone is an assembly of all the components associated with and including the warhead, which are required to enable the warhead to traverse its orbit from the last point of burnout and separation to the desired point of detonation.

GUIDANCE

Guidance and control are performed during powered flight by a self-contained, pre-set programmer and all-inertial guidance system in conjunction with hydraulically powered control systems.

CONTROL

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

ACCURACY

*CEP = 2 nautical miles
 *Overall CEP including errors and uncertainties in re entry vernier shut-off, geophysical data and guidance.

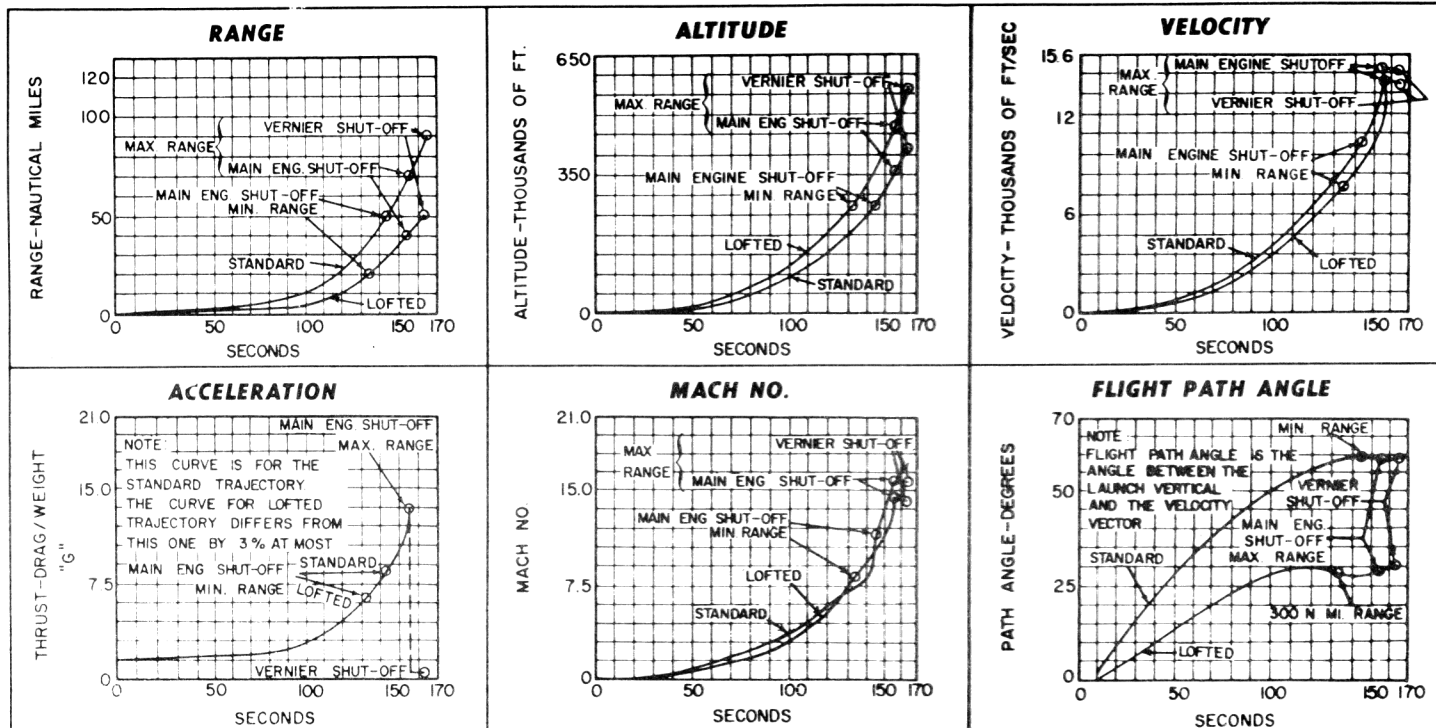
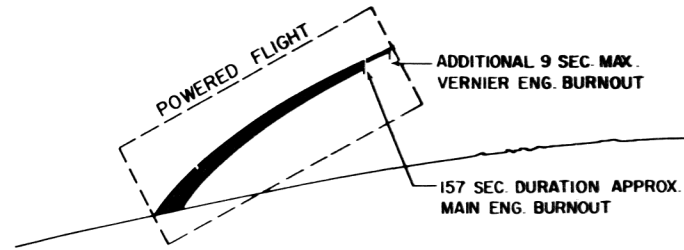
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**PERFORMANCE DATA
(TYPICAL MISSION)**

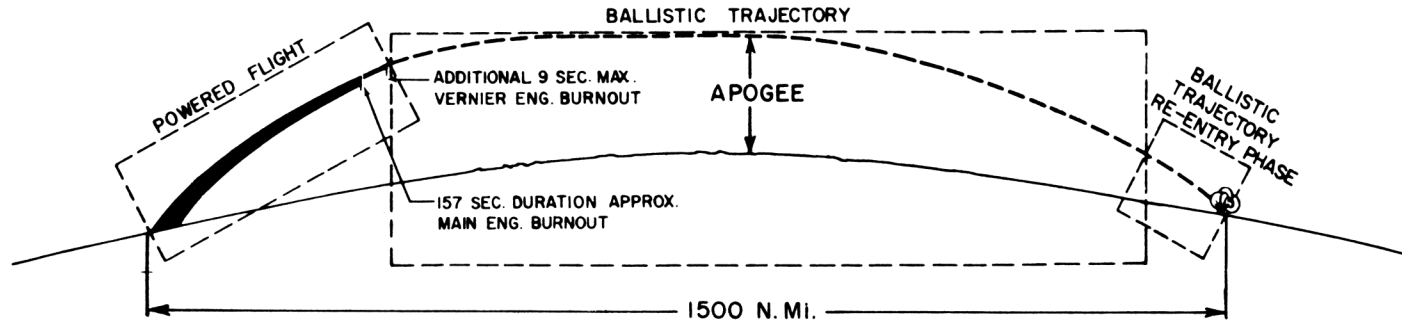


NOTE LOFTED CURVE { MAXIMUM RANGE - 1000 N MI AND STANDARD CURVE { MAXIMUM RANGE - 1500 N MI
 { MINIMUM RANGE - 300 N MI { MINIMUM RANGE - 750 N MI

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TRAJECTORY DATA



	Time (sec)	Altitude (n. mi.)	Range (n. mi.)	Velocity (ft/sec)
Burnout				
Main	157	60	68	14,600
Vernier	166	70	92	14,400
Apogee	525	350	735	11,500
Re-entry	930	25	1470	14,800
Impact	1020	0	1500	500
	(17 minutes)			

NOTES:

1. Typical re-entry trajectories involve peak decelerations of 20 to 50 G's depending upon range.
2. Performance is based on a non-rotating earth.
3. Re-entry to impact will be 90 seconds.

REVISION BASIS: REVISION BASIS: Revise characteristics and performance.

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