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PHOTOGRAPHIC INTERPRETATION REPORT

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NEW SURFACE-TO-AIR MISSILE,
MOSCOW PARADE
7 NOVEMBER 1963

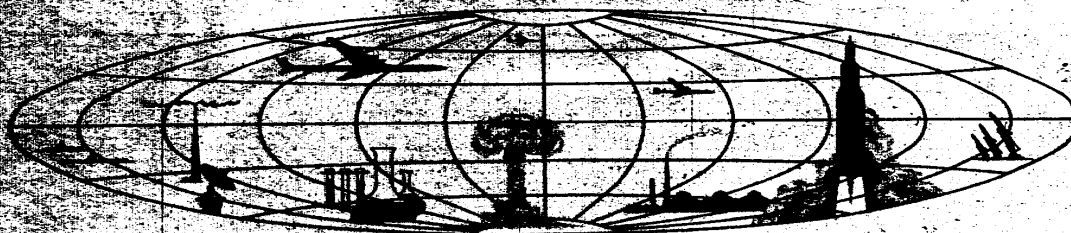


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NEW SURFACE-TO-AIR MISSILE, MOSCOW PARADE 7 NOVEMBER 1963

Attache photography taken in Moscow on 7 November 1963 revealed four surface-to-air missiles reported by the Soviets to be anti-missile missiles. The numerical designations 1240738, 1245211, and 1245215 are visible on three of the missiles; the designation of the fourth missile was not observed. The missiles are two-stage surface-to-air missiles on spe-

cially designed trailers towed by what are probably tractor versions of the MAZ 502 cargo truck (Figures 1 and 2). Each missile consists of a booster and a combination sustainer and warhead stage, with an overall length of 52.2 feet from the tip of the pressure probe to the rear of the booster nozzle. The overall length of the tractor-trailer is 66.0 feet.



FIGURE 1. MISSILE ON TRAILER.

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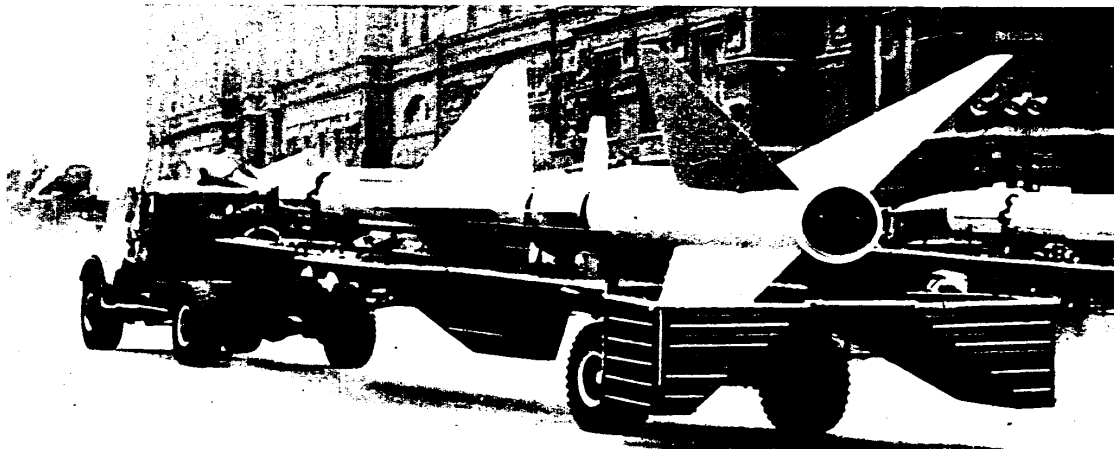


FIGURE 2. MISSILE AND TRACTOR-TRAILER.

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The mensural data are derived from graphical and ratio solutions taken from photographic prints. The basic known dimensions are the 178-inch wheelbase and 8-foot 10-inch height of the vehicle towing the missile. Most of the measurements are considered accurate to within 3.6 inches, but some of the longer horizontal measurements -- such as the overall length of the missile, and the booster and sustainer stages -- contain cumulative errors and may be considered accurate only to within 7.2 inches. The dimensions summarized in Table 1, and shown in Figure 6, are generalized and should not be used in any detailed engineering analysis of the missile or the tractor-trailer.

The booster stage (Figure 3) has an overall length of 13.2 feet and a diameter of 3.2 feet. The diameter of the booster, including the length of each stabilizer fin, is 15.6 feet. The four stabilizer fins are positioned on axes of 90 degrees at the rear of the booster, and each has a surface area of 28.8 square feet. No control or trim tabs were observed on the booster sta-

bilizer fins. The booster stabilizer fins are opposed on axes of 45 degrees to the sustainer control and stabilizer fins. The booster is divided into a nozzle section 3.6 feet long and ranging from 3.2 to 2.2 feet in diameter, and a motor case 9.6 feet long and 3.2 feet in diameter that mates with the sustainer nozzle skirt. Positioned on opposite sides of the missile forward of the booster stabilizer fins are two plugs, possibly cable connections. Located on the top and to the rear of the booster are two probable handling/hold-down couplings. No details on the booster nozzle can be furnished because of the cover plug.

The sustainer and warhead stage (Figures 4 and 5) measures 39.0 feet in length from the tip of the pressure probe to the edge of the sustainer nozzle skirt. The sustainer, excluding the warhead section (dark-toned area), is 29.4 feet long with a diameter of 2.6 feet. The diameter of the sustainer at the nozzle skirt is 1.9 feet. Positioned at the rear of the sustainer are four control fins, each with a surface area of 2.8

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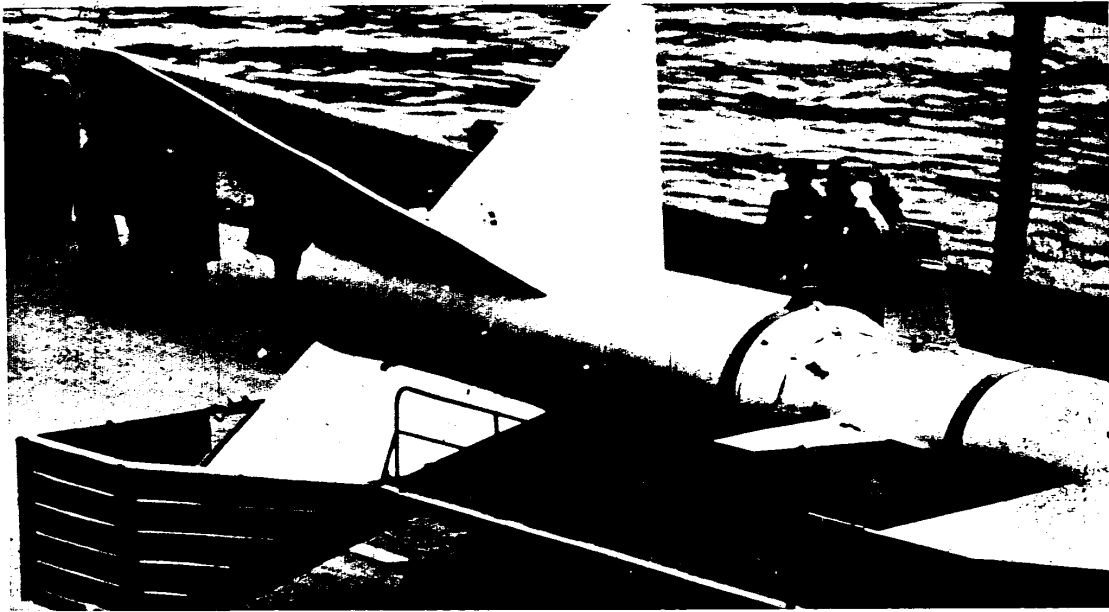


FIGURE 3. BOOSTER STAGE.

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square feet, which pivot on control-fin shafts protruding from the sustainer. The diameter of the sustainer, including the length of the control fins, is 6.8 feet. Located forward of the control fins are four stabilizer fins positioned on axes of 90 degrees, each with a surface area of 23.1 square feet. On at least one, and probably two, of the stabilizer fins are trim tabs with a control surface of 0.9 square feet. Another unidentified appendage is observed forward of the trim tab. The overall diameter of the sustainer, including the length of the stabilizer fin, is 11.0 feet. Located at the tip of each visible stabilizer fin is an antenna 1.3 feet in length. It should be noted that the stabilizer antenna was missing on one of the missiles. In addition, two probable stabilizers 3.5 feet in length are positioned on

an axis of 180 degrees at the front of the sustainer aft of the warhead section. External cableways of various lengths are visible on both sides of the sustainer. One external cableway connects the booster and sustainer stages. The warhead section of the missile (dark-toned area) measures 6.0 feet in length. The curvature of the ogive cannot be determined accurately from available photography. The pressure probe measures 3.6 feet in length, with a maximum diameter of 6 inches and a minimum of 2 inches.

The tractor-trailer used for the missile has an overall length of 66.0 feet; the missile trailer measures 50.0 feet in length and 12.6 feet wide. The dimensions of the unloaded trailer are probably different, as evidenced by the fold-down catwalks protecting the sustainer

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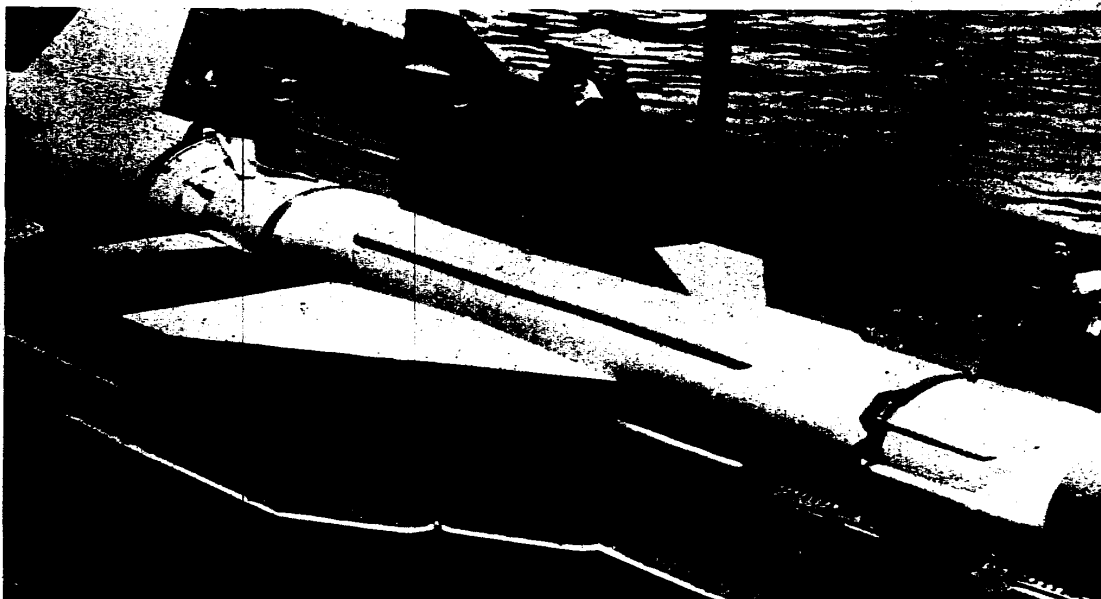


FIGURE 4. SUSTAINER AND PORTIONS OF BOOSTER AND WARHEAD.

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FIGURE 5. WARHEAD AND PORTION OF SUSTAINER.

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Table 1. Dimensional Data on Missile and Tractor-Trailer

Overall length of missile (including pressure probe)	52.2 ft
Overall length of tractor-trailer	66.0 ft
Booster	
Length	13.2 ft
Diameter	3.2 ft
Diameter (including length of stabilizer fins)	15.6 ft
Surface area of each stabilizer fin	28.8 sq ft
Sustainer	
Length (including nozzle skirt)	29.4 ft
Length of nozzle skirt	0.7 ft
Diameter	2.6 ft
Diameter at junction of sustainer and nozzle skirt	1.9 ft
Diameter (including length of control fins)	6.8 ft
Surface area of each control fin	2.8 sq ft
Diameter (including length of stabilizer fin)	11.0 ft
Surface area of each stabilizer fin	23.1 sq ft
Warhead	
Length	6.0 ft
Curvature of ogive	cannot be determined accurately
Length of pressure probe	3.8 ft
Maximum diameter of pressure probe	6.0 in
Minimum diameter of pressure probe	2.0 in
Tractor-Trailer	
Type (probable tractor version MAZ 502)	
Overall length	86.0 ft
Maximum width	12.6 ft

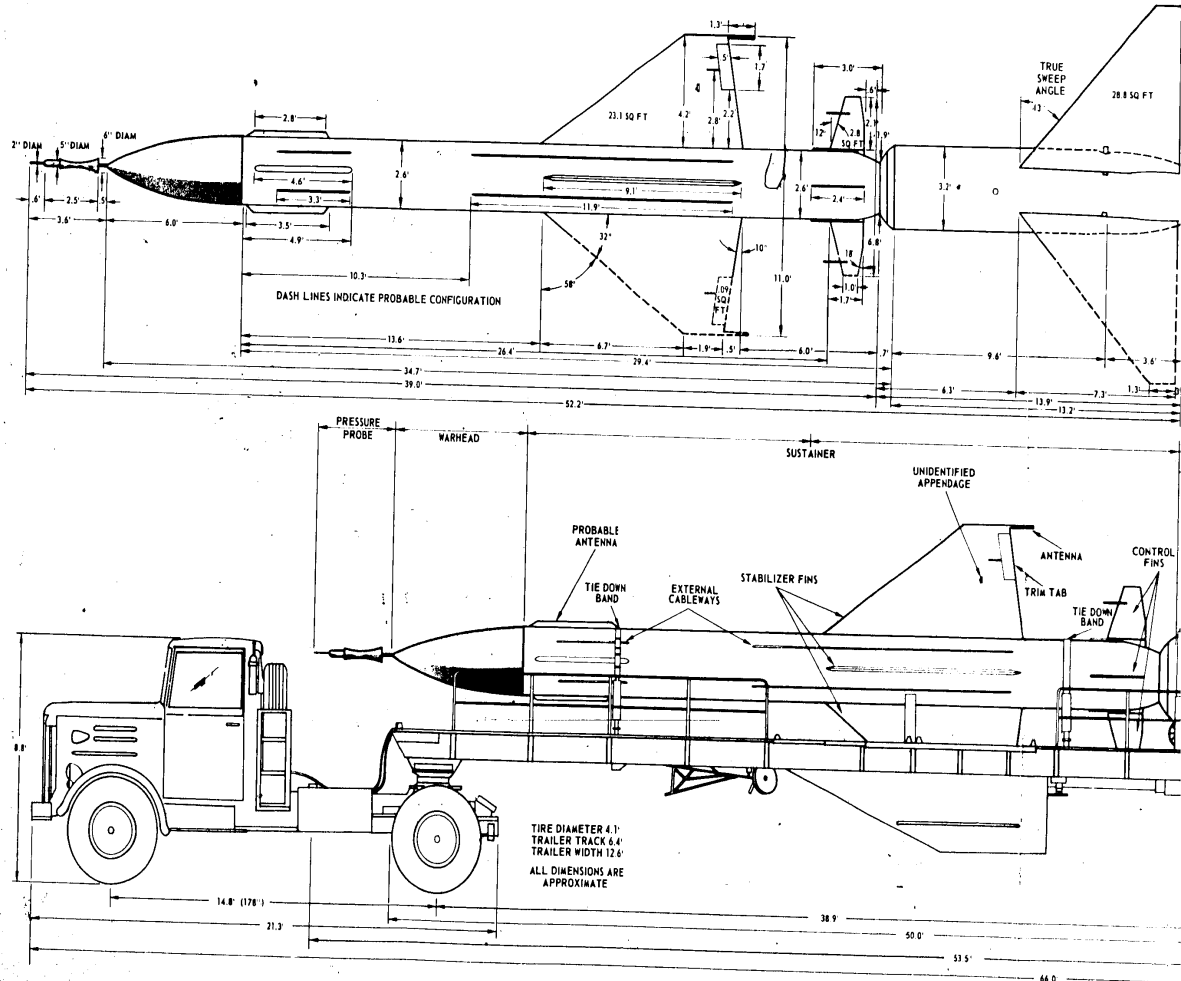


FIGURE 6. DIMENSIONAL DRAWINGS OF MISSILE AND TRACTOR-TRAILER.

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stabilizer fins. In such instances, the trailer dimensions would probably decrease in width. The trailer does not have a launch or erector capability and its design (one vertical booster stabilizer fin extends through the trailer carriage into a boot) necessitates a lifting device for removal of the missile from the trailer. The missile is supported by four and a suspect fifth cradle, at least one of which appears to be hand-cranked to the level of the missile. The missile is secured to the trailer by three tie-

down bands. One band, which is probably tightened by means of a wheel handcrank attached to the cradle support, is located on the forward end of the booster stage; the second is on the aft portion of the sustainer; and the third is on the forward section of the sustainer 4.6 feet aft of the warhead. The third tie-down band has raised channels that permit passage of the external cableways.

At least seven frames are used to provide support for protective canvas covering.

REFERENCES

PHOTOGRAPHY

Attache photography of 7 Nov 63. That in Figure 2 is classified CONFIDENTIAL and that in Figures 1, 3, 4, and 5 is classified SECRET.

REQUIREMENT

PC 595-63

NPIC PROJECT

J-409 63

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