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THE SOVIET T-64B TANK: AN UPDATED ASSESSMENT

The following Key Judgments are reprinted from an Intelligence Assessment (SW 84-10069X) produced by the Office of Scientific and Weapons Research

The Soviet T-64B tank can fire both antitank guided missiles (ATGMs) and conventional tank ammunition through its main gun. The T-64B has only minor external changes and is thus indistinguishable at normal combat ranges (1 to 2 kilometers) from other T-64 tanks that do not fire ATGMs. The ATGM--designated AT-8 by NATO--appears to have been developed specifically for firing from tanks. The T-64B retains a powerful kinetic-energy tank destruction capability [

] we believe the ATGM probably has a secondary role against helicopters and low-flying aircraft

[ ] that the AT-8 missile is loaded by the automatic loader like the conventional ammunition and thus, like the conventional ammunition, is in two parts to fit the loader. We believe the AT-8 probably replaces the high-explosive antitank (HEAT) rounds carried in Soviet non-missile-firing tanks. Those tanks carry five to six HEAT rounds and thus we believe the T-64B carries five to six missiles

[ ]

[ ]

[ ] the T-64B to have a new fire-control system that:

-- Provides semiautomatic, command-to-line-of-sight guidance for the AT-8 ATGM, with a radiofrequency command link.

-- Probably has a laser rangefinder.

-- Has a new ballistic fire-control computer for greater accuracy in firing conventional munitions. The new computer, like the latest Western tank computers, compensates for ballistic variables in addition to range to improve accuracy. Previous Soviet tank computers accepted only range inputs for trajectory calculations

[ ] that the T-64B night sights are not linked to the AT-8 guidance system. The sight used to guide the AT-8 can be used only during the daytime or at night with auxiliary battlefield illumination. Thus, the AT-8 can only be fired under these conditions.

[ ] we assess that the T-64B's automotive components and other internal subsystems--the commander's sights, the radio/intercom, and most of the autoloader parts--are the same as the T-64A's.

EFFECTIVENESS OF APPLIQUE TOP ARMOR ON T-64 TANKS

[redacted] revealed a new Soviet T-64B tank with armor plates added to the turret roof and to the hull roof forward of the turret. Additional armor apparently has not been fitted over the engine compartment.

Comment:

[redacted]

In assessing the protection level resulting from the additional armor, we have made some estimates and assumptions [redacted] complete information on the armor of both the new tank and previously produced T-64As. We assumed that the thicknesses of the T-64B hull and the turret roof are the same as those of the T-72--30 and 50 millimeters (mm), respectively. We know that both the hull and turret areas have a radiation/spall liner on the inside surface, which contributes the equivalent of about 10 mm of steel to the armor thickness. The new roof appliques appear to be 25 to 30 mm thick; we do not know the composition of the appliques but we assume that they are rolled homogeneous armor plates.

Under these conditions, the uparmored T-64B is likely to have the following protection levels:

[redacted]

The Soviets could add overhead armor to the T-64B engine-transmission compartment in the future. If the armor were spaced off the engine deck and contained ceramic or other insulating material, it also could help reduce the thermal signature of the tank

We believe it is likely that the Soviets will retrofit applique roof armor on some existing tanks, such as the T-72, the T-64A, the T-62, and the T-55. The Soviets often modify deployed military systems in response to new US weapons. We estimate that with the addition of about 3 metric tons of weight, the top armor of the T-72 could be increased to the equivalent of 75 mm of steel over the engine and transmission and to about 85 mm over the hull and turret (including the liner). The resulting protection level would be about 20 mm (20 to 30 percent) greater than that estimated for the new T-64B with applique armor

NEW WHEELED ARMORED PERSONNEL CARRIER

The Soviet Ground Forces has introduced an armored personnel carrier-- the BTR-80--that apparently incorporates firepower and protection improvements derived from combat experiences with its predecessor--the BTR-70--in Afghanistan. A Soviet magazine describes the BTR-80 as having a modified turret that increases the elevation capability of the 14.5-mm heavy machinegun from 30 degrees to 60 degrees and firing ports for light machineguns. It also has improved armor protection and a diesel engine 13 percent more powerful than the pair of gasoline engines in the BTR-70

Comment:

With the high-elevation turret seen on a few BTR-70s in Afghanistan, the BTR-80 can shoot at targets on high ground to a range of 2,000 meters. The machinegun's reported capability to fire at slow-moving aircraft to a range of 1,000 meters is new, and its effectiveness would be enhanced by the use of new incendiary ammunition. The BTR-80 may have increased floor armor to protect against mines and thicker side armor--the BTR-70 is protected only in the front against the 12.7-mm machineguns used by the Afghan insurgents. The BTR-80's greater engine power would allow a modest increase in armor protection over that of the BTR-70, while maintaining the same power-to-weight ratio

EXPLOITATION OF KEY WESTERN ANTIARMOR TECHNOLOGIES

A recent open technical publication by N. N. Gorshkov of the Institute of Hydrodynamics in Novosibirsk comparing the experimental formation of explosively formed penetrators with computer-hydrocode modeling of the experiment refers to the unclassified Proceedings of the Third International Symposium on Ballistics, which was sponsored by the United States and West Germany. US research on shaped charges using tanatalum liners was presented openly in these proceedings.

Two additional papers in the same Soviet journal explore methods of marking shaped-charge jets to enable comparison of experimental data with computer hydrocode predictions and the collapse of tublar-shaped charge liners. Although these additional papers do not directly refer to the Proceedings of the Third International Symposium on Ballistics, they do duplicate and extend research papers published in the proceedings

Comment:

The articles also demonstrate Soviet knowledge of the technologies needed for top-attack weapons and indicates their access to the US top-attack goal (at the time of the proceedings) of being able to perforate 75 mm of rolled homogeneous armor at a 122-m standoff. The US top-attack program involves the development of weapons suitable for penetrating the relatively thin top armor of tanks

The research discussed in the Soviet journal is occurring appropriately at the Institute of Hydrodynamics, one of the leading Soviet armor and antiarmor research laboratories. The research was performed under the guidance of Dr. Yu. A. Trishin, who previously has coauthored articles with the authors of the

recent papers and who has separately published on jet formation from advanced hemispherically lined shaped charges and the response of laminated targets to impact-shock loading

The Soviet publication on explosively formed penetrators (EFP)--munitions that explode and whose liners form into kinetic-energy armor penetrators--raises three major issues for Western armor developers. First, the paper demonstrates a Soviet EFP capability equal to the West. EFPs are the key to developmental Western top-attack antiarmor systems, such as Assault Breaker and SADARM. Second, the referenced proceedings provided the US goal for top-attack systems [redacted]

Soviet research on tubular shaped-charge liners has implications for the defeat of tank laminated armors, such as glass- or ceramic-cored armor [redacted]

The three Soviet publications from the Institute of Hydrodynamics partially fulfill the previously announced intention to advance the Soviet state-of-the-art in shaped-charge attack of armor and have resulted in a demonstrated capability to match experimental data and computational analysis. This accomplishment implies that the Soviets now possess the capability to compute and produce jet shapes and velocities to optimize the attack on differently armored targets. Such a capability places the USSR on a par with the United States in shaped-charge antiarmor research

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