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UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND

TRADOC BULLETIN 2[U]

- WEAPONS
- TACTICS
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SOVIET ATGMs:

CAPABILITIES & COUNTERMEASURES

APRIL 1975

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This bulletin is designed to discuss the Soviet antitank guided missile and to propose tactics and techniques that can be used to degrade its effectiveness. Before being able to counter a system, we must first know it. To this end, the SWATTER and SAGGER antitank guided missile systems are discussed in detail, by showing how they are employed, how they operate, how effective they are, how they are integrated into an offense or defense on the battlefield, and what strength and weaknesses they have. The countermeasures proposed are based on the combat results of Israeli techniques and a study of U.S. tactics vis-a-vis Soviet doctrine.

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BULLETIN NO. 2U

SOVIET ATGMS
CAPABILITIES & COUNTERMEASURES

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This TRADOC BULLETIN is intended to provide to commanders, and others concerned with military training, timely technical information on weapons, tactics, and training. It is not intended to supplant doctrinal publications, but to supplement material on "how to fight" with data derived from tests, recent intelligence, or other sources, which probe "why."

TRAINERS' NOTE: The format of this bulletin is designed to help trainers identify and extract needed information. Charts, illustrations, and other key data are unclassified, clearly marked and are boxed-in by a bold line.

Comment or criticism is welcome, and should be directed to:

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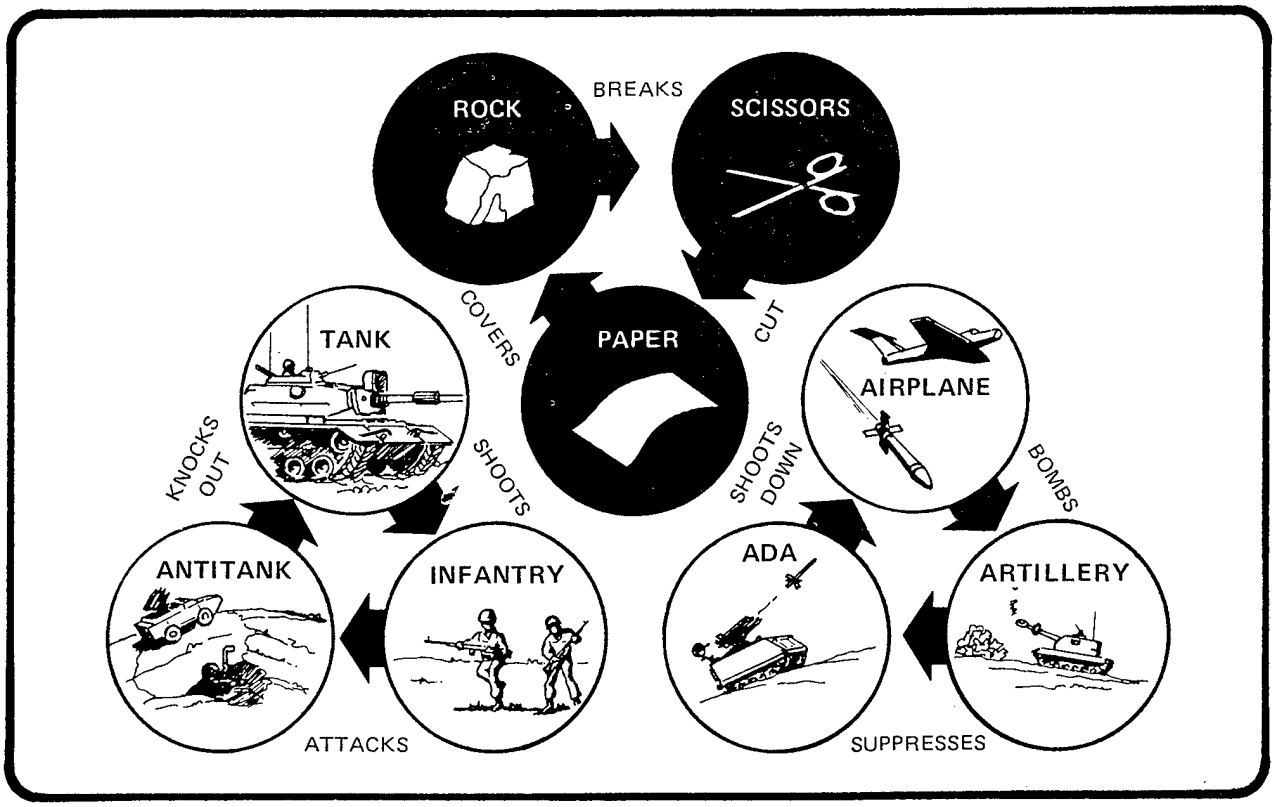
I
THE MODERN BATTLEFIELD

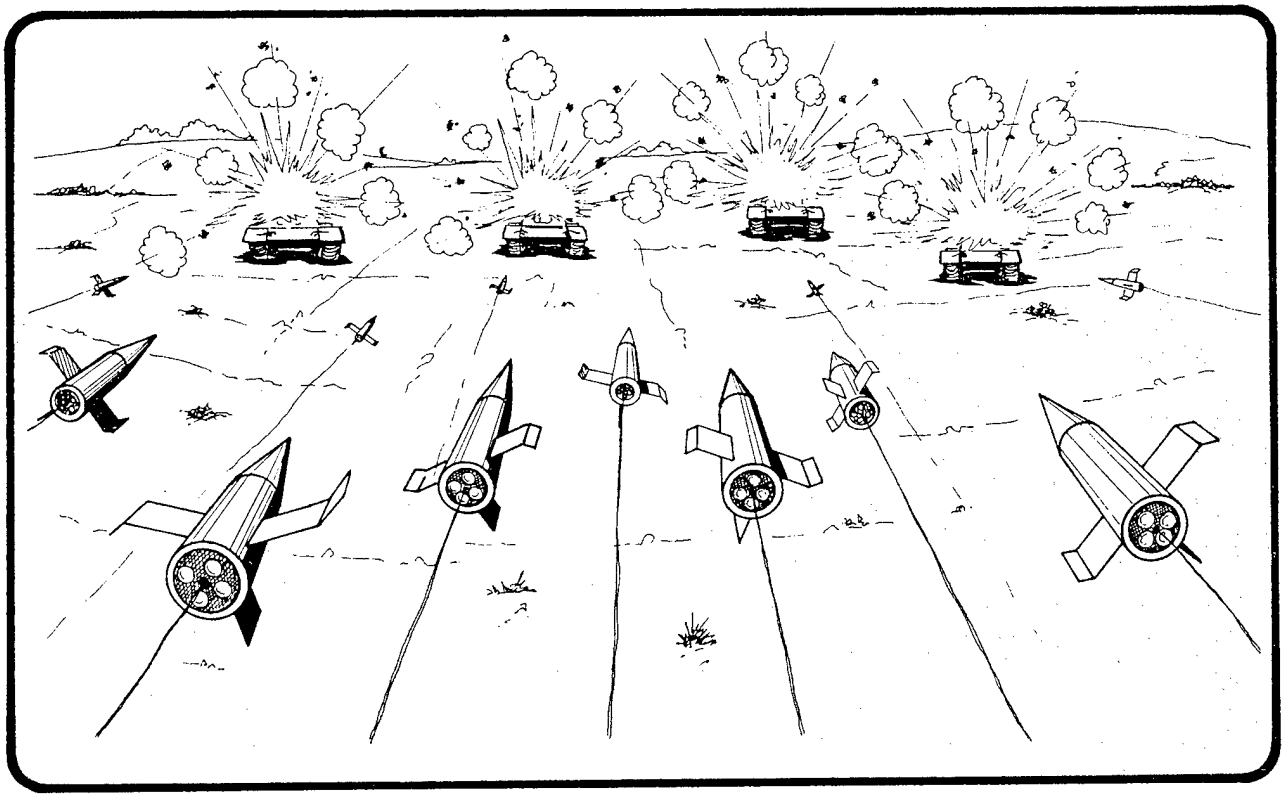
Modern warfare is a contest of measures and countermeasures—fire and counterfire, maneuver and countermaneuver. **FOR EVERY MODERN WEAPONS SYSTEM THERE IS AN EFFECTIVE COUNTERWEAPON OR SYSTEM.** For the fighter there is the surface-to-air missile (SAM); for the tank there is the antitank missile or gun; for artillery fire there is counterbattery fire, and so on. Of course, weapons systems are defeated by countermeasures other than weapons. The SAM, for instance, is often defeated by electronic countermeasures (ECM). Direct fire weapons are defeated through the effective use of terrain to shield oneself from enemy fire. Obscuration can also degrade the effect of some enemy weapons. This, of course, assumes that if he can't see you, he can't hit you. Also, if the enemy is effectively suppressed—if he is too busy ducking incoming fire to fire his weapon—his weapons systems are defeated. Thus, we must realize and accept the fact that *there is no "ultimate" or invincible weapon.* The modern battlefield is a contest of measures and countermeasures which, taken together, and on balance will determine the outcome of the battle. Thus, these dynamics are analogous to the ancient oriental game of rock-paper-scissors:



DYNAMICS OF MODERN BATTLEFIELD - MEASURE & COUNTERMEASURE

All the modern armies of NATO, the Warsaw Pact, the Arab and Israeli nations generally agree that the main offensive weapon of ground forces is the tank. With its heavy armament, armor protection, and cross-country mobility, only the tank can break through an enemy force and engage or defeat it decisively. While the Arab-Israeli War of October 1973 (The "Yom Kippur War") reaffirmed the offensive potential of the tank, it has also dramatized the lethality of modern antitank weapons—particularly the high velocity tank cannon and the long range antitank guided missile (ATGM). The effect of these modern antitank weapons in this war was devastating. Not since the Battle of Kursk between the German and Russians in World War II has there been a comparable loss of tanks in such a short period of time. If the rate of loss which occurred in the Yom Kippur War during the short 20 days of battle were extrapolated to the European battlefields over a period of 60-90 days, the resulting losses would reach levels for which the United States Army is totally unprepared. While it is impossible to say precisely how many losses were attributable to a certain weapons system, we can say, particularly in view of the vast numbers of ATGMs employed, that *the antitank guided missile was responsible for a high percentage of the Israeli tank losses at the beginning of that war.* In the Arab/Israeli War of 1967, the Israelis were able to dominate the battlefield principally with tanks and fighter aircraft. Extensive Arab air defenses in 1973, however, seriously degraded effective close air support. Thus in the first several days of the 1973 war, Israeli armor units, advancing without close air, infantry or artillery support, attacked in the face of large numbers of Soviet-made ATGMs and suffered wholesale destruction. This same situation is, of course, possible on European battlefields. Thus, we should conclude that:

On today's battlefield, unsupported tank attacks face mass destruction from accurate and lethal antitank guided missiles.



This bulletin is designed, therefore, to discuss the **Soviet antitank guided missile** and to propose tactics and techniques that can be used to degrade its effectiveness. Before being able to counter a system, we must first know it. To this end, the SWATTER and SAGGER antitank guided missile systems are discussed in detail, by showing how they are employed, how they operate, how effective they are, how they are integrated into an offense or defense on the battlefield, and what strengths and weaknesses they have. The countermeasures proposed are based on the combat results of Israeli techniques and a study of U.S. tactics vis-a-vis Soviet doctrine.

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II

SOVIET ANTITANK GUIDED MISSILES

The Soviets have fielded three antitank guided missile (ATGM) systems since the early 1950s. They are the **SNAPPER, SWATTER** and **SAGGER.** Since the SNAPPER is obsolescent and unlikely to be found in significant numbers on the modern battlefield, it will not be discussed. The SAGGER is available to the WARSAW Pact Nations and other Soviet client states. Let's compare the two systems:

Characteristic	SWATTER	SAGGER
Length (in)	45.8	34
Diameter (in)	5.2	4.7
Weight (lbs)	65	24.9
Ranges (meters)		
Max eff range	at least 3000	3000
Min eff range	around 500	500
Time of Flight (sec) to Max Range	23.2	27
Armor Penetration (in @ O Deg)	20	16
Guidance System	Radio	Wire
Average Velocity (m/sec)	150	120
Warhead	HEAT	HEAT

This data tells us that:

SWATTER and SAGGER are small and can hit at long ranges - as far as 3 km. Both are lethal enough to penetrate any known armor, but are relatively slow compared to a tank

However, there are some important differences:

The SWATTER is

guided by radio signals.

The SAGGER is guided by wire.

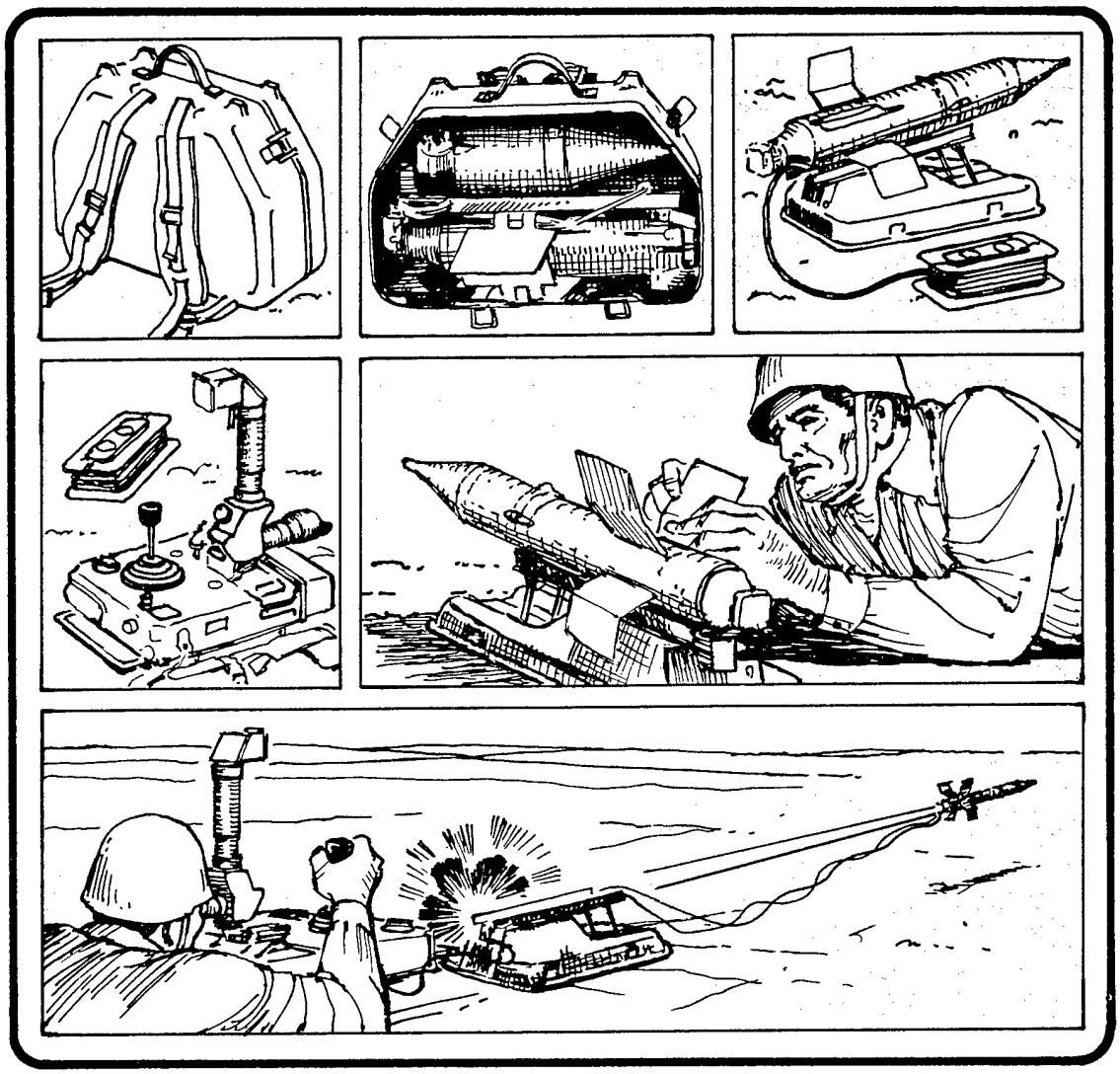
SAGGER

The SAGGER is a wire-guided missile with a shaped charge warhead. It is considered a "first generation" ATGM system. The gunner must visually track the missile and the target and manually control the missile flight to the target. To fly the missile and simultaneously track the target requires considerable manual dexterity and a high level of training. Operators are carefully selected and reportedly fire 2300 simulated rounds to qualify as a SAGGER gunner. Thereafter, 50 to 60 simulated rounds are fired each week to maintain proficiency. In the Yom Kippur War it was reported that the Egyptians brought mobile simulators mounted in truck vans immediately to the rear of the front lines and required each gunner to fire 20-30 simulations daily.

The SAGGER is employed in three principal modes:

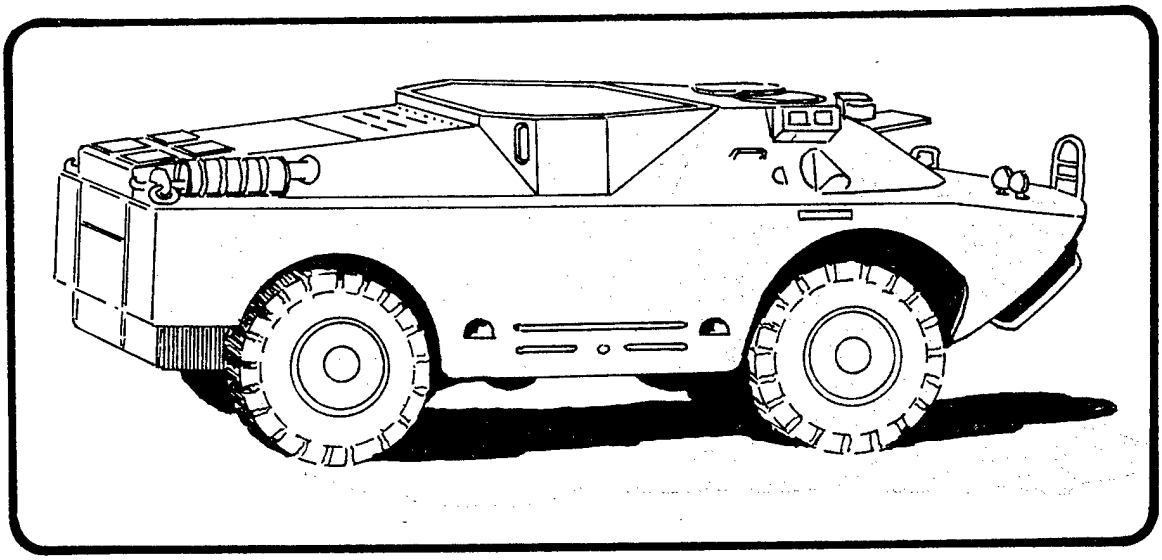
- **Manpacked and ground-mounted (the so-called "suitcase" version)**
- **Mounted on the BRDM scout vehicle**
- **Mounted on the BMP armored personnel carrier**

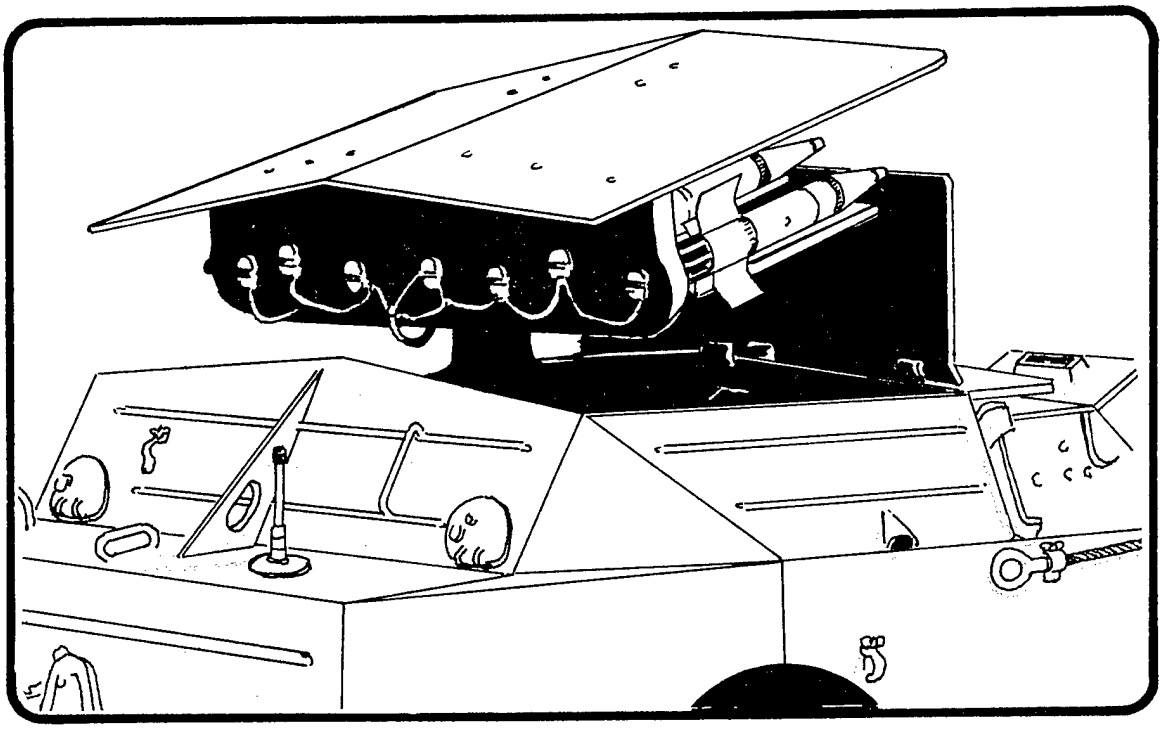
THE "SUITCASE" SAGGER



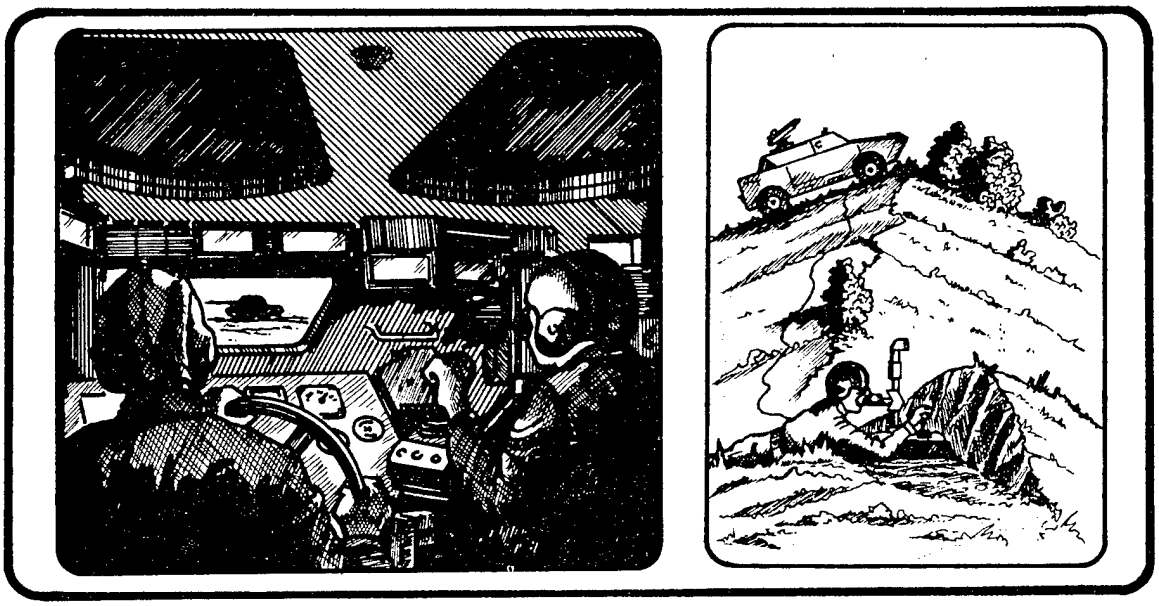
In this version, the SAGGER system is easily manpacked by its crew. Its light weight and small size make it easy to transport, set up, and camouflage. In the Mideast War (Oct 73) Arab infantry were equipped with literally thousands of suitcase SAGGERS.

BRDMs WITH SAGGERs MOUNTED



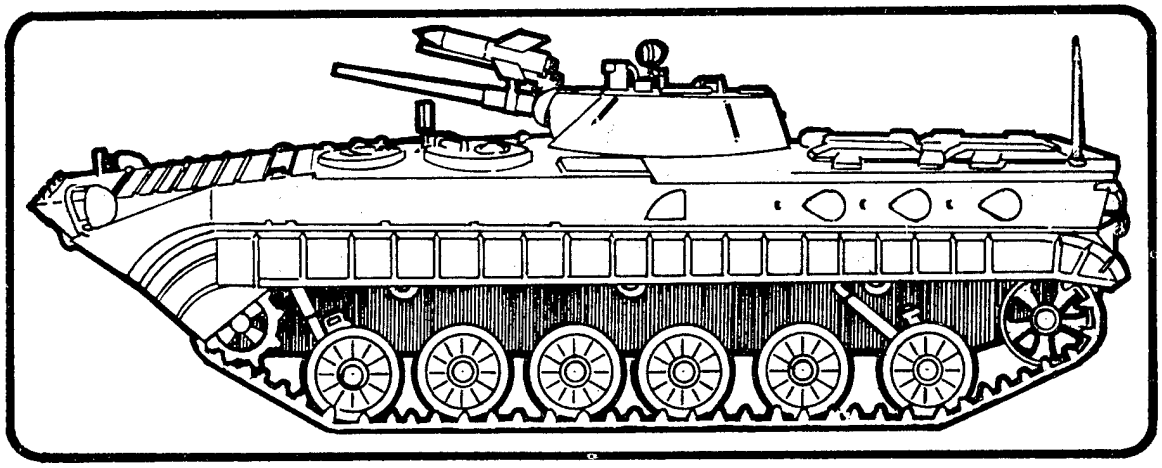


The SAGGER, mounted on a modified chassis of the BRDM, provides a significant antitank capability to the Soviet motorized rifle regiment. The AT battery organic to the motorized rifle regiment is made up of nine ATGM launcher vehicles AT 2/3. These are modified BRDMs that carry SWATTER/SAGGER missiles. The AT-2 vehicle carries 4 SWATTER missiles while the AT-3 vehicle carries 14 SAGGER missiles. The vehicle carries a two man crew and is capable of speeds of 60 mph on surfaced roads and 6 mph in water. The reaction time to fire from a completely buttoned-up travel mode to actual launch is one minute. It can refire within 5 seconds of the first missile's impact on the target.



The gunner can either operate from within the vehicle or from a remote firing position up to 80 meters away. The gunner may rapidly fire up to six missiles without reloading by simply turning the selector switch mounted on the fire control and sighting device. From within the vehicle the gunner fires from a fully protected position. When the BRDM is in a defilade position only a cross section of approximately one by four feet of the vehicle is exposed to the enemy. *When in a remote firing position and dug in, only a cross section of one by four inches of the 8X monocular periscope is exposed to the enemy!*

BMP WITH SAGGER MOUNTED



The Soviet BMP armored infantry combat vehicle features a 73mm smoothbore gun capable of firing HEAT ammunition and a 7.62mm coaxial machinegun as well as the SAGGER missile. There is only one launch rail and the vehicle carries a basic load of 4-5 missiles.

The SAGGER system is readily adaptable to almost any vehicle. It has been mounted on the BMD airborne amphibious combat vehicle.

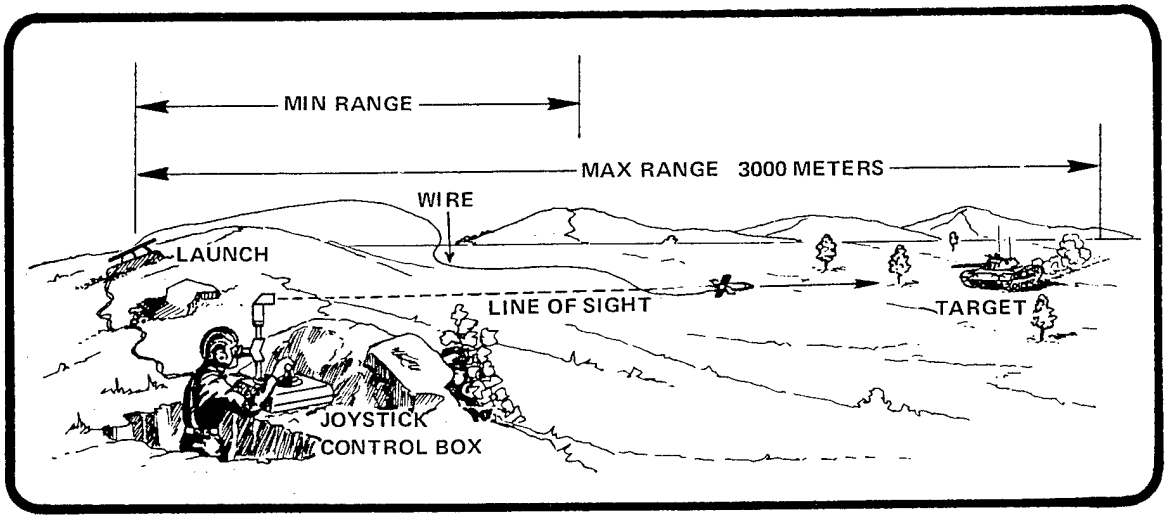
METHOD OF OPERATION OF SAGGER

The general method of operation of both the ground and vehicle launched systems is similar except that for vehicle systems the gunner can operate either inside the vehicle or from a remote location. One difference is that the vehicle system allows the gunner remote operation to a maximum distance of 80 meters; whereas the suitcase SAGGER has only a 15 meter connecting cable.

It is important to know the SAGGER gunner's location with respect to the launcher, so that countermeasures will be more effective. Therefore, we should:

Look for a SAGGER Gunner to be:

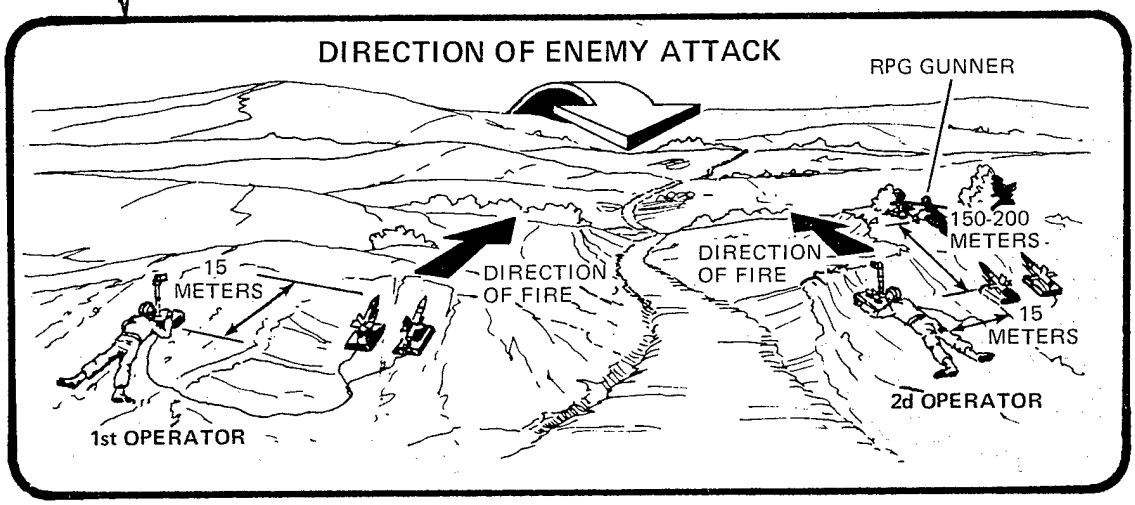
- **Up to 15 METERS away from a suitcase SAGGER Launcher; or**
- **Up to 80 METERS away from a BRDM Launcher**



The main problem of controlling the SAGGER is to **"capture"** it and bring it onto the line of sight after launching it from a remote position. Depending on the skill of the gunner and the distance he is remoted from the launcher, the missile can be captured at ranges of 500-800 meters from the launch site. However, under combat conditions, most gunners will probably be able to successfully engage targets only between 1000-3000 meters.

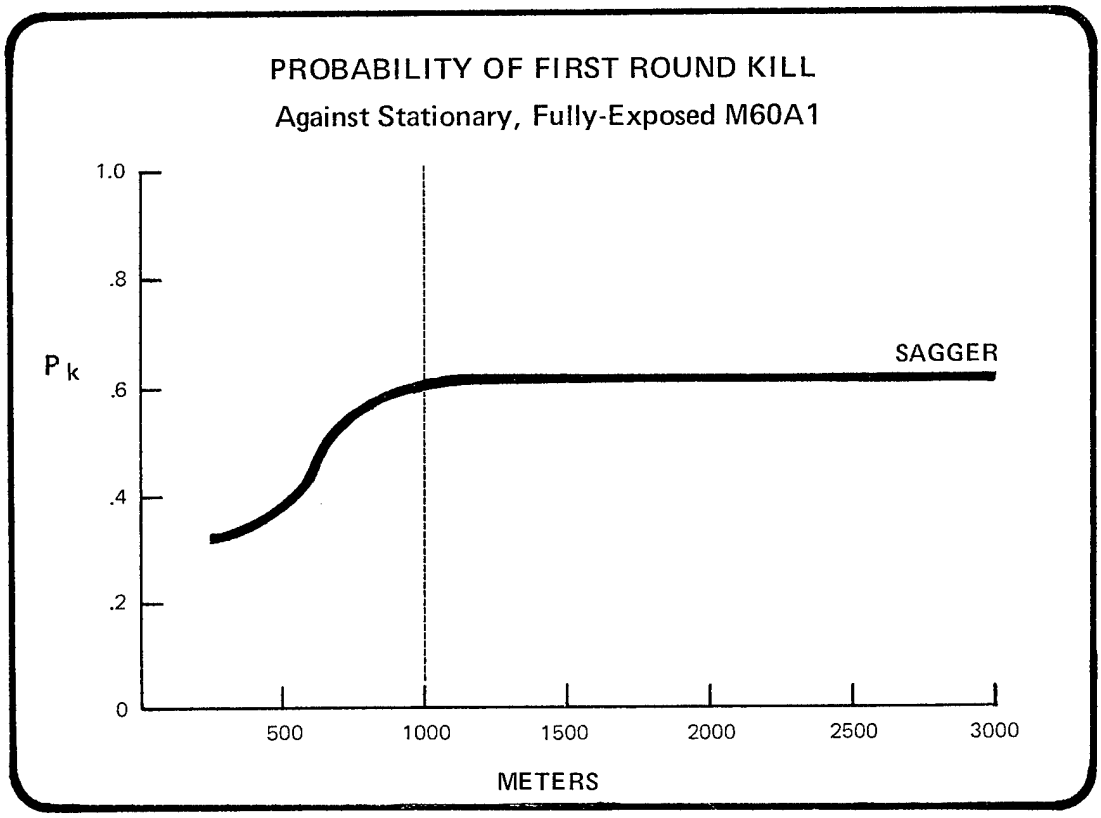
Normally "SUITCASE" SAGGERs are employed by a 3-man firing team and are deployed in groups of four missiles per team. One man is the senior gunner and he fires the missiles; the second man is the junior gunner who assists in the system checkout procedures and deploys nearby to protect the gunner or he can also fire missiles; the third man moves well forward of the firing position with an RPG-7 to engage the target if the SAGGER fails to hit. The time required for the team to set up, check out the missiles, and fire is normally 12-15 minutes for all four missiles. It can be done in 5 minutes for a single missile.

A typical layout for a SAGGER ATGM team is:

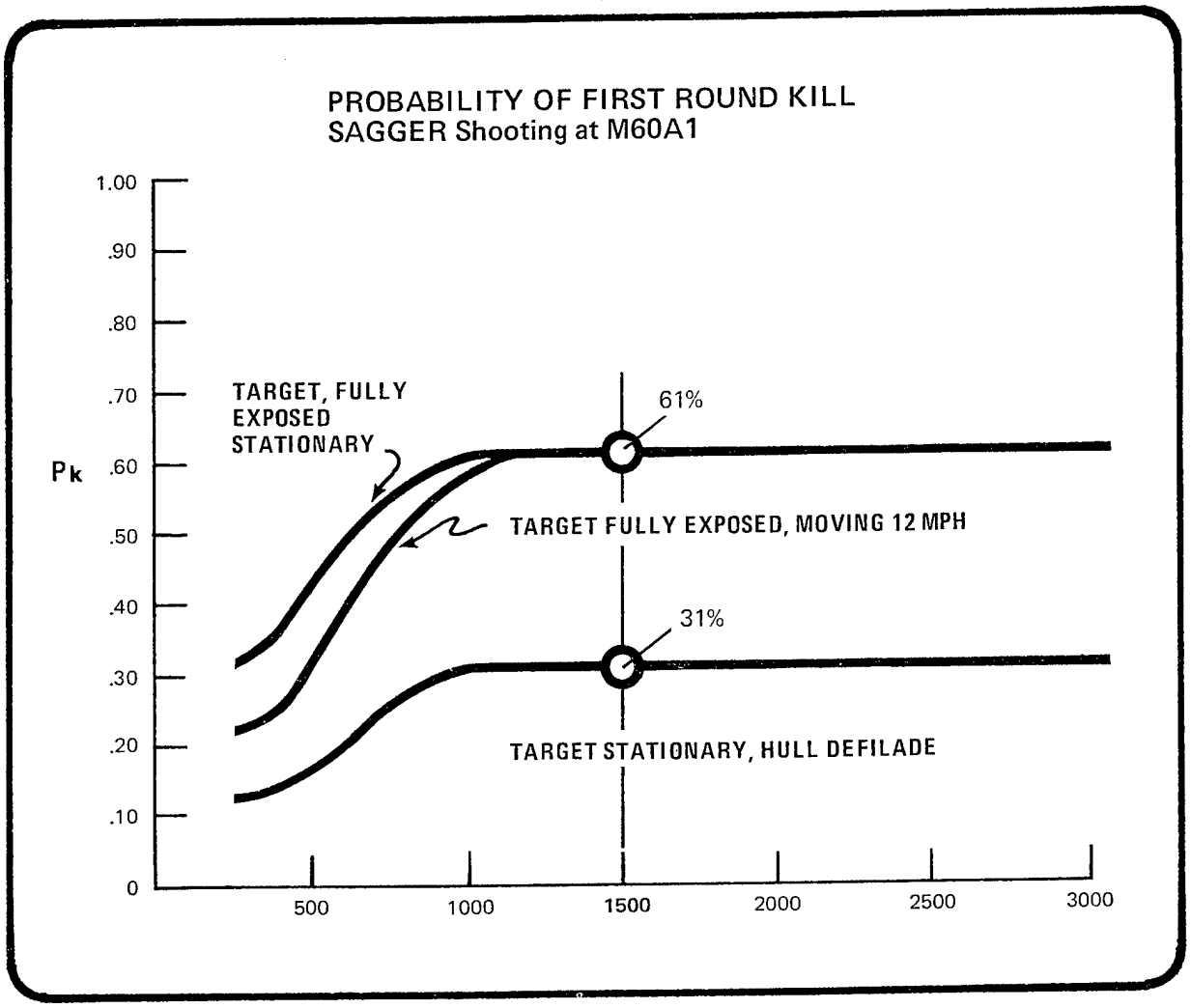


SAGGER EFFECTIVENESS

The SAGGER system is considered to be a highly accurate and lethal system. Although accuracy is a function of the operator's skill, the thoroughness of training for the gunners is likely to ensure a high level of system accuracy. The warhead, capable of penetrating any known armor in the free world, gives it a very high degree of lethality. The probability of a first round kill against a stationary, fully exposed M60A1 tank at ranges from 1000 to 3000 meters is over 60%.

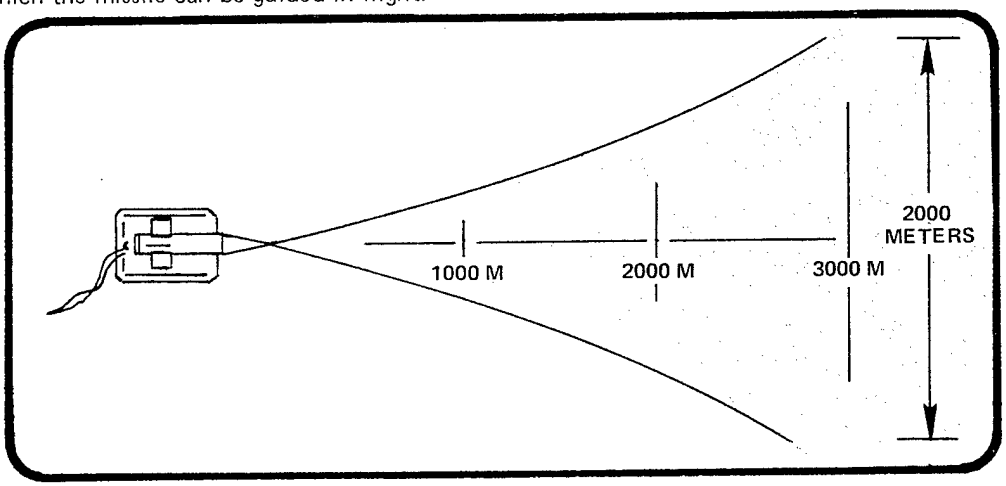


The SAGGER's effectiveness drops off somewhat at short ranges against moving targets. It drops off markedly against targets in hull defilade. At 1500 meters it is only half as effective (31%) against tanks in hull defilade as it is at the same range against tanks fully exposed (61%).



- The SAGGER is highly effective between 1000 and 3000 meters. At close ranges its effectiveness falls off rapidly.
- Therefore, use cover and concealment to close on enemy SAGGER positions.
- Don't give him long range shots. Make him fight at close quarters.
- Get in hull defilade whenever possible. It makes you 2 to 3 times less vulnerable.

The horizontal field of fire for an individual SAGGER missile shows the approximate degree to which the missile can be guided in flight.



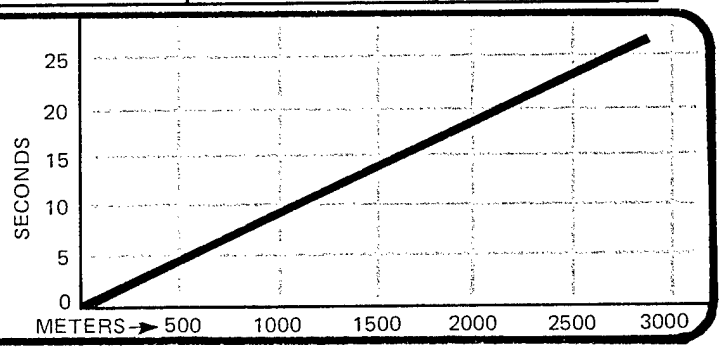
Interpret this picture with care:

- **The SAGGER is easy to shift to cover targets to the right or left of the relatively narrow cone shown.**
- **The SAGGER leaves its launcher armed, and can detonate and kill at very short ranges.**

The signature of the SAGGER missile is extremely difficult to detect. Altough it does give off a cloud of gray smoke and a loud roar at launch, it is hard to detect on the battlefield. In fact, in the Yom Kippur War, there was not a single recorded incident of the detection of the missile's signature. Most Israeli tank commanders (70% of those polled in a survey) could, however, detect the missile in flight as it was being fired at them. The reported percentage of SAGGERS detected in flight compared to the area of operations was:

	Long Range	Medium Range	Short Range
GOLAN	34%	36%	30%
SINAI	20%	40%	39%

The SAGGER's relatively slow time of flight is depicted in this graph.

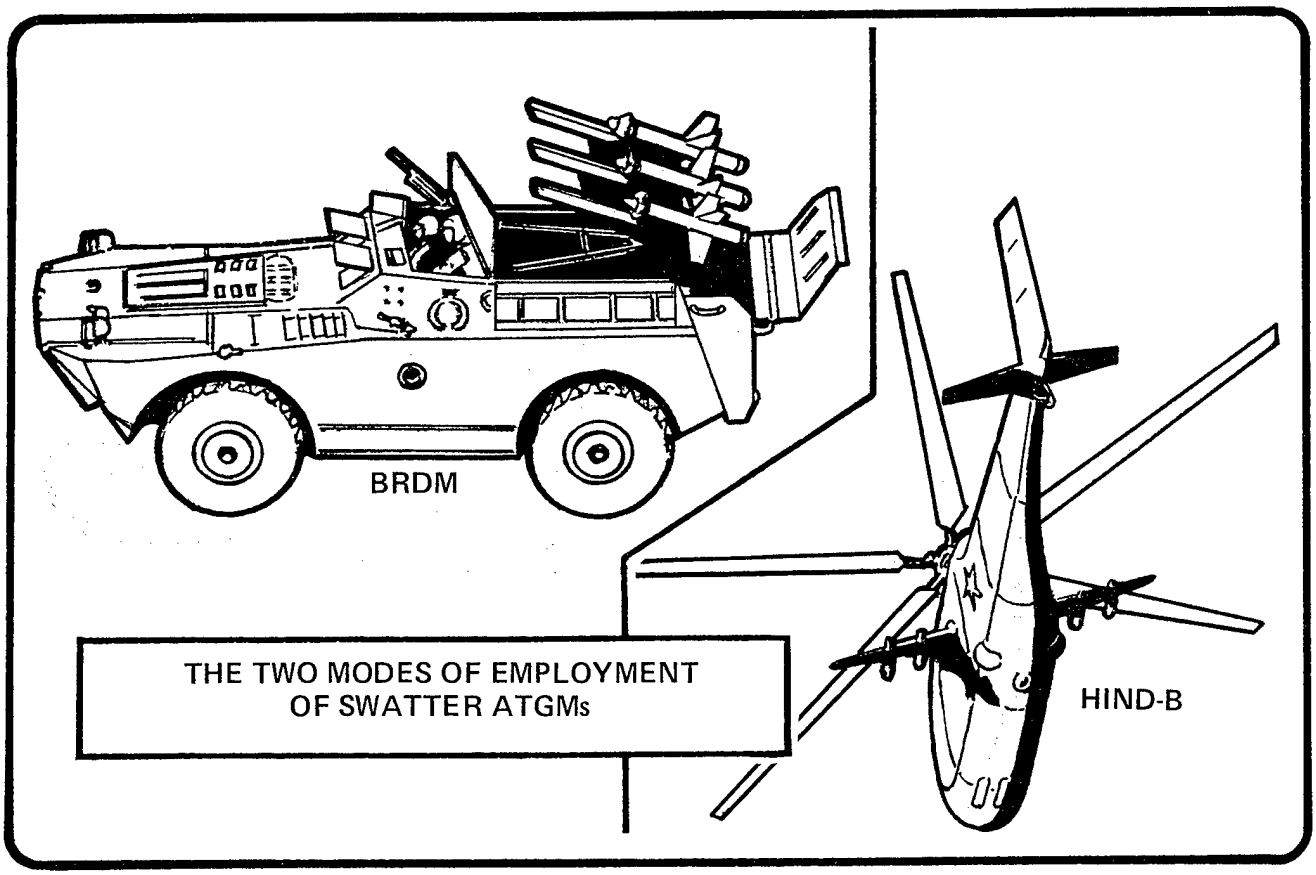


Finally, from exploitation tests done in the United States, we know that the system is highly reliable. The number of malfunctions experienced were negligible considering the number of firings completed.

SWATTER
MODES OF EMPLOYMENT

SWATTER is the NATO designation for the second antitank guided missile known to exist in the Soviet Union. There are two versions - SWATTER A and SWATTER B. SWATTER B is considered the best and the data contained herein pertains to this version. It is still considered, however, a first generation antitank guided missile.

It has been observed in only two modes - mounted on a BRDM reconnaissance vehicle and the HIND-A assault helicopter.

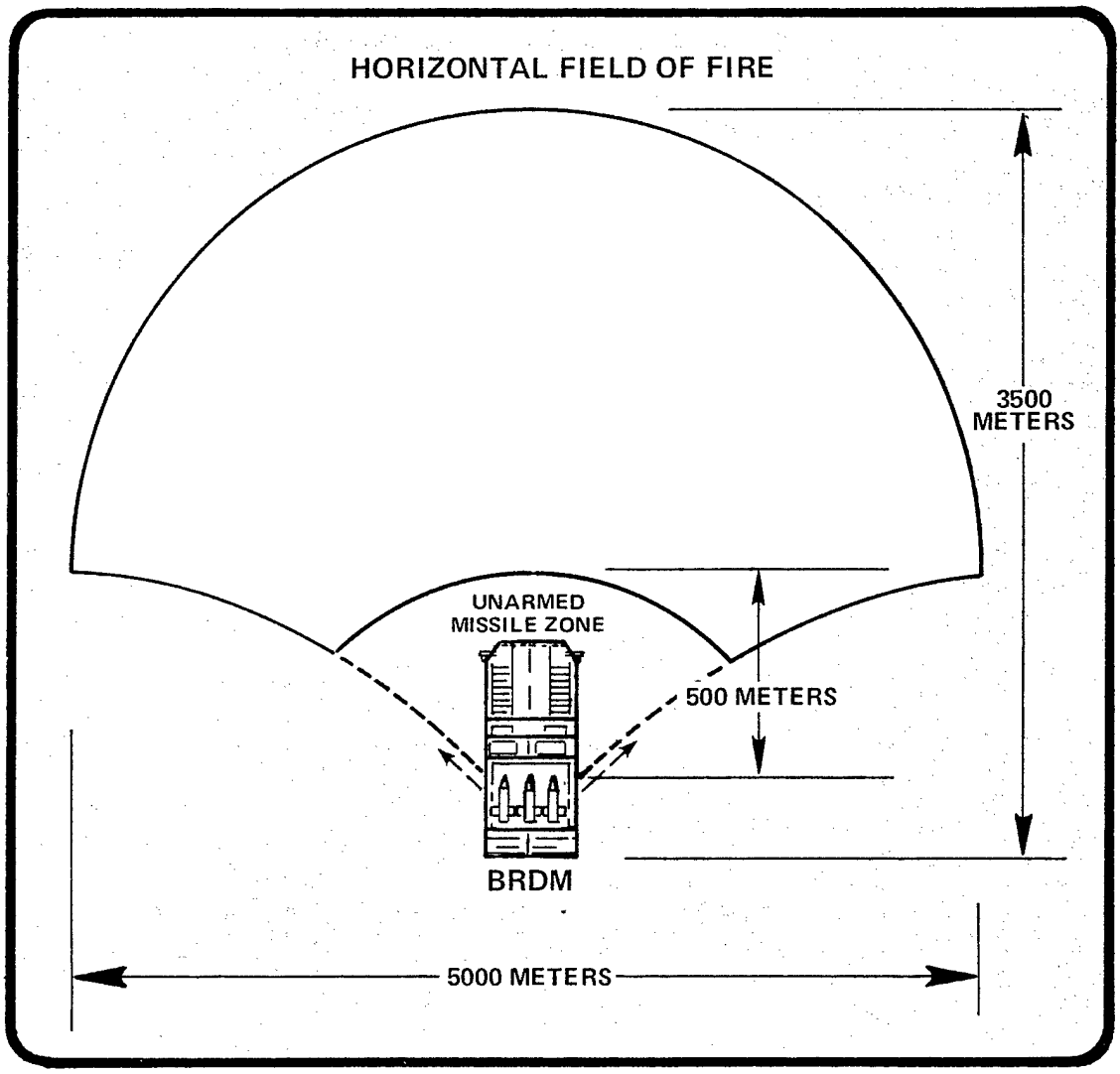


THE TWO MODES OF EMPLOYMENT OF SWATTER ATGMs

EFFECTIVENESS OF THE SWATTER

Hard data on the hit/kill probabilities is unavailable for the SWATTER, but is reported to be the *best* of the three Soviet ATGMs.

The SWATTER launcher on the BRDM has a lateral traverse of +45· and has a field of fire as shown below. The missile *does not arm* until it has flown 500 meters from the launch site.



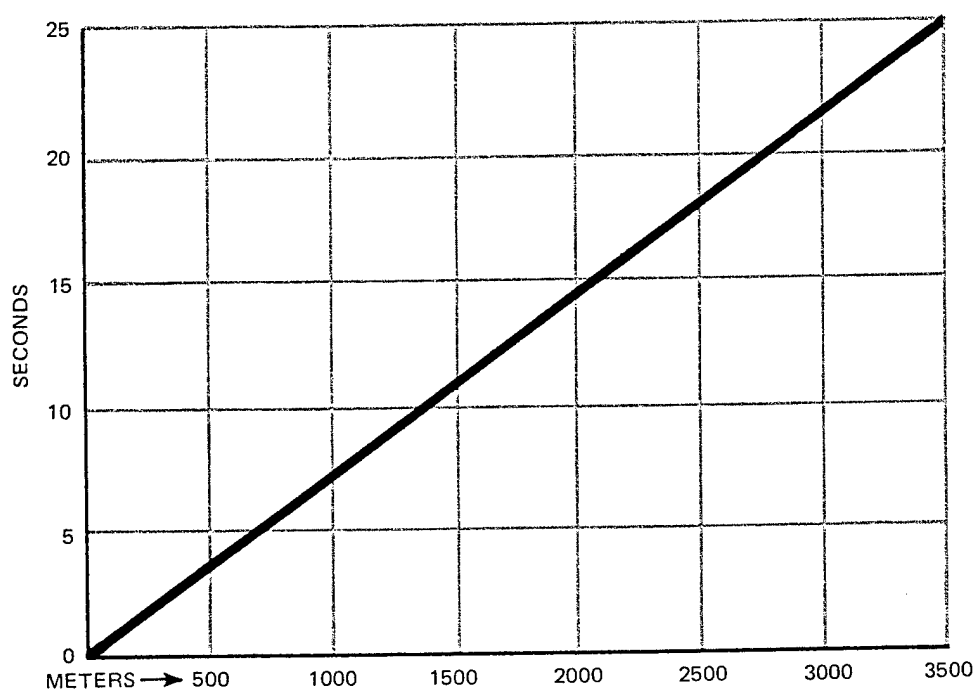
To date there is no indication of it being employed from a ground mount.

METHOD OF OPERATION

The gunner must optically track both the target and the missile simultaneously. The operator guides the missile using an aircraft type control stick with a radio-link between the control box and the missile. The threat of countermeasures is reduced by the availability of three radio frequency options for the gunner.

Like the SAGGER, the SWATTER needs a highly trained gunner.

Any distraction to the gunner can seriously affect the system.

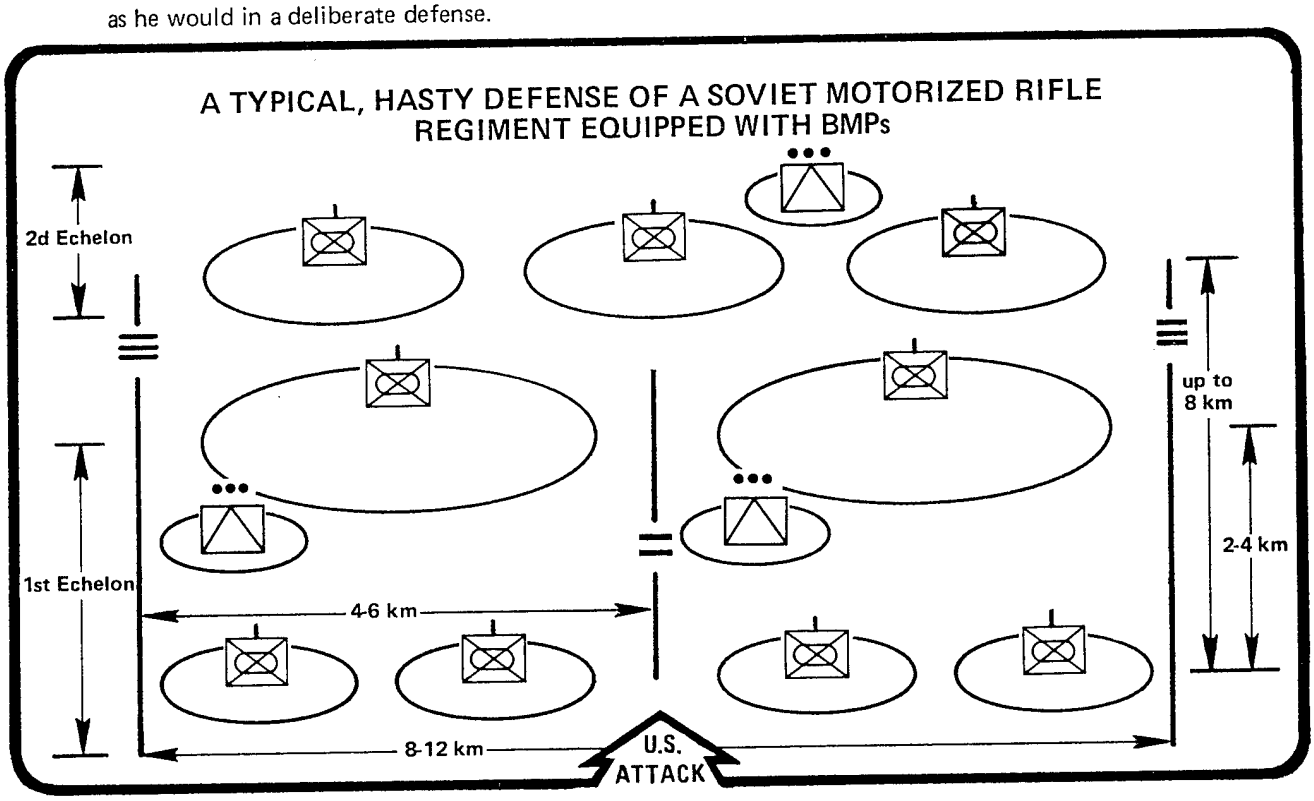


EMPLOYMENT OF SOVIET ATGMs

Essential to the development of effective countermeasures is a consideration of the manner in which ATGMs are deployed on the battlefield. For this discussion, the employment of SAGGER and SWATTER ATGMs is considered to be essentially the same. First, the Soviet doctrine of employment is examined and then a combat example of a variant of this doctrine as employed in the Mideast is illustrated.

TYPICAL SOVIET EMPLOYMENT

Let us look at one typical deployment of Soviet ATGMs which would likely face the battalion commander of an attacking US armor/mechanized force. This situation depicts a hasty defense in which the enemy has not had sufficient time to dig all the trenches, lay all the mines, etc., as he would in a deliberate defense.



This would indicate a total in each battalion area of:

- 3 BRDMs with 14 missiles each
- 1 Suitcase SAGGER Squad with 4 missiles each (employed in 2 teams of 2 missiles each)
- 30 BMPs with 4 missiles each

(or)

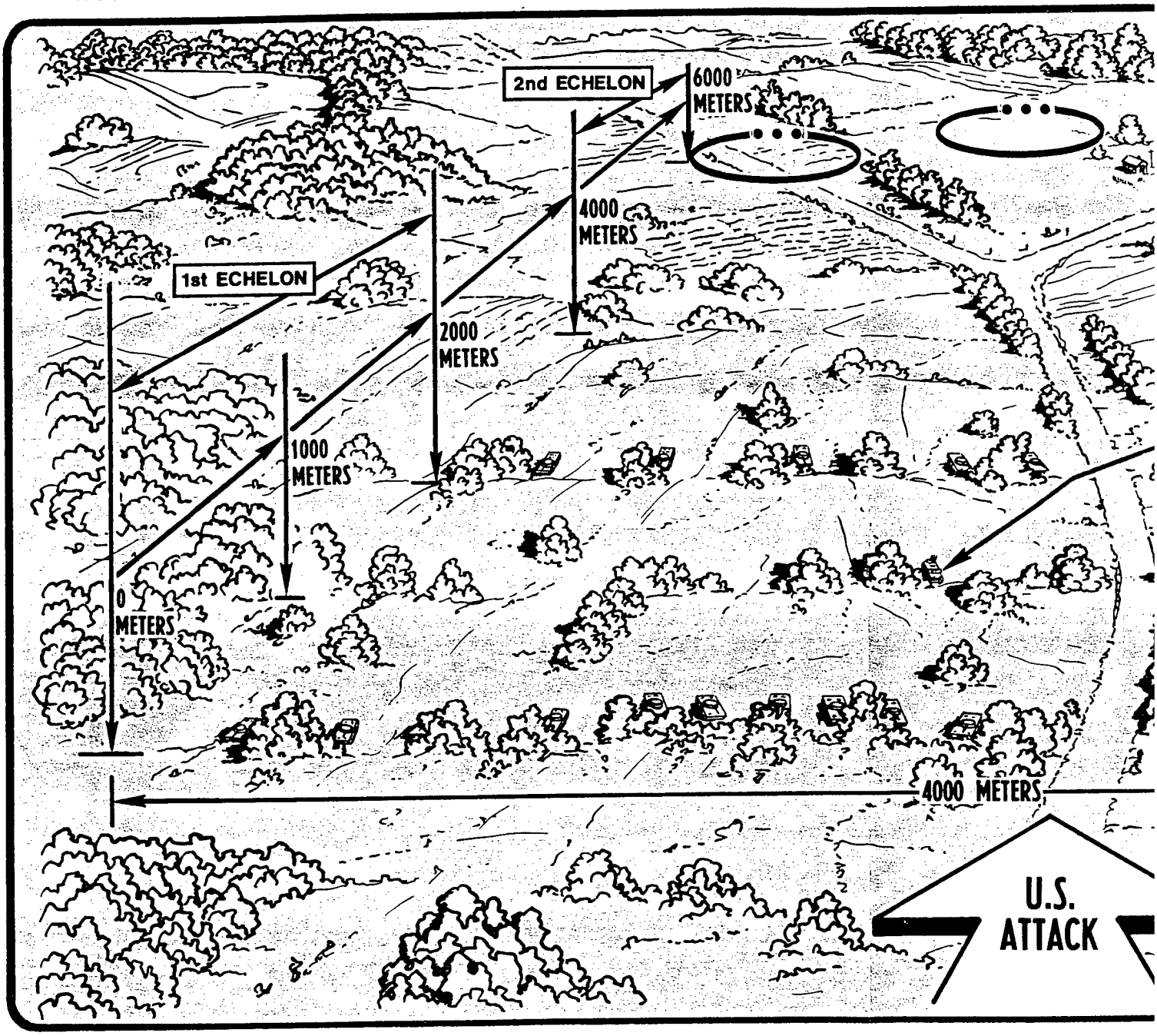
TOTAL - 33 SAGGER equipped vehicles

(or)

166 SAGGER missiles for the battalion

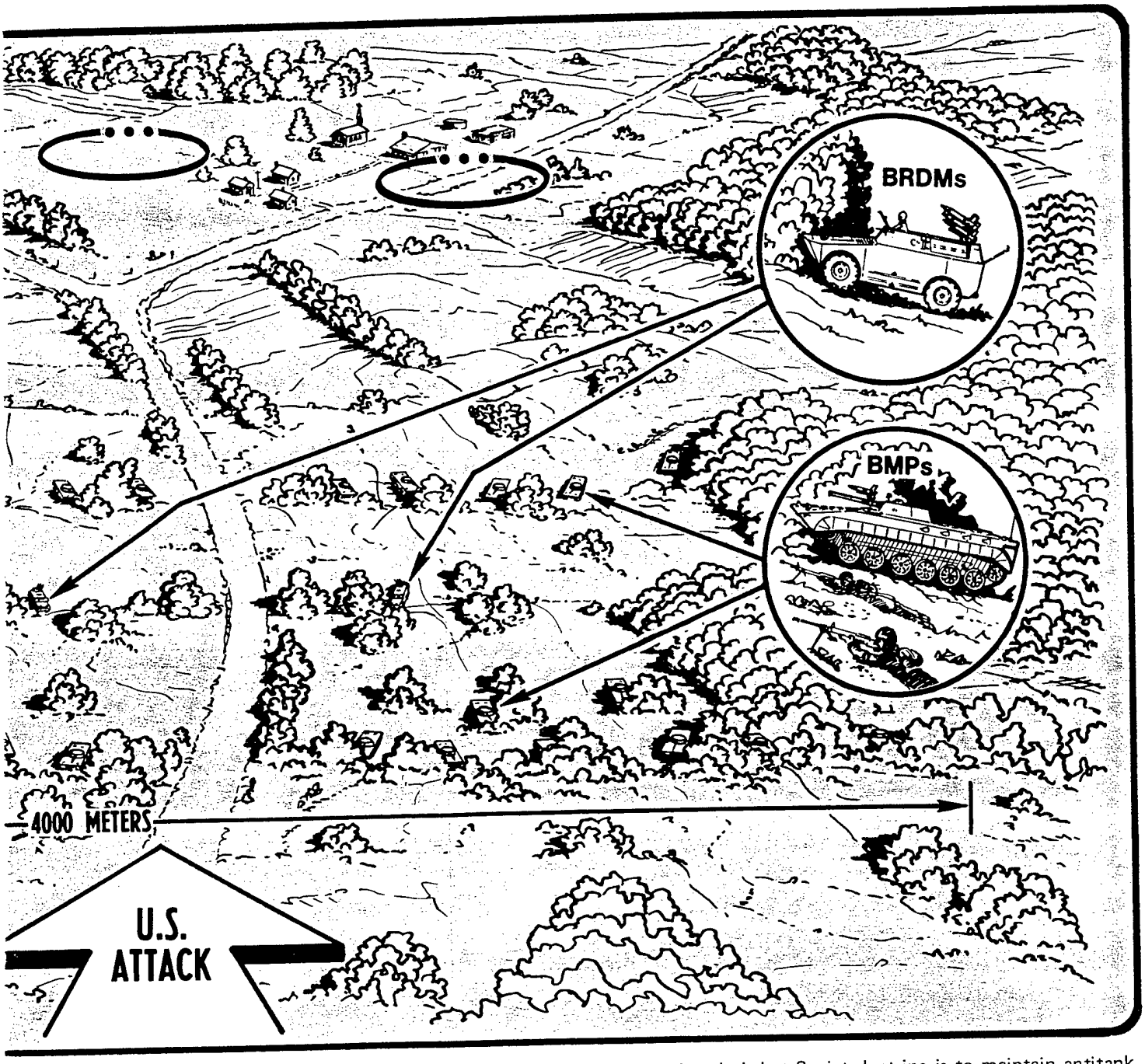
This [illegible] margin of p 17, TRADOC Bulletin 2, April 75

The defense of the 1st echelon battalion on the right flank above might look like this:



When attacking this type of defense of battalion size, you should expect to find at least 33 SAGGER equipped vehicles (BMPs and BRDMs) and 2 (or possibly 3 if reinforced) suitcase SAGGER teams (4-6 missiles). In the forward positions you can expect to find roughly two-thirds of the enemy's ATGMs. In blocking positions or trench lines to the rear you would expect to find the remaining one-third. The attached antitank platoon (3 BRDMs) would be deployed in the most likely

(1)



to find at least 33
suitcase SAGGER
two-thirds of the
expect to find the
in the most likely

area of armor attack. However, you must bear in mind that Soviet doctrine is to maintain antitank reserves at regimental and higher levels. This gives him the capability to thicken his AT defenses wherever he chooses. Also it would be normal for a company of 13 tanks to be attached to the battalion and deployed throughout the battalion sector (not shown in the sketch).

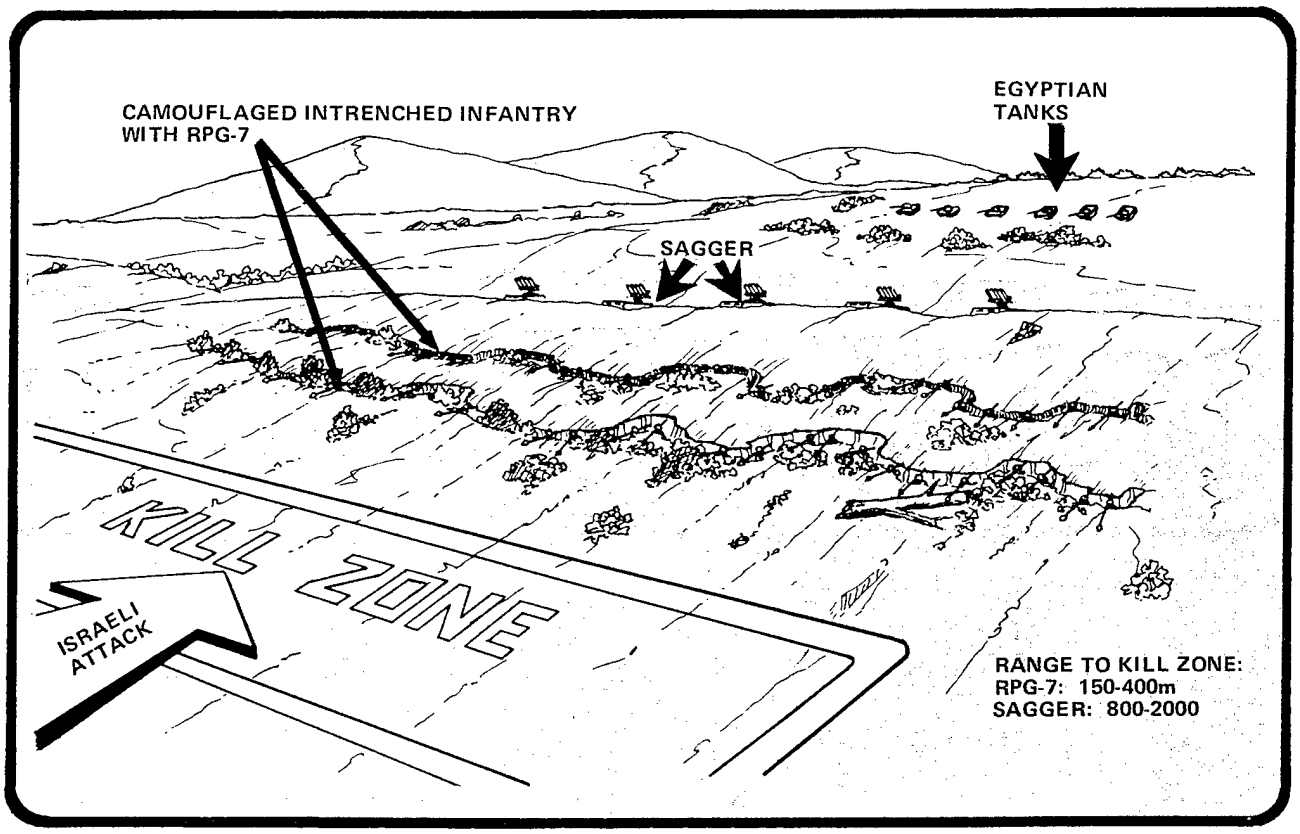
(2)

ATGMs IN THE YOM KIPPUR WAR

"We were advancing and in the distance I saw specks dotted on the sand dunes. I couldn't make out what they were. As we got closer, I thought they looked like tree stumps. They were motionless and scattered across the terrain ahead of us. I got on the intercom and asked the tanks ahead what they made of it. One of my tank commanders radioed back: 'My God, they're not tree stumps. They're men!' For a moment I couldn't understand. What were men doing standing out there—quite still—when we were advancing in our tanks towards them? Suddenly all hell broke loose. A barrage of missiles was being fired at us. Many of our tanks were hit. We had never come up against anything like this before...."

ISRAELI TANK COMMANDER IN THE SINAI,
October, 1973

Another type of antitank defense that capitalizes on extensive ATGM employment was seen in the Sinai Desert during the Mideast War (Oct 73). According to one report, the Egyptians, with an abundance of SAGGERs, established a defense that lured the Israeli Defense Forces (IDF) into a Kill Zone which optimized the potential of both SAGGERs and RPG-7s. The IDF tankers saw Egyptian tanks in the far distance and closed to do battle; however, they were unaware of great numbers of camouflaged RPG-7s and SAGGERs forward of the Egyptian tanks. The defense was disposed in this manner:



By employing their antitank weapons in this manner, the Egyptians caught IDF tanks within the effective ranges of *both* the SAGGER and the RPG-7 at the same time. The effect of the onslaught of vast numbers of these missiles was devastating.

SUMMARY

The antitank guided missile must be considered a potent weapon. Specifically, it has these main advantages:

STRENGTHS OF SOVIET ATGM SYSTEMS

- **Long range accuracy**
- **High degree of lethality**
- **Ease of employment of suitcase SAGGERs**
- **High reliability of the SAGGER**
- **Invulnerability of the SAGGER wireguided system to electronic countermeasures**
- **Remote firing capability**

The system does, however, have its weaknesses.

WEAKNESSES OF SOVIET ATGM SYSTEMS

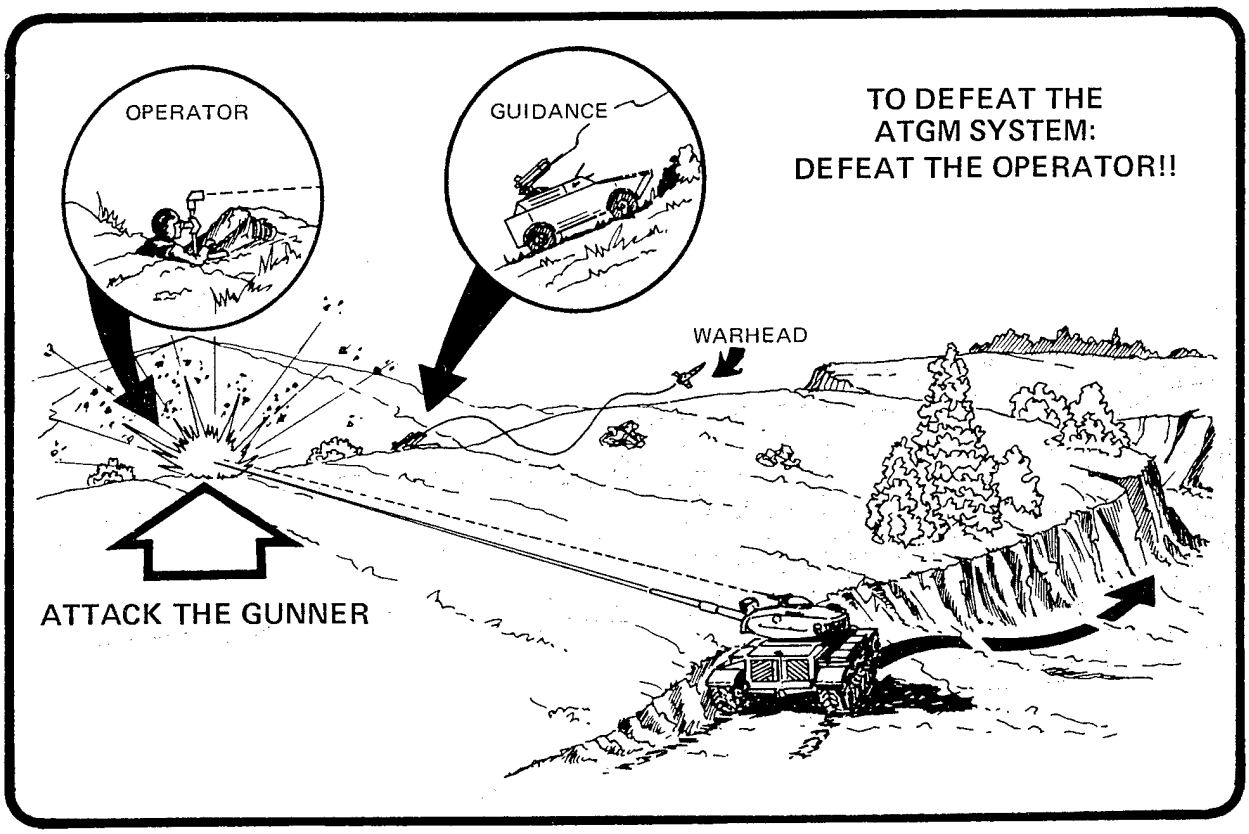
- **Need for highly trained gunners**
- **Minimum range limitations (especially for the SWATTER)**
- **Slow speed of the missile**
- **Susceptibility of the SWATTER to electronic countermeasures**
- **Requirement for good visual contact with both target and missile during flight**
- **Lack of responsiveness in tracking erratic moving targets**

You must remember that both the SWATTER and SAGGER are first generation missiles—*the gunner has to track the target and the missile simultaneously.* The Soviets, however, have the technology to develop a **second generation missile,** which would require the gunner to *track only the target.* It's highly probable that you would face a second generation missile on the battlefield in the future.

III
COUNTERMEASURES

Let's examine the principal components of the antitank guided missile system to determine where the system may be the most vulnerable. The three major components to consider are: the **warhead,** the **guidance mechanism,** and the **operator.** Attempts have been made to devise a method of defeating the shaped charge warhead, but to date no practical solutions have been found.

The guidance system of the SAGGER is considered immune to electronic countermeasures. Therefore, the most vulnerable component of the system is the operator. The ultimate purpose of the countermeasures discussed in this bulletin, therefore, is to *defeat the operator.*

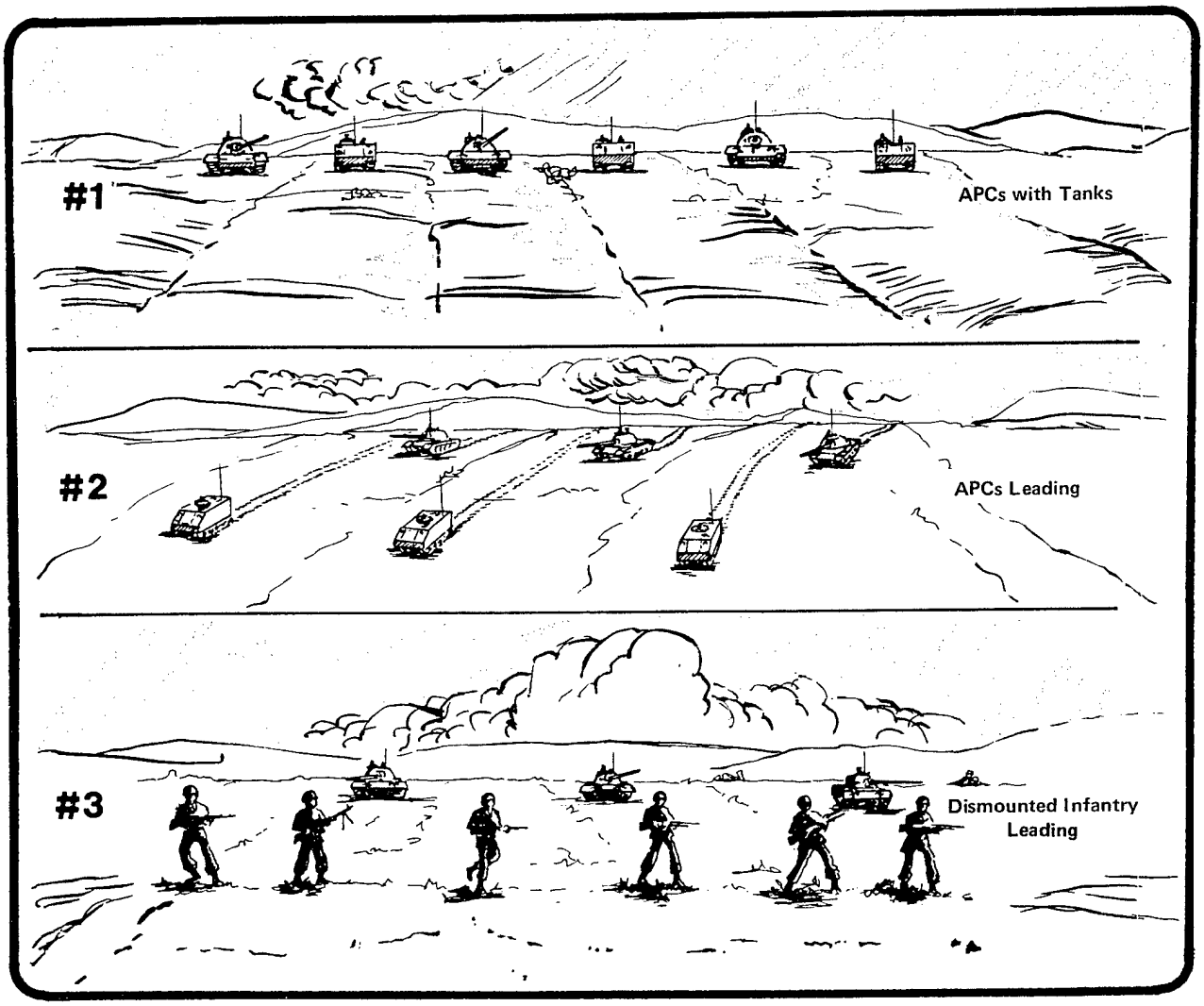


MIDEAST WAR RESULTS

Initial news media reports from the October War heralded the demise of the tank and the ascendancy of the antitank guided missile. The Israeli tank losses in the war tended to support the view that the tank was dominated by SAGGERs and RPG-7s. However, subsequent reports and analysis indicate that, in fact, the tank was the principal tank-killer. The effect of the ATGM was significantly degraded by the use of proper tactics and techniques.

During the first few days of the war, Israeli armor units attacked without adequate artillery or infantry support. Few artillery units had been mobilized, and what few mechanized infantry units were available were mostly mounted in halftracks and could not keep up with the tanks. The result was devastating destruction of Israeli tanks by Arab ATGMs and RPG-7s.

The Israelis, however, soon modified their tactics to employ the combined arms team—infantry, armor and artillery. By firing artillery on likely or suspected locations for SAGGERs and employing infantry with the tanks to add suppressive fire to SAGGER and RPG-7 positions, the effectiveness of the antitank guided missile was significantly reduced. The infantry was employed with the tanks in the three ways described on the following page.



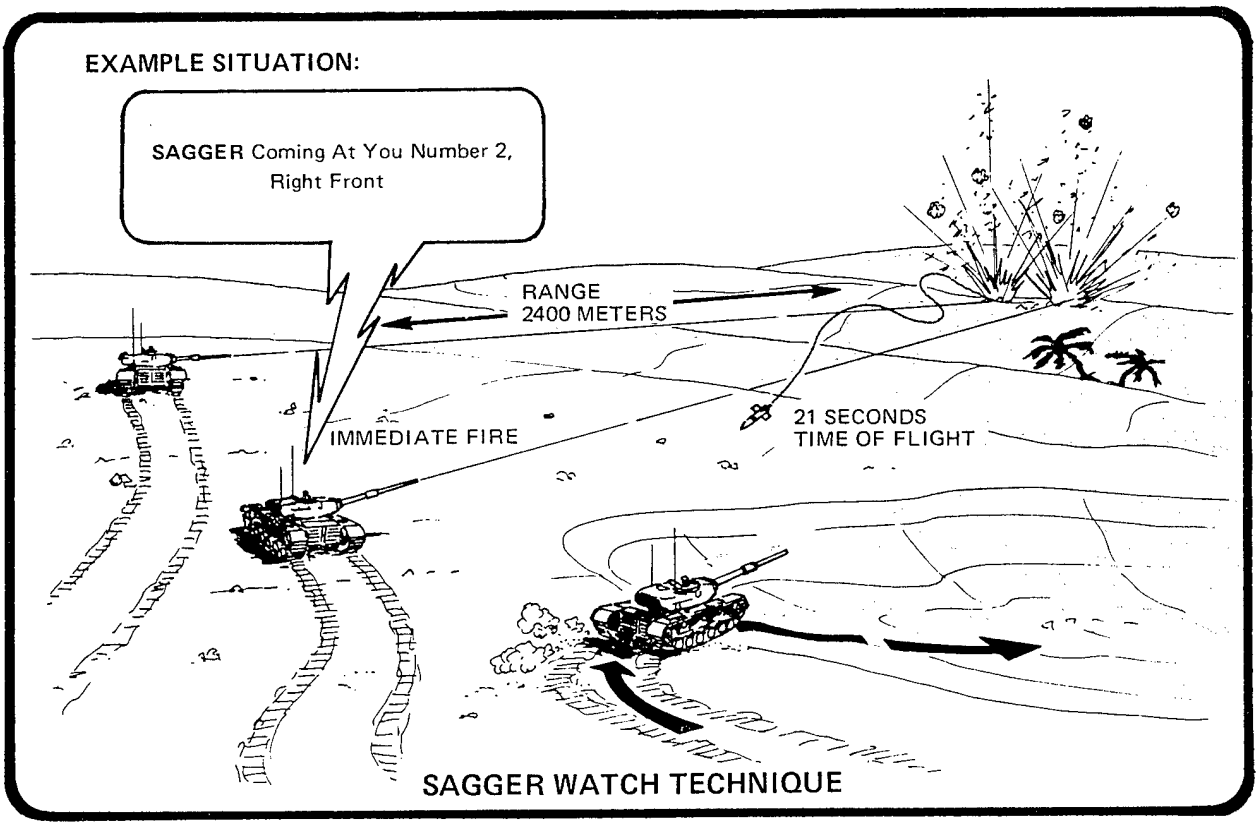
The role of the infantry in the attack was primarily to add more suppressive fire. Infantry fought mounted, except only when heavy antitank fire prevented forward movement.

These simple tactics were *not,* of course, invented nor developed independently by the Israelis. They are US tactics. They represent the application of the combined arms team concept which has long been taught in US Army schools. The lesson to be learned is that the October War has once again proved the validity of the combined arms doctrine.

Other more specific techniques that can be used to counter the ATGM include:

THE SAGGER WATCH

In both the offense and defense, one tank in the platoon is designated to be on **"SAGGER WATCH."** His primary and most important duty is to watch for SAGGER missiles being fired at the platoon. He attempts to determine, if possible, which tank is being fired upon, gives an immediate warning over the radio, and then, *immediately* fires the main tank gun at the point from which the SAGGER was fired. The idea is to "shake up" the SAGGER gunner sufficiently to cause him to overcorrect and thereby lose control of the missile.



SAGGER WATCH TECHNIQUE

The tank being fired upon makes an attempt to take evasive maneuvers or moves to cover before the missile impacts.

Some difficulties with this technique are:

- The missile signature is very hard to detect, especially by the tank being fired upon. The missile does have a small vapor trail while in flight to the target. The launch site, however, is extremely difficult to locate.

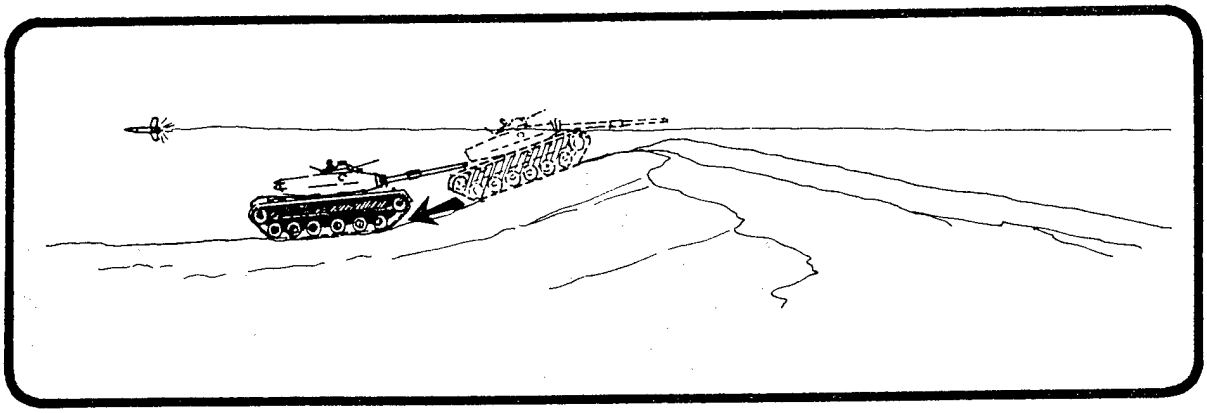
- The long range from launch site to target makes it very difficult to guess the operator's location in order to place effective fire on his position.

- The gunner's capability to operate from a remote site (80m away from a BRDM or 15m away for a suitcase SAGGER) and to be dug in reduces the probability of return fire effectively harrassing him.

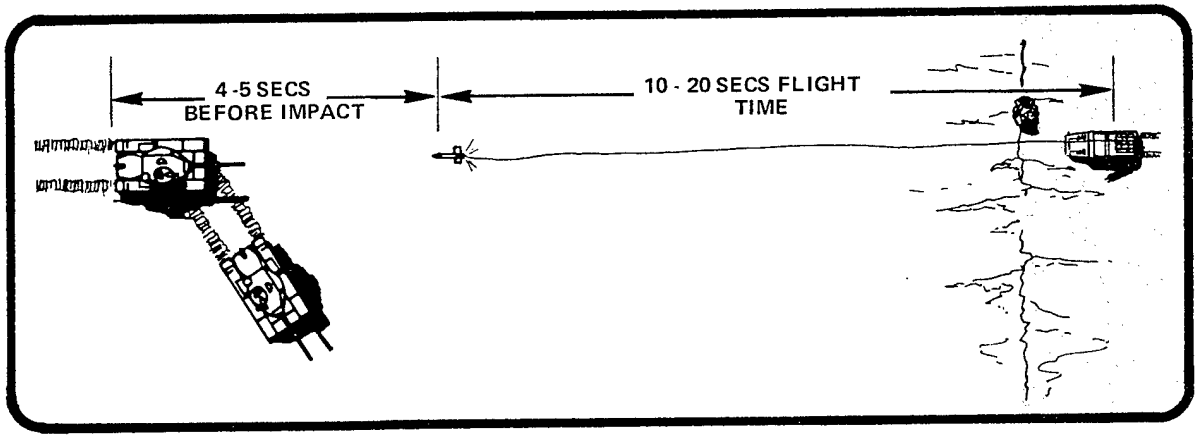
- In the offense when the SAGGER alarm is given there may be a tendency for every tank to move to cover or start evasive maneuvers, thus slowing the momentum of the attack.

THE DODGE

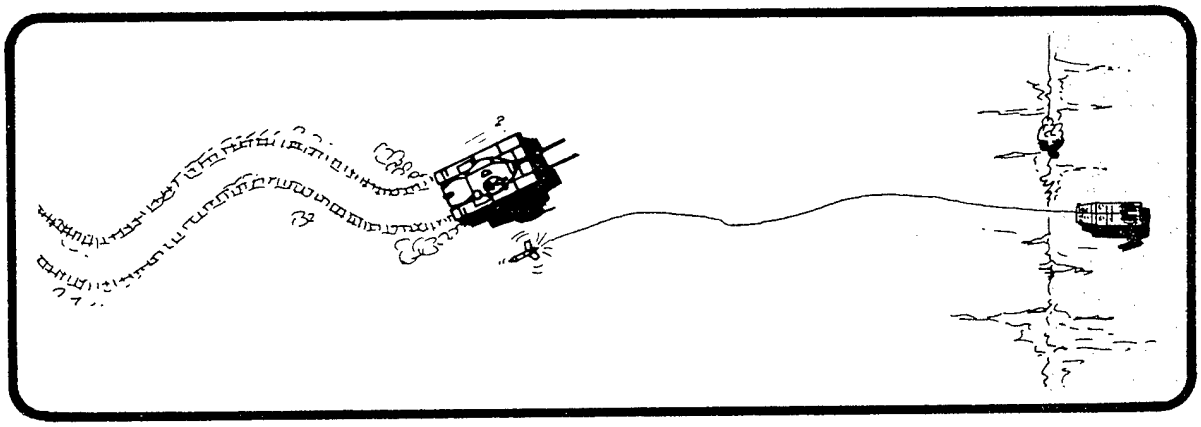
Various type dodges can be used successfully to counter the ATGM. The most effective type dodges are:



★Move immediately to natural cover. This includes simply backing down from a hull defilade firing position to a complete hull down position.



★A violent turn to the right or left at the last few seconds of missile flight, since it is then hard for the SAGGER gunner to correct for sudden, sharp moves by his target.



★An erratic path. This is designed to cause the gunner to overcorrect and thus lose control of the missile.

GENERAL METHODS FOR COUNTERING ATGMs

If you are facing a strong antitank defense you must counter the enemy through the use of one or more of the following general methods to be able to move against him:

a. *Maximize the cover afforded by the terrain.*

b. *Destroy the AT weapon(s).*

c. *Suppress the enemy so he will not be able to effectively fire at you.*

d. *Obscure the enemy's vision by employing smoke.*

e. *Move during periods of reduced visibility such as fog or night.*

(NOTE: Recently developed night vision devices plus battlefield illumination enable the enemy to see extremely well at night. Thus, maximum use of the terrain is essential even at night.)

a TERRAIN

One of the most effective countermeasures to the Soviet ATGM is still the proper use of terrain! Emphasis in training *must* be on:

- **Bounding and traveling overwatch as discussed in TCs 17-15-3, 17-36-2, 7-4 and 71-4-2.**
- **Firing from hull defilade positions.**
- **Using covered routes of approach even at long ranges (3-4 km) from suspected enemy positions.**

b DESTRUCTION

Obviously, antitank weapons that are destroyed are effectively countered. Many Soviet ATGMs move about the battlefield on vehicles vulnerable to tank and antitank fire. Thus, destruction of a BMP is more significant than the mere destruction of an armored personnel carrier—it is the *destruction of 4 or 5 SAGGER missiles.* Similarly, destruction of a BRDM represents the *destruction of 14 SAGGER missiles* and not just the destruction of an enemy scout vehicle.

All aspects of good gunnery techniques, as outlined in appropriate field manuals and training circulars, apply to the destruction of ATGMs. Several points, however, deserve special emphasis:

- **Train to hit at long ranges.** Since the ATGM is accurate at long ranges, it will most likely be encountered there.
- **Train to hit small targets.** You are not likely to have many shots at fully exposed vehicles. They will fire from hull defilade. So train accordingly. Don't train on large 7 1/2' X 7 1/2' panels; use smaller ones (maximum of 3 1/2' X 3 1/2').

> **Train to shoot FAST and hit.** The old tank gunnery standards of getting a round off within 15 seconds is too slow. To be able to distract a SAGGER gunner while his missile is in flight *you have to fire within 5-10 seconds.*
>
> **See TC 17-12-5**

Mechanized infantry may be forced to dismount, attack and destroy ATGMs if they cannot be countered by other means. This method, however, is time consuming and the momentum of an attack may be lost. Training should be oriented to *rapid* (i.e., double time) movement of lightly equipped dismounted troops.

C SUPPRESSION

First, we should define suppression as fires, direct and indirect, brought to bear on known or likely enemy locations to interfere with his effective fire on friendly maneuver elements. Suppressive fires can be immediate or planned. We must bear in mind that the principal suppressive weapons available to the battalion commander are:

WEAPON	SUSTAINED RATE OF FIRE RDS/MIN	MAXIMUM EFFECTIVE RANGE (METERS)
Machinegun 7.62mm	100	1100
Machinegun cal .50	40	1825
40mm grenade launcher	———	350
81mm mortar	8	4737
4.2" mortar	2	5500
105mm Howitzer	201 rds/hr	11,500
155mm Howitzer	69 rds/hr	14,600
8" Howitzer	33 rds/hr	16,800

The relationship between the ranges of available suppressive weapons and the locations on the battlefield of Soviet ATGMs must be kept in mind. Only some (approximately two-thirds) of the enemy's ATGMs are likely to be found in his forward defenses; the remainder will be found 1-2 km to the rear, *but* **WITH THE 3000 METER RANGE OF HIS ATGMs HE CAN HIT YOU WHILE YOU ARE ATTACKING HIS FORWARD POSITIONS.** Thus, consider his positions in depth when planning suppressive fires.

You should:

- Make maximum use of tank and APC machinegun fire to provide direct fire suppression in the assault.
- Consider available resources that can provide suppression and allocate a portion to suppress dangerous and likely SAGGER positions *BEHIND* the forward defenses.
- Ensure correct timing. The maximum amount of suppressive fire must be delivered during those moments the maneuver force is most exposed.
- Use VT fire to the maximum, particularly in loose sandy soil. On loose sandy soil, point detonating rounds lose up to 60% of their effectiveness.

Additionally, the principles explained in TC 6-20-1 concerning field artillery suppression of direct fire weapons should be known and applied by maneuver and field artillery units in training. These principles are:

★ DEDICATE FIRING BATTERIES TO COMPANY TEAMS

★ MONITOR MANEUVER COMPANY COMMAND NETS

★ SIMPLIFY CALLS FOR FIRE

★ DEVIATE FROM NORMAL FIRE PLANNING

★ STANDARDIZE AND ENSURE THAT FOs POSSESS MANEUVER CONTROL MEASURES

★ FDC AND FIRING BATTERY PROCEDURES MODIFIED TO RESPOND WITHIN 30-45 SECONDS

★ TRADE SOME ACCURACY FOR SPEED

(See TC 6-20-1 for a full discussion of these principles)

d OBSCURATION

It may prove difficult to suppress ATGMs through suppressive fire only. Shortages in artillery ammunition and well protected enemy positions may require alternative means of degrading ATGM effectiveness. Obscuration by smoke offers an attractive option. Commanders should:

- **Know the capabilities and limitations.** Different rounds have different effects under different conditions. You should know what smoke can and cannot do. As a

rough guide, you can figure that an artillery round of smoke (HC) will give you about 5-6 minutes of obscuration when there is little or no wind. White phosphorous rounds, on the other hand, will only provide 1-1 1/2 minutes of obscuration since it dissipates rapidly.

- **Train to use smoke.** Training exercises should include the use of smoke. Extensive training with live fire smoke rounds is ideal; however, this will not always be possible. When conducting field exercises, ARTEP, and ORTTs, the use of smoke should always be played to the maximum extent possible.

- **Plan for the use of smoke.** You must think through the amount of smoke you will need to move on the battlefield. It will be a lot. Present FMs do not give a reliable guide because past experience on smoke usage did not include countering ATGM. Smoke will be more important, and its use will be more extensive than ever. Look at your basic load. *Are you ready?*

- **Plan your smoke to coincide with your tactical move.** *Timing is critical!* Planning a smoke mission is more complicated than the normal HE mission—it takes more time to process and to build up on the ground. Once obtained, the obscuration will have to be maintained during the move. *Don't get caught in the open!*

More reliable data on the effects of smoke are forthcoming. Tests are presently being conducted and future bulletins and/or training circulars will address this subject in more detail.

e REDUCED VISIBILITY

With recently developed night vision devices now available to the enemy, the "cover of darkness" no longer provides the protection it once did. However, to counter the effects of known Soviet ATGMs there still is an advantage to moving on the battlefield at night instead of during the day because:

- There is apparently no night sight for present Soviet ATGMs, which must rely on artificial illumination.

- Current Soviet night vision devices are apparently only effective out to 1500 meters.

- Fog, especially at night, effectively degrades enemy ATGMs even at close range.

Future bulletins and/or Training Circulars will treat this important subject in greater detail.

CONCLUSION

Certain techniques, such as the "SAGGER WATCH" and the dodge which are developed in the heat of battle, are more effective in some situations than in others. There are, however, countermeasures which we should consider more universally valid. We can say that:

To survive against Soviet ATGMs we must:

- **Employ the Combined Arms Team**
- **Maximize the use of terrain for cover and concealment**
- **Use fast, accurate gunnery to destroy ATGMs**
- **Suppress enemy ATGM positions using indirect and direct fires.**
- **Obscure the enemy's vision**
- **Take advantage of periods of reduced visibility for battlefield movement**

TRAINERS' NOTE:

Each TASO has master copies of the diagrams and pictures in this Bulletin, from which you can order color Vu-graph transparencies for use in officer schools or other training.

W. E. DePUY
General, United States Army
Commanding

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