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SYSTEMS

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ABSTRACT

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The potential armored threat of the Warsaw Pact forces in Europe and similar threats in the Middle East and in large areas of Asia dictate that the US Army have the capability to cope with these threats. During the past 10 years, the Army's antiarmor weapon developments have sought to improve the total mix of weapons by providing antiarmor systems for use against targets at close, intermediate, and long ranges with emphasis on a high probability of a first round hit. Data for this essay was gathered using literature search and personal interview. Tank engagement ranges in past wars frequently varied from a few yards to well beyond 3000 meters. Based upon this data and recent studies, the Army determined a need for a mix of light, medium and heavy antitank weapon systems to permit engagement of enemy armored forces at the various ranges and to provide for a more effective all-around antiarmor capability for infantry and mechanized units. This overall increase in antiarmor capability has resulted in a change in philosophy of employment of friendly armor forces and may require a reassessment of the doctrine of employment of infantry antiarmor missile systems, attack helicopters and tanks in combined operations.

## ARMY'S REQUIREMENT FOR ANTIARMOR WEAPON SYSTEMS

### BACKGROUND

Germany's successes with her armored forces in the early stages of World War II vividly portrayed to the rest of the world the effectiveness of the main battle tank as an instrument of war. Ever since then, the battle tank has been regarded as one of the best all around ground offensive weapon systems ever devised and "it appears that no Army as yet considers that there are sufficient grounds for seriously doubting the role of the tank as the main combat weapon, both for the attack and defense."<sup>1</sup> There are many indications that foreign nations are not only continuing to build tanks, but are also developing tanks of increasingly higher performance.<sup>2</sup> From all evidence, "the tank is here to stay"<sup>3</sup> and it is quite probable that this weapon system will continue to have a decisive influence on conventional engagements until well past the turn of this century. Consequently, as long as the tank exists as a threat on the battlefield, the Army must have a capability to cope with this threat. This essay addresses the armored threat confronting the US forces; analyzes the

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<sup>1</sup>Lotje F. Schreier, "The Modern Battle Tank," International Defense Review, (December 1971), p. 581.

<sup>2</sup>Ibid.

<sup>3</sup>LTC Warren W. Lennon, "The Death of the Tank," Armor Magazine, (January - February 1972), p. 13.

effectiveness of antiarmor weapon systems presently used by the Army; identifies what new systems will be available in the near time frame; and develops the rationale for a mix of systems needed by the Army to meet this potential threat.

#### THREAT

Most United States military planners readily acknowledge that U.S. forces are faced by a potential enemy force numerically superior in tanks and mechanized units. In Central Europe, NATO forces are presently opposed by over 13,000 battle tanks of the Warsaw Pact countries which could readily be reinforced on short notice by a further 6,000 - 8,000 tanks stationed in the Western part of the Soviet Union.<sup>4</sup> This same type of threat also exists to a lesser degree in many other parts of the world, e.g., Middle East and large areas of Asia where United States forces may be committed in the event of future hostilities. Until recently, it was assumed that armor units would not be employed in a low intensity or counter-insurgency operations. This assumption is still valid; however, a conflict can rapidly change from low-intensity to near mid-intensity as recently occurred in South Vietnam when hundreds of tanks and armored vehicles were employed by the NVA

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<sup>4</sup>Schreier, p. 581.

against U.S. and ARVN forces in the spring offensive of 1972. Foreign powers will apparently continue to equip emerging nations with armored vehicles whenever it serves their purpose. Consequently, an armored threat may exist at anytime, anywhere in the world.

#### CURRENT ANTIARMOR WEAPON SYSTEMS

During World War II tank engagement ranges were generally between 800 - 1,500 meters and during the 1967 Sinai campaign, engagement ranges were generally between 900-1100 meters.<sup>5</sup> In Vietnam, tank engagement ranges varied from 75 to 3,000 meters. Based on historical combat data and separate combat development studies,<sup>6</sup> the Army has sought to improve its antiarmor weapon systems by providing weapons which are applicable against armor at close, intermediate, and long ranges, with emphasis on high probability of first round kill.<sup>7</sup> Other considerations in the development of new systems were the need to increase the antitank capabilities of combat support, combat service support and headquarters units as well as the need to provide the infantry soldier with a weapon that is lightweight, easy to operate and maintain, which requires only minimum

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<sup>5</sup>Lotje F. Schreier, "The Modern Battle Tank," International Defense Review, (February 1972), pp. 59-60.

<sup>6</sup>US Department of the Army, US Army Combat Developments Command Tank, Antitank and Assault Weapons Requirements Study (U) CONFIDENTIAL (December 1968).

<sup>7</sup>US Department of the Army, US Army Combat Developments Command, Command Guidance Memorandum Program, Tank/Antitank (U) CONFIDENTIAL (23 December 1971), p. 2.

operator exposure to enemy direct fire during the firing procedure. It was also desirable to have a system which is capable of being employed in high densities, and available to all units throughout the battle area. Further considerations will be brought out in ensuing discussions of individual systems. Before proceeding with a discussion of these systems, it is appropriate that the role of the tank as a "tank killer" should first be addressed.

During World War II, many tacticians considered the tank to be the most effective ground weapon system against enemy armor and therefore, it was often employed in this role. Since this thought still prevails, any discussion of antitank weapon systems must of necessity include the tank's capability to destroy another tank. Current US Army doctrine depicts the role of the tank as "the primary armor defeating weapon of armored forces."<sup>8</sup> Although this role is specified in various field manuals, the priorities and techniques of armor employment have indeed changed. Whereas the tank was once thought to be the key antitank weapon in the defense, it is now considered principally as an offensive weapon. This reflects an important change in our overall employment

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<sup>8</sup>US Department of the Army, Field Manual 17-1: Armor Operations (October 1966), p. 6.



philosophy since the tank no longer is considered to be the total means of antitank defense. A study recently conducted by the USACDC Armor Agency specified that:

"Improved capabilities of Infantry support weapons, artillery, and attack helicopters to defeat enemy tanks, and the interrelationship of these systems with the tank, allow a reordering of priorities in tank employment. The requirement of habitually positioning tanks along the front during the defense and tying them to the movement of infantry during the offense, no longer exists."<sup>9</sup>

If this employment philosophy is followed, then it appears that infantry and mechanized forces will have to accept a greater responsibility for providing for their own antitank defenses with other available systems. No one is currently "writing off" the tank as a tank killer, but it is no longer being developed primarily as an antitank system.<sup>10</sup> With the de-emphasis on this particular role for the tank, other antitank systems available to the ground forces assume a much greater importance in combating armored attacks.

There are three weapons currently in the Army that are primarily used in the antiarmor role. The M72 light antitank weapon (LAW), is a lightweight, self-contained weapon system consisting of a 66mm high explosive antitank (HEAT) rocket which "provides the

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<sup>9</sup>US Department of the Army, US Army Combat Developments Command Support to MBT Task Force and Examination of MBT/AAH Relationship (U) CONFIDENTIAL (15 July 1972), p. C-II-3.

<sup>10</sup>Ibid.

primary means of antitank protection for the rifle squad or other units not having crew served antitank weapons."<sup>11</sup> This weapon has a maximum effective range of 200 meters and is issued as a munition rather than as an individual weapon. It is carried and employed by the soldier in addition to his basic weapon, and is a high density weapon available whenever needed throughout the combat area. The LAW provides the infantry squad with a capability to force the enemy to dismount from his carrier or separate him from accompanying tanks.<sup>12</sup> Moreover, it provides the squad a tank killing and assault capability in situations where supporting fires may not be readily available; e.g., patrols, combat in urban areas and jungles, ambushes, and small unit operations behind an enemy build-up.

Because of its light weight and high penetrating power, the M72 is ideally suited for use in a tank-killer team role. Its recent use in this manner in Vietnam was dramatically portrayed by the Vietnamese marines during their defense of a fire base near Quang Tri. During an enemy attack on 9 April 1972, the marines held their ground and destroyed nine T-54 tanks using M72 LAWS.<sup>13</sup>

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<sup>11</sup>US Department of the Army, Field Manual 23-33: 60-MM High Explosive Antitank Rocket, M72 (September 1965), p. 30.

<sup>12</sup>US Department of the Army, US Army Combat Developments Command Qualitative Materiel Development Objective (QMDO) for Advanced Light Anti-tank/Assault Weapon (LAW) (U) CONFIDENTIAL (29 December 1969), p. 2.

<sup>13</sup>Interview with Carl T. Hansen, Major, US Army Combat Developments Command Liaison Office, USARV, (27 July 1972).

Most of the engagement ranges averaged between 75-100 meters.

The LAW provided the foot soldier with an effective close-in antitank capability against medium tanks and armored vehicles. This capability significantly increases the infantryman's survivability against these threats and strengthens the ground forces antitank defenses throughout the battle area.

The current medium range antitank weapon system in use by the Army is the M67 90mm recoilless rifle. This rifle is a direct fire, single shot, breech loaded weapon that weighs approximately 35 pounds.<sup>14</sup> The only type of ammunition available for this weapon is the HEAT cartridge which has the capability of penetrating the armor of any known tank. Although the 90mm is considered an effective antitank weapon, it has certain shortcomings. It does not meet Army stated required capabilities and characteristics with regard to lethality, accuracy and range. The maximum effective range for the 90mm is 450 meters which is less than half the medium range (1,000 meters) requirement established for a follow-on system to the 90mm. The signature elements of the M67; e.g.,

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<sup>14</sup>US Department of the Army, Field Manual 23-3: Techniques of Antitank Warfare (August 1966), p. 100.

smoke, flash and blast are also undesirable, since upon firing, they tend to disclose the weapon's position to the enemy. The rapid rate of fire is one round every six seconds up to five rounds and after five rounds have been fired, a 15 minute cooling period must be observed. This is certainly an undesirable feature in sustained operations against massive enemy armor attacks. It is anticipated that this weapon will be replaced by the DRAGON surface attack guided missile system during the mid 70's.

The 106mm recoilless rifle is the "big brother" of the 90mm, with a maximum effective range of 1,100 meters. Many of the shortcomings described for the 90mm apply as well to this system. The weapon's firing signature and related effects are undesirable and the ballistic mismatch of spotting and major caliber rounds result in inaccurate fire at the greater ranges. The first round hit and kill probabilities are less than desirable and the weight of this recoilless rifle (251 pounds) often precludes its employment in a ground mounted role. However, at the present time, the 106mm provides the primary means of antitank protection for the rifle company. This weapon is scheduled to be replaced by the Tube-launched, Optically tracked, Wire-command link (TOW) guided missile system in the 1980 time frame.

The TOW will provide the long range heavy antitank assault capability for the infantry, airborne infantry and mechanized infantry battalions. Recently, this system has been issued to a

small number of active Army units. Two important features of the TOW are its mobility and simplicity of operation.<sup>15</sup> Since the entire ground launcher can be hand-carried, employment sites can be changed quickly to minimize detection or to engage targets that are not within range of one emplacement.<sup>16</sup> The maximum effective range of 3,000 meters is more than double that of the 106mm system. The weapon, ammunition and its crew can be transported easily by an assault helicopter for rapid emplacement anywhere on the battlefield. The first round hit and kill probabilities of the TOW are extremely high and crew training is minimal. A shortcoming of the TOW is the extended time of flight of the missile out to the maximum range. The gunner must guide the missile throughout its flight and consequently, is susceptible to counterfires by the enemy.

This system was battle tested in Vietnam during the 1972 NVA Spring offensive and successfully destroyed enemy armor targets at ranges between 750 and 2,300 meters.<sup>17</sup> In summary, the TOW will be used to destroy formations of armored vehicles at extended ranges before the firepower of enemy armor can be brought to bear effectively on friendly forces. This system will give the infantry battalion a significantly increased antitank capability and should,

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<sup>15</sup>US Department of the Army, Training Circular 23-23: TOW Heavy Antitank Weapon System (July 1970), p. 3.

<sup>16</sup>Ibid.

<sup>17</sup>Hansen, personal interview.

therefore, result in reducing the requirements for tanks to be employed in a purely antitank role.

Another system with an antitank capability which was recently acquired by the Army is the M551 Sheridan/Shillelagh. Basically, the M551 was developed to fulfill a requirement for an armored vehicle to function as the main reconnaissance vehicle for armor, infantry and airborne operations, and as the main assault weapon for airborne operations and combined arms teams not employing the main battle tank.<sup>18</sup> This vehicle was to replace the M56 Self-Propelled Antitank (SPAT) weapon and the M41 tank. Although the M551 can effectively engage and destroy armor targets up to 3,000 meters with its Shillelagh missile, it is essentially a specialized weapons system used primarily in the armored reconnaissance role. Since it is not envisioned that the M551 will normally become decisively engaged, it is not considered as an antitank weapon as are other systems such as the TOW. The M551 (without the Shillelagh) was employed in Vietnam with limited success in the assault and fire support roles.

The last system to be discussed is the M203 40mm grenade launcher that is mounted on the M16 rifle. The ARVN marines

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<sup>18</sup>US Department of Defense, Blue Ribbon Defense Panel, Report to the President and Secretary of Defense on the Department of Defense, Appendix F, Staff Report on Operational Test and Evaluation (July 1970), p. F-2.

performed a combat evaluation of this launcher in early 1972 and successfully destroyed several Soviet made BTR's (armored vehicles equivalent to US APC). The M203 has an effective range of 150 meters and can penetrate three inches of rolled homogenous steel.<sup>19</sup> The projectile is a high explosive dual purpose (HEDP) round that can be used against hard point targets or personnel. This system, therefore, provides a limited armor defense capability to the rifle squad at near ranges; however, it is considered a much more effective weapon when used in the anti-personnel role.

#### FUTURE ANTIARMOR WEAPONS SYSTEMS

Perhaps one of the most promising antiarmor weapons under development by the Army is the XM 47 DRAGON surface attack guided missile system. The DRAGON is a command-to-line-of-sight guided missile system. Fired from a recoilless launcher, the missile is tracked optically and guided automatically to the target by electrical impulses transmitted via a wire link.<sup>20</sup> The entire system weighs less than 30 pounds and allows for one-man portability. It is far superior in effective range and kill probability to the 90mm recoilless rifle which it is scheduled to replace in the Army

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<sup>19</sup>Wallace J. Harvey, "A Plus for Firepower," Ordnance Magazine (September-October 1972), p. 143.

<sup>20</sup>McDonnell Douglas Astronautics Company, "Dragon," p. 18.

inventory. Despite its light weight and simplicity of operations, the DRAGON's lethal striking power makes it possible for a single infantryman to successfully challenge and destroy any known armor. The US Army is currently developing a night sight for this system. Consequently, the DRAGON may be the Army's first day/night antitank weapon which will have the capability of engaging armor at ranges approximating that of the 106mm recoilless rifle. Its introduction to infantry and mechanized units should greatly enhance their defensive capability against tanks and other armored vehicles.

There is one additional antiarmor weapon system currently under development by the Army that may completely change the nature of armor operations. The system is the TOW/COBRA which has been designated the AH-1Q. This attack helicopter (AH) will carry 8 TOW missiles and be capable of engaging armored vehicles from standoff slant ranges of up to 3,000 meters. Two prototype systems, deployed to Vietnam in May of 1972, proved so successful that the Army decided to accelerate the TOW/COBRA development program by six months. The first unit to be equipped with this airborne antitank capability is scheduled to be in operation in the early part of 1975. Numerous studies, tests and field experiments have been conducted during the past three years on employment of the attack helicopter in the antiarmor role. The conclusions were remarkably similar--that the attack helicopter may be a deciding factor in



blunting or stopping an armored offensive.<sup>21</sup> During duels between attack helicopters and tanks, the loss exchange ratios heavily favored the attack helicopter particularly in a defensive situation and during the hours of darkness. This is especially true in the case of the advanced attack helicopter (AAH) which will have a 24 hour operational capability. Another advantage that the AAH will have over other antiarmor weapon systems will be its rapid mobility. It is terrain independent and can be employed within minutes anywhere within the battle area. By utilizing nap-of-the-earth flight and terrain masking techniques, the AAH can pop-up from behind a mask at 3,000 meters and engage a target within moments. The attack helicopter is extremely difficult to detect at this range and usually acquires targets prior to itself being detected by the ground attacking force.<sup>22</sup> Because of the successes with the prototype systems employed in Vietnam and the advanced attack helicopter's predicted potential to destroy tanks, the AAH's may very well make it too costly for the enemy to conduct massive armor daylight offensive operations.

#### SUMMARY

The potential enemy armor threat is the driving force behind the U.S. Army's current program to improve its antiarmor capability.

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<sup>21</sup>See Bibliography for list of studies, tests and experiments.

<sup>22</sup>US Department of the Army, HQ., USAREUR Preliminary Report, "Joint Attack Helicopter Instrumented Evaluation," (June 1972), p. 14.

The acquisition of the LAW and TOW have greatly increased the infantryman's ability to defend against an armored attack at the close and long ranges. The DRAGON will provide the medium range antiarmor defense for the infantry platoon. The TOW/COBRA and advanced attack helicopter will provide the ground commander with a new dimension in antiarmor warfare that may change the doctrine and tactics of armored operations. There is a definite need to improve the night firing capabilities of the current antiarmor weapons and to develop new systems that reduce the exposure time of the operator while firing the weapon. The ranges at which enemy armored forces are engaged is highly dependent upon the terrain and/or inter-visibility between the antiarmor weapons and the attacking force; therefore, a light, medium and heavy antitank capability is needed to enable the infantryman to fire on targets throughout the engagement arena. Development of the current antiarmor missile systems has resulted in a change in the philosophy of employment of friendly armor forces and has made infantry and mechanized units less dependent upon these forces for their overall antitank defense. It is apparent that the US Army must reassess its current doctrine to determine the preferred tactics and techniques for employing attack helicopters and tank and antitank systems together as a combined arms team. Finally, from all evidence, it is doubtful that any new antiarmor systems

other than the DRAGON and TOW/COBRA will be introduced into the Army inventory in the next decade, inasmuch as the LAW and ground TOW are already deployed and are considered exceptionally reliable and effective systems.

ADDENDUM

It is fully recognized that there are other ways to destroy armored vehicles which were not mentioned, such as use of antitank mines, artillery and close air support (CAS) aircraft. These were intentionally excluded in order to limit the scope of this paper. Use of mines is a passive rather than active technique of antitank warfare. Artillery weapons are not essentially designed as antitank weapons; however, there is some work being accomplished by the Army in this area. CAS aircraft have proven extremely effective against armor vehicles in Korea and in the South East Asia conflict; however, discussion of their use in this role is somewhat beyond the scope of this essay. There are several other antiarmor systems presently being considered that were also excluded from discussion such as the cannon launched guided missile, fire and forget antiarmor missile systems and scatterable mines. Again, these were not included since these systems are in the early stages of development and may not prove feasible.

  
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