

**GAO**

Report to the Chairman, Subcommittee  
on Defense, Committee on  
Appropriations, House of  
Representatives

---

July 1999

# DEFENSE ACQUISITIONS

## Reduced Threat Not Reflected in Antiarmor Weapon Acquisitions



**G A O**

Accountability \* Integrity \* Reliability

---

---

---



United States General Accounting Office  
Washington, D.C. 20548

National Security and  
International Affairs Division

B-280327

July 22, 1999

The Honorable Jerry Lewis  
Chairman, Subcommittee on Defense  
Committee on Appropriations  
House of Representatives

Dear Mr. Chairman:

In its report on the Fiscal Year 1999 Defense Appropriations Bill, the House Committee on Appropriations expressed concern with the Cold War mindset of the services, which are continuing to develop and procure an increasing number of tank-killing weapons. The Committee questioned whether current antiarmor acquisition plans are appropriate at a time when potential adversaries have smaller armored forces than during the Cold War. Accordingly, the Committee directed the Secretary of Defense to develop an antiarmor master plan to be submitted with the fiscal year 2000 budget. The plan is to identify the projected armored threat and the quantity of all antiarmor weapons, with the purpose of eliminating excess antiarmor weapon capabilities. The last master plan was prepared in September 1990.

You requested that we independently review and comment on the master plan. Specifically, you asked that we evaluate the plan's findings and conclusions, its underlying data and analyses, and its key assumptions, as well as overall antiarmor funding trends. As of June 30, 1999, the Secretary of Defense had not submitted the plan. As agreed with your office, we are therefore providing information we have gathered that addresses the parts of your request that we could complete without the Department of Defense's (DOD) plan. For this report, we (1) identified changes in armored threats from 1990 to 1997, (2) compared the number and makeup of the 1990 antiarmor weapon inventory with those of the 1998 inventory, and (3) identified the funding trends of past and future antiarmor procurements. When the master plan is issued, we will review it and issue our final report to you.

---

## Results in Brief

The number of potential enemy armored targets U.S. forces expect to face has decreased considerably since 1990. During the Cold War, the services considered the greatest threat to be a massive land attack spearheaded by

---

thousands of armored vehicles in Central Europe. Today's conditions, however, are significantly different, and military planners consider smaller regional conflicts as the threat basis when developing war-fighting plans and requirements. According to the Defense Intelligence Agency's latest biannual Outyear Threat Report, issued in 1997, the number of armored targets is less than 20 percent of the number considered in 1990.

The overall size of DOD's current antiarmor weapons inventory is approximately the same as during the Cold War, and inventories of the more sophisticated and lethal antiarmor weapons have actually increased. Currently, there are 35 different types of antiarmor weapons in the inventory and 10 other types in production. While today's inventory weapons have similar capabilities to those in the 1990 inventory, the 10 new weapons are expected to provide improved targeting, lethality, and survivability capabilities developed in response to the anticipated future tank threat.

The services continue to invest in antiarmor weapons and are planning funding increases. They estimate they will spend \$11.1 billion in total procurement funding to acquire the 10 antiarmor weapons currently in production, which includes \$4.2 billion for fiscal years 2000 through 2003. In addition, DOD is developing nine new antiarmor weapons at an estimated cost of \$3.5 billion. The procurement costs for six of the nine new programs have not yet been determined, but the remaining three have an estimated procurement cost of about \$4.7 billion. Plans to acquire large quantities of new and improved antiarmor weapons do not appear consistent with the reduced size of the armored threat and the existing large and capable inventory of antiarmor weapons.

---

## Background

Antiarmor weapons are capable of destroying targets such as tanks, armored combat vehicles, and/or artillery. To determine weapon requirements, the services use the Defense Intelligence Agency's latest biannual Outyear Threat Report estimates. The current report modeled a scenario in which U.S. forces would fight two major regional conflicts.

In October 1998, the administration issued "A National Security Strategy for a New Century," which describes the new and different threats facing the United States since the end of the Cold War. Similarly, the Under Secretary of Defense (Acquisition and Technology) testified in October 1998 that the military needs to change the way it fights, the weapons it uses, and the way it acquires weapons to successfully meet the new anticipated

---

threats. According to the Under Secretary, the most likely future combat scenarios include information warfare, urban combat, chemical/biological attack, terrorism, and nuclear attack. He noted that the dilemma the military faces is how to fund competing demands to develop weapons to achieve the goals of the early 21<sup>st</sup> century and meet current readiness needs. The Under Secretary stressed that the military needs to shift away from traditional weapons designed to counter a Cold War threat. He specifically stated that one required action is to reduce the number of traditional weapons now in acquisition to fund the required newer weapons. This, he said, would enable the military to reallocate resources to top-priority modernization programs for communications, sensors, space-based reconnaissance, and computer systems.

DOD's 1990 antiarmor master plan was a single integrated document describing the development and acquisition of weapons capable of defeating armored threats. Prior to 1990, antiarmor requirements were primarily justified according to the potential threat of a Central European conflict. A principle component of this threat was the very large Soviet and Warsaw Pact inventories of armored vehicles. While the 1990 plan still concluded that the Soviet Union would retain major conventional and strategic forces and would remain the major concern of defense planning, it recognized that the Warsaw Pact was no longer a credible military alliance.

In 1993, we reported that DOD had not sufficiently reexamined its antiarmor needs since the decline of the Warsaw Pact.<sup>1</sup> DOD reported that the Office of Program Analysis and Evaluation had plans to conduct a 2-year study of the antiarmor mission. However, according to a Program Analysis and Evaluation official, the Office terminated the study before it was completed, and no reportable results were obtained.

---

## Armored Threat Substantially Reduced

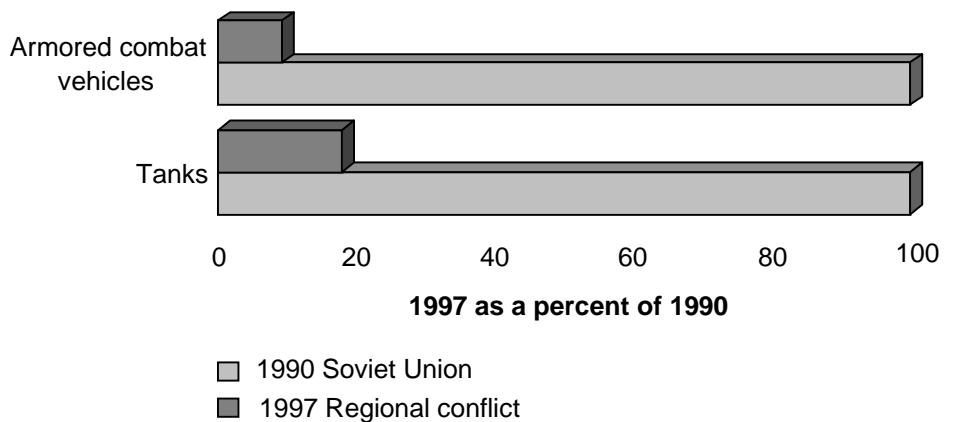
DOD reports as well as testimony by top Defense officials show that the armored threat facing the United States has dropped substantially since 1990. A comparison of the armored targets in the 1990 antiarmor master plan with those in the 1997 Defense Intelligence Agency Outyear Threat Report shows that the number of armored targets U.S. forces expect to face has dropped significantly during the period. Figure 1 shows the number of

---

<sup>1</sup>Antiarmor Weapons Acquisitions: Assessments Needed to Support Continued Need and Long-term Affordability (GAO/NSIAD-93-49, Mar. 4, 1993).

enemy tanks and armored combat vehicles in the 1997 Outyear Threat Report is less than 20 percent of the number in 1990 antiarmor master plan.

**Figure 1: Comparison of Enemy Tanks and Armored Combat Vehicles, 1990 Soviet Union and 1997 Regional Conflict**



This decline reflects the changes in threats since the collapse of the Soviet Union in 1991. In 1987, we reported that the Soviet inventory totaled approximately 52,000 tanks, including about 29,000 in Europe.<sup>2</sup> About 26,000 of the tanks in the inventory were produced after 1978 (including the T64B, T72M1, and T80). The technical sophistication and the sheer numbers of these armored vehicles were far greater than the armored threat associated with any other war-fighting contingency, either then or now. However, the collapse of the Warsaw Pact significantly reduced the likelihood that the United States would have to face an opponent with such technically sophisticated armored weapons. Consequently, the armored threat as projected in the 1997 Outyear Threat Report is not nearly as capable as that of the former Soviet Union in terms of quantity and quality.

In January 1998, the Director of the Defense Intelligence Agency reported to Congress that threats had diminished substantially, that the United States was unlikely to face a global military threat similar to the former Soviet Union for at least two decades, and that ground forces throughout the world were being reduced. Further, he said many developing nations

<sup>2</sup>Antitank Weapons: Current and Future Capabilities (GAO/PEMD-87-22, Sept. 17, 1987).

---

had outdated equipment that was either not operational or in serious disrepair. Developed countries were in various stages of modernization, but ground forces were a low priority.

The Defense Intelligence Agency's 1997 Outyear Threat Report used two regional conflict scenarios as the threat estimate for determining requirements. Iraq and North Korea are currently the most likely opponents the United States would face. The number of armored vehicles currently maintained by Iraq and North Korea represents only a small fraction of the Cold War threat. In addition, the Central Intelligence Agency Director testified before the Senate Select Committee on Intelligence in January 1998 that the United Nations sanctions and arms embargo implemented after the Persian Gulf War limit Iraq's opportunity to procure additional weapons and have had a devastating effect on its economy. Further, North Korea's overall military readiness continues to erode along with its worsening economic situation.

---

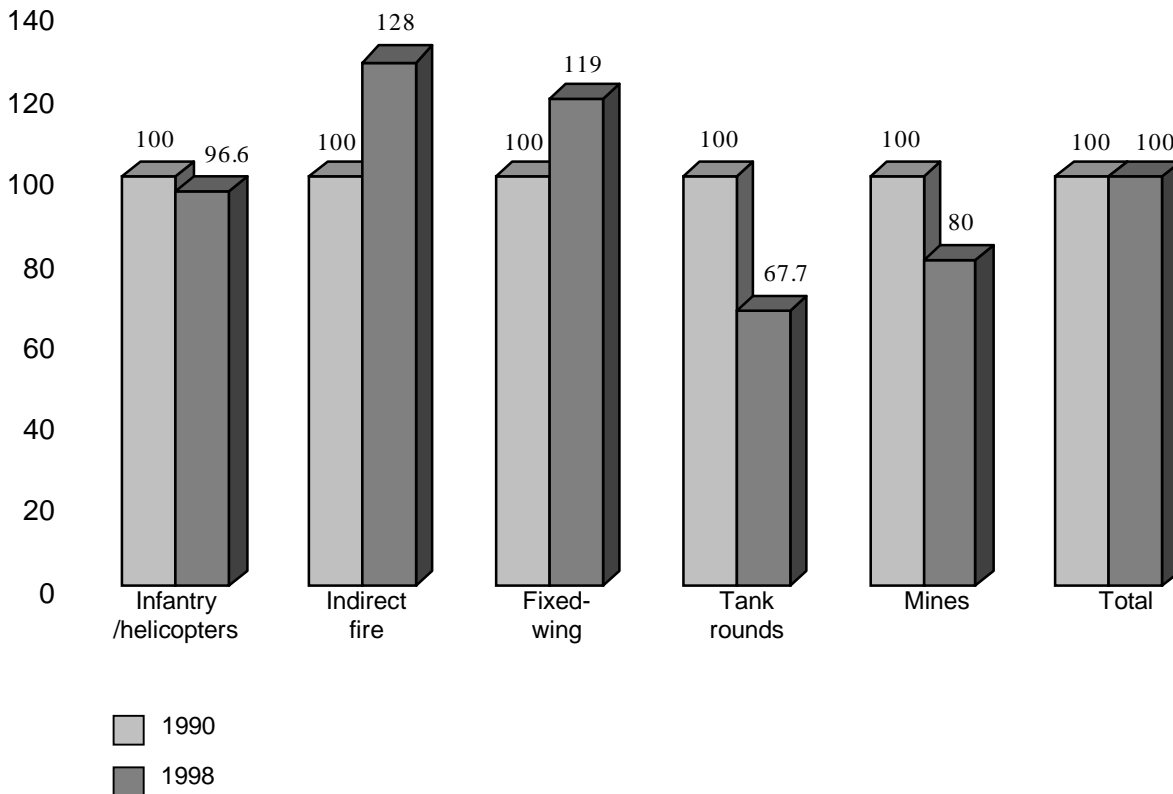
## Antiarmor Weapon Inventory Remains at Cold War Levels While New and Improved Weapons Are Added

The overall size of the antiarmor weapon inventory has remained fairly constant since 1990. At the same time, weapons have become more sophisticated, lethal, and effective. These more highly sophisticated weapons, some of which are capable of killing multiple targets, were developed to defeat the anticipated future Soviet tank threat.

The 1990 antiarmor master plan divided the inventory and procurement of antiarmor weapons into five different categories: infantry/helicopter, indirect fire support, fixed-wing, tank rounds, and mines. Figure 2 compares the number of all types of antiarmor weapons in 1990 and 1998 within these five categories. There are various types of antiarmor weapons within each category. The various types of antiarmor weapons are described in appendix I.

Figure 2: Comparison of Antiarmor Munitions, 1990 and 1998

1998 as a percent of 1990



The 1998 inventory of infantry/helicopter antiarmor weapons is slightly smaller than in 1990, but it contains inventories of three additional weapons with improved capabilities—the Javelin, the Hellfire II missile, and the Longbow Hellfire missile. The 1998 inventory of indirect fire weapons increased from 1990 levels. The biggest contributors were the higher number of Multiple Launch Rocket System (MLRS) rockets and the recently produced Sense and Destroy Armor (SADARM) submunition. The 1998 inventory of fixed-wing antiarmor weapons also grew over the 1990 level. It included two additional weapons capable of killing multiple armored targets—the Joint Stand-Off Weapon (JSOW) and the Sensor Fused Weapon. The 1998 inventory of tank rounds shrank significantly. However, the drop was in the number of tank rounds for the older M60 and M61 tanks. Rounds for the M-1 Abrams main battle tank currently in use



---

increased by 425 percent. These rounds are more lethal against modern armored targets. The 1998 inventory of mines also shrank from 1990, but quantities of two new mines that provide increased performance and lethality were added. Detailed comparisons of the 1990 and 1998 inventories are in appendix II.

U.S. antiarmor weapons proved very capable during Operation Desert Storm. The United States and its allies destroyed or forced abandonment of 2,633 tanks during the air and ground assault against Iraqi ground forces. According to a 1992 House Committee on Armed Services report, technology gave U.S. forces the edge, and the equipment performed above the most optimistic expectations.<sup>3</sup>

---

## DOD Continues to Invest in Antiarmor Weapon Capability

In 1998, the services had 35 different types of weapons in inventory capable of performing today's antiarmor mission and had spent a total of \$20.2 billion (in then-year dollars) to acquire these weapons.<sup>4</sup> They had also spent a total of \$3.6 billion through fiscal year 1998 to procure 10 additional antiarmor weapons and estimated they would spend another \$7.4 billion to complete procurement of these new weapons. The procurement funding requests for the 10 antiarmor weapons in production are in appendix III.

In addition, the services are currently developing nine new weapons with varying levels of antiarmor capability for a total estimated development cost of almost \$3.5 billion, \$2.6 billion of which has already been spent. Some of the weapons such as the Brilliant Antiarmor Submunition and the Line-of-Sight Antitank (LOSAT) are primary antitank weapons. Others such as the Multipurpose Individual Munition (MPIM) engage a variety of targets, including buildings, bunkers, and light armor. The guided MLRS can engage personnel, light armor, or heavy armor, depending on the payload selected. At this time, only three of the weapons are approaching a procurement decision. Their estimated future procurement funding is about \$4.7 billion. Table 1 shows the development and projected procurement costs for the nine weapons.

---

<sup>3</sup>Defense for a New Era, Lessons of the Persian Gulf War, House Committee on Armed Services (1992).

<sup>4</sup>Inventory quantities and costs are defined as what was on contract through fiscal year 1998, not necessarily what was on-hand at the end of the fiscal year. For some older Army munitions, inventory was based on on-hand data because original procurement data was unavailable.

**Table 1: Antiarmor Development Weapons**

Then-year dollars in millions

	Total development cost	Development cost to complete	Estimated procurement cost
Brilliant antiarmor submunition <sup>a</sup>	\$1,020	\$ 34	\$1,864
Improved brilliant antiarmor submunition <sup>a</sup>	334	206	Undetermined
Line-of-sight antitank	387	220	Undetermined
Multipurpose individual munition	61	42	Undetermined
Improved sense and destroy armor	988	36	Undetermined
Guided multiple launch rocket system	96	78	Undetermined
Tank round M829E3	255	193	Undetermined
Joint stand-off weapon BLU-108	245	47	2,369
Predator	139	25	492
<b>Total</b>	<b>\$3,525</b>	<b>\$881</b>	<b>\$4,725</b>

<sup>a</sup>Does not include the cost to develop and procure the Army Tactical Missile System (ATACMS) needed to deliver the submunition to the target area.

Source: President's Fiscal Year 1999 Budget.

In addition, the Army has spent almost \$178 million to develop the Enhanced Fiber Optics Guided Missile antiarmor weapon. The future of this weapon is uncertain. No funding was requested in the President's Fiscal Year 2000 Budget, and procurement funds for fiscal years 1998 and 1999 were rescinded and eliminated. Table 2 shows the projected yearly procurement funding requests through fiscal year 2003 for the 10 weapons in production and the 3 nearing production.

**Table 2: Antiarmor Procurement Funding Requests**

Then-year dollars in millions

Weapons	Fiscal year						To complete
	1998	1999	2000	2001	2002	2003	
In production	\$784	\$964	\$1,154	\$1,087	\$1,121	\$814	\$1,975
Nearing production		122	267	478	448	480	2,930
<b>Total</b>	<b>\$784</b>	<b>\$1,086</b>	<b>\$1,421</b>	<b>\$1,565</b>	<b>\$1,569</b>	<b>\$1,294</b>	<b>\$4,905</b>

Source: President's Fiscal Year 1999 Budget.

---

Procurement funding for antiarmor weapons fell steadily between 1986 and 1996. According to the Institute for Defense Analysis, antiarmor funding fell from \$2.5 billion in 1986 to \$770 million in 1996.<sup>5</sup> However, future funding demands for the 10 weapons in production and the 3 in development show a reverse in this trend. Fiscal year 1999 was the first year to exceed \$1 billion in antiarmor funding since fiscal year 1994. Funding for these weapons is expected to increase each year through fiscal year 2002.

---

## Conclusions

DOD has maintained the overall size of its antiarmor weapon inventory at the same level as in 1990 while significantly increasing its effectiveness. The lethality and accuracy of the weapons in the current inventory are superior to those available in 1990. At the same time, however, the threat of a massive heavily armored attack by potential enemies has greatly diminished, and war-fighting strategies have been modified to reflect global changes in threats and priorities. Nevertheless, DOD plans to increase its procurement of antiarmor weapons. Plans to acquire large quantities of new and improved antiarmor weapons do not appear consistent with the reduced size of the armored threat and the existing large and capable inventory of antiarmor weapons.

---

## Agency Comments and Our Evaluation

In commenting on a draft of this report, DOD partially concurred. DOD offered comments that were generally directed at explaining and justifying the findings of this report. For example, DOD noted that the report did not discuss or account for the fact that many of the antiarmor weapons quantities are leftover stockpile levels from the Cold War and the technology in those weapons did not provide the levels of precision, lethality, and survivability available today.

As discussed in our report, we plan to assess DOD's forthcoming antiarmor master plan. The plan is expected to provide an updated assessment of the current armored threat, current antiarmor capabilities, and antiarmor weapons requirements. We plan to assess the plan's findings and conclusions, its underlying data and analyses, and its key assumptions.

---

<sup>5</sup>Trends and Funding for Acquisition of Antiarmor Munitions, 1986-2001, Institute for Defense Analysis (Jan. 1997).

---

## Scope and Methodology

To determine the change in threat from 1990 to 1997, we compared the threat contained in the 1990 antiarmor master plan with the threat contained in the Defense Intelligence Agency's 1997 Outyear Threat Report. We discussed threat information with representatives from the Defense Intelligence Agency, Bolling Air Force Base, Maryland; the U.S. Central Command, MacDill Air Force Base, Florida; and the Commander of U.S. Forces Korea.

To determine the change in number and types of antiarmor weapons between 1990 and 1998, we compared the inventory contained in the 1990 antiarmor master plan with data the individual services provided on their 1998 antiarmor inventory. We discussed antiarmor weapon inventories with representatives from the Army's Deputy Chief of Staff for Operations and Plans, Washington, D.C.; the Army's Concepts Analysis Agency, Bethesda, Maryland; the Air Force's Director for Operational Requirements, Crystal City, Virginia; the Naval Air Systems Command, Patuxent River, Maryland; and the Marine Corps' Combat Development Command, Quantico, Virginia.

We identified past and future funding trends by obtaining data from the 1997 Institute for Defense Analysis report on Trends and Funding for Acquisition of Antiarmor Munitions, 1986-2001 and from fiscal year 1999 and 2000 budgetary documents.

We conducted our review from June 1998 to May 1999 in accordance with generally accepted government auditing standards.

---

We are sending copies of this report to the Honorable William S. Cohen, Secretary of Defense; the Honorable Louis Caldera, Secretary of the Army; the Honorable F. Whitten Peters, Acting Secretary of the Air Force; the Honorable Richard Danzig, Secretary of the Navy; General James L. Jones, Commandant of the Marine Corps; Jacob J. Lew, Director, Office of Management and Budget; and other interested parties. We will also make copies available to others upon request.

---

Please contact me at (202) 512-4841 or William Graveline at (256) 650-1400, if you or your staff have any questions concerning this report. The major contributors to this report are listed in appendix V.

Sincerely yours,

A handwritten signature in black ink that reads "James F. Wiggins". The signature is written in a cursive style with a large, looping initial "J".

James F. Wiggins  
Associate Director  
Defense Acquisitions Issues

---

# Contents

---

---

Letter	1
Appendix I U.S. Antiarmor Weapons	14
Appendix II Comparison of Antiarmor Weapons in Inventory, 1990-98	19
Appendix III Current Production Weapon Funding Requests	21
Appendix IV Comments From the Department of Defense	22
Appendix V Major Contributors to This Report	25
Tables	
Table 1: Antiarmor Development Weapons	8
Table 2: Antiarmor Procurement Funding Requests	8
Figures	
Figure 1: Comparison of Enemy Tanks and Armored Combat Vehicles, 1990 Soviet Union and 1997 Regional Conflict	4
Figure 2: Comparison of Antiarmor Munitions, 1990 and 1998	6

---

---

**Abbreviations**

ATACMS	Army Tactical Missile System
BAT	Brilliant Antiarmor Submunition
CEM	Combined Effects Munition
DOD	Department of Defense
HEAA	High Explosive Antiarmor
JSOW	Joint Stand-Off Weapon
LOSAT	Line-of-Sight Antitank
MLRS	Multiple Launch Rocket System
MOPMS	Modular Pack Mine System
MPIM	Multipurpose Individual Munition
SADARM	Sense and Destroy Armor
SFW	Sensor Fused Weapon
SLAP	Saboted Light Armor Penetrator
SMAW	Shoulder-launched Multipurpose Assault Weapon
TOW	Tube-launched, Optically Tracked, Wire Command-link Guided
WAM	Wide Area Munition
WCMD	Wind Corrected Munitions Dispenser

---

# U.S. Antiarmor Weapons

---

---

## Infantry/Helicopter Weapons

---

---

### Dragon

The Dragon completed production in 1980. It is a shoulder-fired, lightweight, short-range antitank guided missile that only needs one soldier to fire. The missile uses semiautomatic command line-of-sight guidance with an infrared tracker. The Dragon has limited antiarmor capability due to its 1,000-meter range and lack of fire-and-forget technology (allowing personnel to fire the weapon and take cover rather than remaining exposed while guiding the weapon to its target).

---

### Hellfire

The Hellfire air-to-ground missile is the primary antitank armament of the Army's Apache, Kiowa Warrior, and special operations helicopters; the Marine Corps' Super Cobra helicopter; and the Navy's Sea Hawk helicopter. The Hellfire uses semi-active laser terminal guidance. Beginning in 1990, the missile was reconfigured with an interim warhead to improve lethality against near-term threat reactive armor. Hellfire II includes improvements to defeat all known electro-optical countermeasures and advanced reactive armors.

---

### High Explosive Antiarmor

The High Explosive Antiarmor (HEAA) rocket is an antitank weapon designed to defeat targets at ranges up to 500 meters. It is effective against current tanks without additional armor. The rocket is launched from the shoulder-launched multipurpose assault weapon (SMAW). When the HEAA completed development in 1988, it transformed the SMAW into a multipurpose weapon suitable for close-in antiarmor urban fighting.

---

### Javelin

The Javelin is a portable antitank weapon used by the Army and the Marine Corps. The weapon weighs 48.5 pounds and has a maximum range of 2,500 meters. It provides high lethality against conventional and reactive armor and will replace the Dragon. The weapon has a high kill rate against all known armored threats at extended ranges under day/night, adverse weather, and battlefield obscurants. Its key feature is fire-and-forget technology. The Javelin is hardened against countermeasures and does not require extensive training for effective employment.



---

---

**Line-of-Sight Antitank**

The Line-of-Sight Antitank (LOSAT) weapon consists of a kinetic energy missile and launcher mounted on a High Mobility Multi-purpose Wheeled Vehicle (HMMWV). LOSAT is being developed as a mobile, direct fire, antitank weapon that provides lethality at long ranges.

---

**Longbow Hellfire**

The Longbow Hellfire air-to-ground missile is designed to defeat individual armored targets and enhance the survivability of the Longbow Apache Helicopter. Longbow uses radio frequency guidance. It can be used both day and night, in adverse weather, and with battlefield obscurants. Longbow Hellfire complements the semi-active Laser Hellfire II with fire-and-forget capability, maximizing the ability of the Apache.

---

**Predator Multipurpose Individual Munition**

Predator is designed to be a lightweight shoulder-fired weapon capable of defeating reactive armor. The weapon is designed with a modular warhead. The Marine Corps uses a warhead that can defeat tanks with reactive armor. The Army has modified the Predator with an alternative warhead, the Multipurpose Individual Munition (MPIM). The MPIM provides infantry with a fire-and-forget weapon capable of defeating enemy forces in buildings, bunkers, and lightly armored vehicles.

---

**Saboted Light Armor Penetrator**

Saboted Light Armor Penetrator (SLAP) is a 50-caliber ammunition effective against light armor with a maximum effective range of approximately 1,500 meters. It is a reduced caliber munition wrapped in plastic. The lighter weight allows the velocity to be significantly and safely increased in an unmodified machine gun.

---

**Tube-launched, Optically Tracked, Wire Command-link Guided**

The Tube-launched, Optically Tracked, Wire Command-link Guided (TOW) missile is an antitank weapon designed to fulfill the heavy assault requirement for close combat maneuver forces. The TOW can be fired from a ground tripod or from specifically adapted vehicles such as Bradleys and HMMWVs or from Cobra helicopters. The weapon includes a thermal sight for operations at night, in reduced visibility, and in countermeasures. Several upgraded variants of the missile are in inventory, including ones that can counter reactive armor. However, the TOW is not a fire-and-forget weapon.

---

---

## Indirect Fire Weapons

---

### Brilliant Antiarmor Submunition

The Brilliant Antiarmor Submunition (BAT) is a guided submunition that searches and destroys moving armored targets using acoustic and infrared seekers. The Army Tactical Missile System (ATACMS) Block II can carry the BAT to ranges beyond 100 kilometers. The preplanned product improvement (P3I) BAT uses millimeter wave, infrared, and acoustic seekers to also attack cold stationary or dug-in targets like Surface-to-Surface Missile Transporter-Erector Launchers and Heavy Multiple Rocket Launchers. The ATACMS Block IIA missile will carry the P3I BAT to ranges of 300 kilometers.

---

### Copperhead

The Copperhead is a laser-guided projectile fired from standard 155-millimeter howitzers. Its production was completed in the 1980s. The projectile's semi-active laser seeker searches for a target illuminated by a forward ground- or aircraft-based observer using a laser. The minimum range of the Copperhead is 3 kilometers and its maximum range is 15.5 kilometers. The warhead can penetrate every tank now in service. The Copperhead has been modified with a time-delay fuse, which permits the warhead to penetrate reactive armor without detonating it.

---

### Multiple Launch Rocket System

The Multiple Launch Rocket System (MLRS) has been in production since the 1980s. The MLRS basic rocket is a free-flight unguided tactical rocket with a warhead containing 644 Dual Purpose Improved Conventional Munition (DPICM) submunitions. The DPICM can penetrate light armor. The Extended Range MLRS (ER-MLRS) began production in fiscal year 1996. The new rocket added enhanced capability through improvements in range, accuracy, effectiveness, and maneuver force safety. The extended range rocket has a range of 45 kilometers and contains 518 DPICM submunitions. Starting in fiscal year 2002, the guided MLRS will integrate a guidance control package into the ER-MLRS resulting in reduced mission time and increased survivability.

---

---

## Sense and Destroy Armor

The Sense and Destroy Armor (SADARM) is a fire-and-forget sensor-fused submunition delivered by 155-millimeter artillery projectiles or by the MLRS. It is designed to detect and destroy light armored vehicles, primarily self-propelled artillery. Once dispensed over the target area, it detects individual targets using millimeter wave and infrared sensors and fires an explosively formed penetrator through the top of the target. The 155-millimeter projectile carries two SADARMS per round and has a range of 22.5 kilometers. The MLRS carries six SADARMS per rocket and has a range of 30 kilometers. According to the Department of Defense (DOD), the Army's MLRS-delivered SADARM program is currently not funded.

---

## Fixed-Wing Weapons

---

### Combined Effects Munition

The Combined Effects Munition (CEM) is a multipurpose cluster bomb for ground support and is used against light armor, personnel, and artillery. The CEM weighs approximately 950 pounds and dispenses 202 bomb units. The CEM entered production in 1985. Because of its inaccuracy when dropped from higher altitudes, the Air Force is fitting CEM with a wind corrected munitions dispenser (WCMD) kit. The kit will provide inertial navigation to correct for the effects of the wind.

---

### Joint Stand-Off Weapon

The Joint Stand-Off Weapon (JSOW) is a Navy-led joint program with the Air Force. JSOW is an air-to-ground weapon capable of attacking a variety of targets from outside enemy point defenses during day/night and adverse weather conditions. There are currently three configurations of the JSOW: JSOW baseline for soft and area targets, JSOW BLU-108 for massed land combat vehicles, and JSOW Unitary for harder/point targets and increased kill effectiveness.

---

### Maverick

The Maverick is a rocket propelled, air-to-surface, precision guided tactical missile with fire-and-forget capability designed for use against tanks and a variety of hardened targets. The pilot has to visually acquire a target. When the missile is engaged, a video picture instantly appears on the cockpit display. The pilot then lines up the target with the gunsight. When the missile is released, it finds the target automatically.

---

## Rockeye

The Rockeye is an air-launched dispenser weapon. It is one of the older, best known, and most widely used dispensers. The bomblet is designed primarily as an antiarmor weapon for use against tanks, armored carriers, and gun emplacements. The Rockeye II carries 247 dual-purpose antiarmor bomblets and has a nose-mounted fuse to control the opening of the dispenser at predetermined altitudes.

---

## Sensor Fused Weapon

The Sensor Fused Weapon (SFW) is a cluster weapon designed for use against land combat vehicles. It consists of a tactical weapon dispenser containing 10 submunitions. Each submunition contains four warheads. The warheads are released in a horizontal trajectory and are activated through a small infrared sensor contained in the warhead. This weapon provides multiple kills per pass capability. The Air Force is fitting SFW with the WCMD kit, which will provide inertial navigation to correct for the effects of the wind.

---

## Tank Rounds

The 120-millimeter tank round is fired from the M1A1 and M1A2 tanks. There are four basic cartridge types: (1) Kinetic Energy; (2) Armor Piercing, Fin Stabilized, and Discarding Sabot-Tracer; (3) Chemical Energy High Explosive; and (4) training rounds for each of the tactical cartridges. The Armaments Enhancement Initiative program provides upgrades to the 120-millimeter round capability to defeat Soviet-built armored vehicles of the 1990s and later.

---

## Antiarmor Mines

Antiarmor mines in inventory include several non-self-destructing and self-destructing mines. The inventory includes the M15, M19, and M21 non-self-destructing mine and a family of mixed munitions that includes the Modular Pack Mine System (MOPMS), Volcano, and Gator. MOPMS contains 21 individual antitank and antipersonnel mines. It is used as a protective minefield, for obstacle enhancement, or to close gaps in other larger minefields. Volcano contains six antitank mines and is designed for quick emplacement. The Gator system has a total of 94 mines (72 antitank and 22 antipersonnel) and was developed to place mine fields on the ground using high-speed tactical aircraft. DOD has one mine in production, the Wide Area Munition (WAM). The WAM is a first-generation smart weapon. It recognizes armor and autonomously aims and launches its submunition against the target. It offers increased performance and lethality over current mines in inventory.

---

# Comparison of Antiarmor Weapons in Inventory, 1990-98

---

The 1990 antiarmor master plan contained a total of 34 antiarmor weapons in inventory or procurement. Comparisons of the weapons by category shows that more sophisticated lethal weapons have been added since then.<sup>1</sup>

In the infantry/helicopter weapon category, the 1998 inventory stood at 97 percent of the 1990 inventory. The 1990 inventory contained five weapons: the Dragon, the Light Assault Weapon, the Lightweight Multipurpose Weapon (AT-4), the TOW missile, and the Hellfire. The 1998 inventory included these five weapons and three additional ones with improved capabilities: the shoulder-fired Javelin, the Hellfire II missile, and the Longbow Hellfire missile.

In the infantry/helicopter category, the inventory quantities of shoulder-fired weapons were 95 percent of 1990 levels. The 1998 inventory included the Javelin, which provides fire-and-forget technology and enhanced lethality over the Dragon. The 1998 inventory of TOW missiles was about 81 percent of the 1990 inventory. Although the number of TOW missiles has declined, the 1998 inventory contained more modern variants, which provide more lethality and longer range. The 1998 inventory of helicopter air-to-ground missiles was well above its 1990 level and included over 20,000 Hellfire II and Longbow Hellfire missiles, which provide improved lethality and survivability over the basic Hellfire missile.

The 1998 inventory for the indirect fire support weapons category was 128 percent of the 1990 inventory. This category is composed of artillery shells and rockets. The biggest contributors to the larger 1998 inventory were the increased numbers of the MLRS rocket and the inclusion of some recently produced SADARM submunitions. The SADARM was developed to improve the ability of the artillery projectile to accurately locate targets.

The 1998 inventory in the fixed-wing category of antiarmor weapons was 119 percent of the 1990 inventory. The fixed-wing 1990 inventory contained the Maverick air-to-ground missile and the Rockeye and CEM cluster weapons. In the 1998 inventory, the Maverick was 104 percent, the Rockeye 107 percent, and the CEM 164 percent of the 1990 inventory. The 1998 inventory included two additional antiarmor area weapons capable of

---

<sup>1</sup>We did not include four weapons (25-millimeter and 30-millimeter munitions) in the comparison because their quantities were extremely large compared with the other weapons in the same categories.

---

**Appendix II  
Comparison of Antiarmor Weapons in  
Inventory, 1990-98**

---

killing multiple armored targets: the JSOW air-to-ground missile and the SFW.

In the tank rounds category, the 1998 inventory stood at 68 percent of the 1990 inventory. This category contained 105-millimeter and 120-millimeter tank rounds. While the 1998 inventory of tank rounds was significantly smaller than the total 1990 inventory, most of the rounds in 1990 were 105-millimeter M60 or M61 tank rounds. However, the main battle tank currently in use is the M-1 Abrams, which uses the 120-millimeter round shell. A comparison of the 120-millimeter inventory shows that the 1998 inventory was 425 percent of the 1990 inventory. The 120-millimeter tank rounds have increased lethality against modern armored weapons. Some of the newer kinetic energy rounds were designed to defeat the newer Soviet-built tanks.

In the mines inventory category, the 1998 inventory was 80 percent of the 1990 inventory. The 1998 inventory contained two newer mines, the Volcano and the WAM. Both provide increased performance and lethality over the mines contained in the 1990 inventory.

# Current Production Weapon Funding Requests

Then-year dollars in millions

Weapon	Service	Total quantity to be procured	Total cost	Cost through fiscal year 1998	Cost fiscal year 1999 to completion
WCMD on CEM	Air Force	30,000	\$500	\$112	\$388
WCMD on Gator	Air Force	5,000	82	19	63
Javelin	Army	24,403	3,012	945	2,067
Javelin	Marine Corps	2,553	287	96	191
Longbow Hellfire	Army	12,905	2,092	704	1,388
MLRS-extended range	Army	6,102	245	109	136
SADARM	Army	50,000	1,978	235	1,743
SFW	Air Force	5,000	2,066	912	1,154
Tank round M829A2	Army	144,000	614	470	144
WAM	Army	3,165	214	40	174
<b>Total</b>			<b>\$11,090</b>	<b>\$3,642</b>	<b>\$7,448</b>

Source: Service budgetary data.

# Comments From the Department of Defense



OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON  
WASHINGTON DC 20301-3000

23 JUN 1999

Mr. James F. Wiggins  
Associate Director  
Defense Acquisition Issues  
National Security and International Affairs Division  
U.S. General Accounting Office  
Washington, D.C. 20548

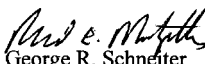
Dear Mr. Wiggins:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "(U) Defense Acquisitions: Reduced Threat Not Reflected in Antiarmor Weapons Acquisition," dated April 7, 1999 (GAO Code 707356/OSD Case 1786-X)."

The DoD partially concurs with the draft report. General comments are attached, and suggested technical changes for clarification and accuracy have been provided separately.

The Department appreciates the opportunity to comment on the draft report.

Sincerely,

*For*   
George R. Schneider  
Director  
Strategic and Tactical Systems

Attachment





GENERAL COMMENTS

The GAO report compares raw numbers of anti-armor weapons in pre- and post-cold war environments. However, the report does not discuss or account for the fact that many of those munitions quantities are leftover stockpile levels from the cold war. For example, the Army has a requirement for TOW missiles of approximately 62,000. Currently, there are over 110,000 TOW missiles. Of these, only 32,000 are of the TOW 2B configuration which are very capable of defeating the most modern threat tanks.

Also, during the cold war, the Army was a threat-based force designed to maintain a rough parity with the significant threat forces in existence at that time. Technology during the cold war did not provide the levels of precision, lethality, and survivability available today. U.S. casualties in a conventional war against threat forces were expected to be very high. By contrast, the Army of today is a capabilities-based force that is expected to achieve lethality and survivability overmatch against potential threat forces. This requires a significant amount of more-precise weapons throughout Army forces to keep casualties low while achieving relatively quick victories. Technology will help make this possible by adding capabilities like fire-and-forget, extended range, strategically deployable and tactically mobile systems, greater munitions lethality, and kinetic energy missiles.

The subject report notes that the armored threat is substantially reduced compared to the cold war time period. The report states that the DoD inventory of anti-armor munitions has physically increased since 1990. However, this inventory is inclusive of older munitions that are being phased out of service due to either shelf life or tactical obsolescence. This aging drives the development of follow-on systems to replace those that will no longer meet minimum shelf-life requirements. Additionally, while threat forces are not building new armored vehicles in significant numbers, the development and proliferation of relatively inexpensive Active Protection Systems and Explosive Reactive Armors that can be applied onto current vehicles require an appropriate level of weapons modernization.

The GAO report compares numbers of threat platforms against required munitions quantities. While this number comparison is certainly a factor to be considered, it should not be used as the sole determinant for the requirements for specific munitions capabilities or quantities.

- (a) Shelf Life. As a weapon ages, various mechanical and chemical components reach a point where the risk to the warfighter employing the weapon outweighs the benefits of potential target effects. Whenever fiscally prudent, programs are initiated to repair and maintain older weapons, given that the risk to the warfighter employing the weapon will be substantially reduced.
- (b) Tactical Obsolescence. Many of the anti-armor weapons procured by the DoD from 1970 to 1990 do not have sufficient technology incorporated to defeat current and future threat systems. Additionally, weapon designs during that time

---

**Appendix IV**  
**Comments From the Department of Defense**

---

period did not allow for the increased survivability for the warfighter that current and future weapons would provide. Given today's political climate and military commanders' desires, minimal losses of U.S. military personnel involved in a military action can be catastrophic to the strategic position of the United States and its Allies.

Continued procurement of current anti-armor munitions and future acquisition programs for modernized anti-armor munitions allow the DoD to increase not only the lethality of the existing inventory, but also increase the survivability of the warfighters. Weapons that are currently being procured have enhanced accuracy as compared to older DoD antiarmor munitions. Future weapons will be even more precise, which will also give the warfighter the ability to predict and control the amount of collateral damage to non-military structures and personnel in the vicinity of the intended target. Additionally, most current weapons require support from the warfighter after launch. An example is laser-guided bombs. Although the weapon is precise within relatively close proximity to the target, the aircrew that is designating the target is required to stay in the vicinity of the target until the bomb impacts, due to the fact that the aircrew must maintain laser energy on the target in order for the bomb to guide successfully. By maintaining close proximity to the target, the aircrew is increasingly susceptible to threat ground- and air-based counter fires. Future weapon designs are incorporating technologies that either allow the aircrew to support the weapon from a greater distance, or require no support by the warfighter after launch.

# Major Contributors to This Report

---

**National Security and  
International Affairs  
Division, Washington,  
D.C.**

William Gillies  
Roy Karadbil

---

**Atlanta Field Office**

Laura Durland  
Beverly Breen

---

## **Ordering Information**

**The first copy of each GAO report and testimony is free. Additional copies are \$2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary, VISA and MasterCard credit cards are accepted, also.**

**Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.**

### **Orders by mail:**

**U.S. General Accounting Office  
P.O. Box 37050  
Washington, DC 20013**

### **or visit:**

**Room 1100  
700 4th St. NW (corner of 4th and G Sts. NW)  
U.S. General Accounting Office  
Washington, DC**

**Orders may also be placed by calling (202) 512-6000  
or by using fax number (202) 512-6061, or TDD (202) 512-2537.**

**Each day, GAO issues a list of newly available reports and testimony. To receive facsimile copies of the daily list or any list from the past 30 days, please call (202) 512-6000 using a touchtone phone. A recorded menu will provide information on how to obtain these lists.**

**For information on how to access GAO reports on the INTERNET, send an e-mail message with "info" in the body to:**

**[info@www.gao.gov](mailto:info@www.gao.gov)**

**or visit GAO's World Wide Web Home Page at:**

**<http://www.gao.gov>**

---

**United States  
General Accounting Office  
Washington, D.C. 20548-0001**

**Official Business  
Penalty for Private Use \$300**

**Address Correction Requested**

---

**Bulk Rate  
Postage & Fees Paid  
GAO  
Permit No. GI00**

