

# ARCHIVED REPORT

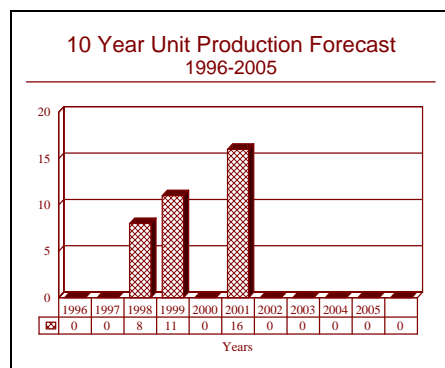
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## Anti-Helicopter Mine - Archived 12/97

### Outlook

- Production of this munition forecast to be limited to developmental test munitions to prove concept
- Program will be brought to production status then allowed to go dormant



### Orientation

**Description.** A smart mine.

**Sponsor.** The development of the Anti-Helicopter Mine has been sponsored by the Balanced Technology Initiative office of the United States Department of Defense, the Defense Advanced Research Projects Agency and the United States Army Armament Research, Development and Engineering Center, Project Manager for Mines and Demolitions located at Picatinny Arsenal, Dover, New Jersey.

**Contractors.** This munition is being competitively developed under a proof of principle program; one competitor is the team of Alliant Techsystems, Edina, Minnesota, United States of America and Ferranti International, Ferranti Instrumentation Limited, Manchester, England, United Kingdom. The other competitor is Textron Systems, Wilmington Massachusetts, United States of America. No subcontractors have yet been determined.

**Licensees.** None

**Status.** The Anti-Helicopter Mine is in the competitive proof of principle phase; demonstrations of the concept have been made at Sandia National Laboratory. Since 1993, the developmental program has slowed.

**Total Produced.** As of January 1, 1996, no definitive prototypes of the Anti-Helicopter Mine had been fabricated. Approximately 21 competitive pre-prototype Anti-Helicopter Mines have been fabricated; some of these have been evaluated under the proof of principle portion of the development program.

**Application.** To detect and destroy hostile helicopters, including armored helicopters. In addition, the mere sowing of the Anti-Helicopter Mine will force hostile helicopters to fly higher, thus making them easier to detect and exposing themselves to other ground and aerial defenses.

**Price Range.** The unit price of a serially produced Wide Area Mine is estimated at \$44,650 in Fiscal 1996 dollars.

### Technical Data

The precise technical data related to the various Anti-Helicopter Mine programs are sensitive and still fluid. It is known that the Anti-Helicopter mine will probably be light enough to be transported by one man in addition to his normal combat gear. All the contenders probably use

an advanced acoustic sensor combined with some sort of data processing equipment for the detection process. In addition, some method of passive identification friend or foe component is also required. The coverage in terms of

sensor range is presently classified but is believed to be 360 degrees.

**Propulsion.** In the Textron Defense Systems proposal, the lethal mechanism is ejected and propelled toward the target by means of an as yet unknown solid propellant.

The method of propelling the lethal mechanism by the other contender is unknown at this time.

**Warhead.** The warhead used in both the Alliant/ Ferranti candidate and the Textron Defense Systems candidate for the Anti-Helicopter Mine is an advanced form of multiple flat cone-shaped charge technology.

## Variants/Upgrades

Due to the status of the program, not applicable at this time. If this weapon is ever placed into production, it can be expected that various product improvements will be incorporated as production cut-ins. It should be noted that the Anti-Helicopter Mine is derived from several areas of

military technology that are already being fielded; the Textron contender is heavily based on the technology developed by that firm under the Sensor Fuzed Weapon program.

## Program Review

**Background.** By the early eighties, the military anti-tank and assault helicopter had come of age, having more than proven itself in numerous conflicts around the world. By the mid-eighties, the first truly effective generation of military helicopters, as exemplified by the AH-1, was being succeeded by the next greatly enhanced generation such as the Mi-24 and AH-64. By the late eighties, anti-tank and assault helicopters were becoming increasingly widespread throughout the world. Aside from the development of helicopters designed to do combat with other helicopters using missiles such as the air-to-air Stinger, the problem of how to deal with modern attack helicopters is very difficult to solve. This is especially true when the helicopter employs nap of the earth flying techniques. In addition to making detection all the more difficult, nap of the earth flying greatly reduces the engagement time; in fact, many anti-aircraft systems are left impotent when faced with a high performance helicopter flying nap of the earth profiles.

Faced with this dilemma, in 1987, the United States Department of Defense began examining the possible ways that new defenses against helicopters could be developed. From the onset, the Defense Advanced Research Projects Agency was involved with this effort. In addition, the Balanced Technology Initiative Office has been involved; the overall program is under the United States Army Armament Research, Development and Engineering Center located at Picatinny Arsenal, Dover, New Jersey.

**Program Development.** By early 1988, the concept of some novel non-airborne defense against helicopters had been sufficiently formulated for the Armament Research, Development and Engineering Center to issue contracts for an initial concept definition study to seven firms. These firms were Ferranti Instrumentation, General Dynamics, General Motors/Hughes Aircraft, Alliant Techsystems (then Honeywell Defense Systems), Lockheed, Texas

Instruments and the then Textron Defense Systems. Following this phase, the Army issued an advanced sources sought notice for the development of a "mine-like system" that would be capable of destroying helicopters flying nap of the earth profiles. The solicitation was issued on December 15, 1988, and by the closing date, the seven above-mentioned firms had responded. In July of 1989, the down selection process was held and three contracts for the proof of principle phase of development were awarded. Texas Instruments was awarded a \$16,202,030 contract while Textron Defense Systems was awarded \$8,362,486; Ferranti received approximately \$9.3 million. The contracts ran to September 1, 1993, in two phases. The first phase covered the development and fabrication of components to prove the technologies involved. The second phase had each contractor fabricate at least three form, fit and function prototypes for testing and demonstration of effectiveness. In late 1991, a further downselection was made with the Alliant/Ferranti team and Textron Defense Systems each awarded \$12.5 million proof of principle contracts covering 24 months.

**Anti-Helicopter Mine Concept.** While the basic concept of the Anti-Helicopter Mine program is to detect and destroy hostile helicopters flying nap of the earth profiles, the new mine will also have a secondary benefit. Just the threat of having mines of this type sown in areas of low level helicopter operations is expected to force these helicopters to fly higher. While this may well put the helicopters out of the detection/destruction range of the mine, it would also make the helicopter easier to detect by radar and expose the helicopter to other more effective air defense weapons.

**Anti-Helicopter Mine Deployment.** The Anti-Helicopter Mine is to be hand emplaced, and also deployed by the new M139 Volcano air or ground based multiple mine delivery system. Additional delivery systems which may

be integrated with the Anti-Helicopter Mine are the M270 227 millimeter Multiple Launch Rocket System and the new MGM-140 Army Tactical Missile System.

Anti-Helicopter Mine Description. While each of the contractors' exact systems are sensitive, some details are generally known that are applicable to all systems. There

is an overall effort to develop an identification system based on the unique acoustic signatures of the various helicopter types. In any event, some sort of passive identification system will be incorporated by all the contenders. Also, a method to render the mine safe so friendly forces can pass is expected to be incorporated in each design.

## Funding

The developmental funding of the Anti-Helicopter Mine is provided by the Balanced Technology Initiative office of the United States Department of Defense, the Defense Advanced Research Projects Agency and the United States Army Armament Research, Development and Engineering Center.

	FY91		US FUNDING FY92		FY93		FY94	
	QTY	AMT	QTY	AMT	QTY	AMT	QTY	AMT
<u>Research and Development</u>								
PE#0603606A(a)								
Project D006(b)	-	3.4	-	0.2	-	2.6	-	2.3
	FY95		FY96		FY97		FY98	
	QTY	AMT	QTY	AMT	QTY	AMT	QTY	AMT
<u>Research and Development</u>								
PE#0603004A(c)								
Project DL95(d)	-	3.0	-	2.9	-	2.2	-	TBD

All dollar amounts are in millions.

(a) Program Element 0603606A - Landmine Warfare and Barrier Advanced Development.

(b) Project D006 - Landmine warfare development; the Fiscal 1990 funding was \$1.8 million. After Fiscal 1994, this developmental effort was transferred to Program Element 0603004A - Weapons and Munitions Advanced Technology, Project DL95.

(c) Program Element 0603004A - Weapons and Munitions Advanced Technology.

(b) Project DL95 - Landmine warfare development; this project supports a variety of developmental landmine technologies.

## Recent Contracts

In July of 1989, three contracts for the proof of principle phase of development were awarded. Texas Instruments was awarded a \$16,202,030 contract, Textron Defense Systems was awarded \$8,362,486, and Ferranti received approximately \$9.3 million.

In late 1991, Alliant/Ferranti and Textron Defense were each awarded 12.5 million contracts for the Anti-Helicopter Mine proof of principle program. The development contract ran 24 months.

## Timetable

This timetable is for the Anti-Helicopter program only and does not relate to the XM93 Wide Area Mine or any other mine or submunition program.

	1987	Concept formulated
Feb	1988	Concept study contracts issued to seven firms
Dec	1988	Source solicitation document issued
Jul	1989	Down selection process made; three proof of principle contracts awarded
Late	1991	Downselection to two contractors made
Late	1996	Development of basic technology related to anti-helicopter mine ongoing at a slower pace

## Worldwide Distribution

**Export Potential.** Due to the sensitive nature of the technology involved, we expect no export until well after the new munition is fielded (if ever).

**Country.** **United States of America** (pre-prototypes only)

## Forecast Rationale

As of late 1996, the development of the technology related to the Anti-Helicopter Mine has slowed to the point that more than one source contacted in relation to this research stated that the program was dead. In point of fact, our research indicates that the development of the technology still continues, albeit at a snail's pace. Our research indicates that the main reason for the dramatic slowdown in this development program is the major changes in the threat. When conceived, the Anti-Helicopter Mine's sensor suite was directed to the (then) Soviet helicopter technology. In the revised threat of the nineties and beyond, the United States of America can expect to be confronted with helicopters of British, French, German, Italian and even American origin. Therefore, the Anti-Helicopter Mine as it was originally developed, is no longer a realistic munition.

Many observers still feel that the need for a munition of this type is clear as an ever increasing number of heli-

copters are fielded around the world. However, the realities of the mid-nineties and beyond do not portend well for this program — the money simply is not there. Therefore, we are now forecasting that the development of the Anti-Helicopter Mine program will be continued, albeit at a low rate, in order to prove the concept and avoid technological surprise. The best evidence indicates that the program will be brought to production status then allowed to go dormant. However, we must hold out the caveat that the helicopter threat may be deemed sufficient to allocate more funding for this program including for its procurement. Due to this, we will continue to monitor this program and update this report on an interim basis if warranted.

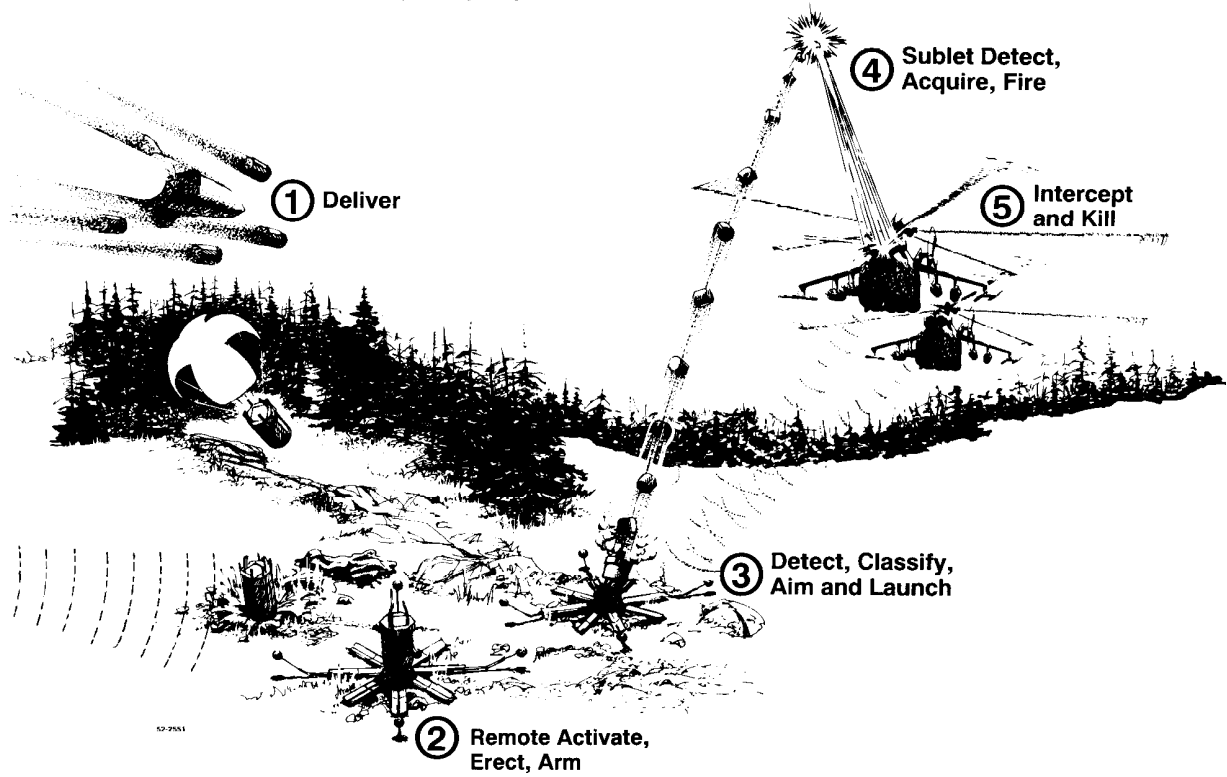
The numbers in the forecast chart below are for the developmental prototypes and operational test munitions of the winning design.

## Ten-Year Outlook

Munition	through 95	ESTIMATED CALENDAR YEAR PRODUCTION										Total 96-05
		High Confidence Level			Good Confidence Level			Speculative				
		96	97	98	99	00	01	02	03	04	05	
NOT SELECTED												
ANTI-HELICOPTER MINE (a)		0	0	8	11	0	16	0	0	0	0	35
Total Production		0	0	8	11	0	16	0	0	0	0	35

(a) All forecast production is for the developmental, contractor and operational test munitions of the winning design

# AHM Is Easily Deployed – Provides Persistent Threat



## ANTI-HELICOPTER MINE

Source: Textron Defense Systems