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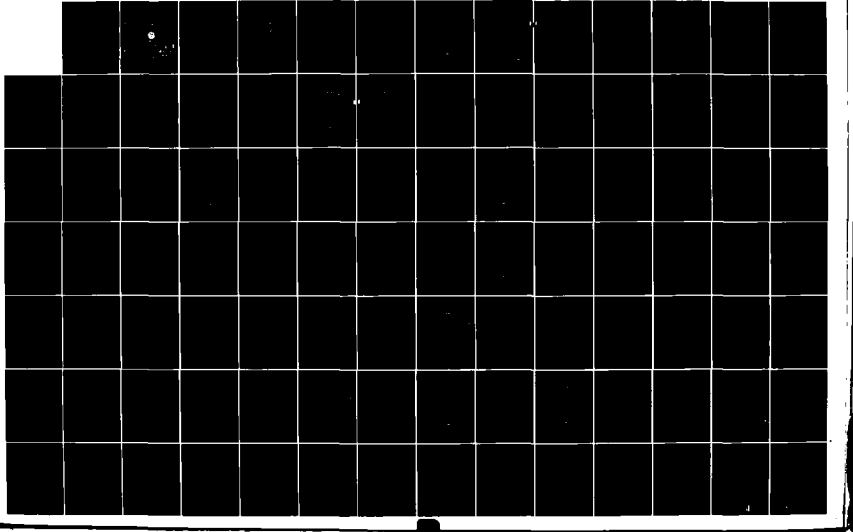

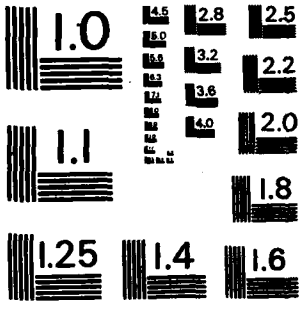

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VOLUME II

Supporting Data FY 1984
Budget Estimate

Submitted to CONGRESS — February 1983

Descriptive Summaries Of The

RESEARCH DEVELOPMENT TEST & EVALUATION
Army Appropriation FY 1984

"READINESS THROUGH MODERNIZATION"

DEPARTMENT OF THE ARMY DEPUTY CHIEF OF STAFF
FOR RESEARCH DEVELOPMENT AND ACQUISITION
RDTE PROGRAMS AND BUDGET DIVISION

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SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

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VOLUME II

DESCRIPTIVE SUMMARIES FOR PROGRAM ELEMENTS OF THE RESEARCH, DEVELOPMENT, TEST AND EVALUATION, ARMY PROGRAM FY 1984 (U) FEBRUARY 1983

This page contains no classified information.

Department of the Army
Deputy Chief of Staff for Research, Development, and Acquisition

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PROGRAM ELEMENT DESCRIPTIVE SUMMARIES
INTRODUCTION AND EXPLANATION OF CONTENTS

1. **General.** This section has been prepared for the purpose of providing information concerning the US Army Research, Development, Test and Evaluation Program. The Descriptive Summaries provide narrative information on all RDTE program elements and projects. A Test and Evaluation Section is provided for all major weapon systems (identified by asterisks in the Table of Contents). This information supplements the testimony given by US Army witnesses.

2. **Comparison of FY 1982 and 1983 Data.** A direct comparison of FY 1982 and 1983 data in the Program Element Descriptive Summaries dated February 1982 will reveal some differences. Specific explanations are set forth in the appropriate descriptive summaries, however most of the differences are attributable to the following factors:

a. FY 1983 reductions as a result of Congressional action on the appropriation.

b. FY 1982 funding changes subsequent to October 1, 1981, including RDTE Reprograming Actions.

c. Restructure of FY 1982 and FY 1983 data to bring it into alignment with the program structure for FY 1984.

3. **Relationship of FY 1984 Budget Structure to the FY 1983 Budget Approved by Congress.** This paragraph provides a list of program elements which were not contained in the FY 1983 RDTE budget approved by Congress.

Program Element		Remarks
Budget Activity 1. Technology Base		
62728A	Exploratory Application of High Technology	New program to develop technologies to improve capabilities of the light forces in the 1990s and beyond.
Budget Activity 2. Advanced Technology Development		
63220A	Advanced Rotorcraft Technology Integration (ARTI)	New program to demonstrate maturing rotorcraft technology prior to engineering development.
63314A	High Energy Laser Components	New program to develop laser weapon technology.

Program Element (Continued)		Remarks
63637A	Advanced Propellant/Launch System Munitions	New program to develop advanced liquid propellant technology demonstrators.
63756A	Advanced Software Technology	New program to develop embedded computer software.
63758A	Artificial Intelligence/Robotics Demonstration	New program to exploit advantages offered by Artificial Intelligence and Robotics technologies.
Budget Activity 3. Strategic Programs		
33152A	WWMCCS Information System	New joint program for WWMCCS ADP systems redesign and replacement.
Budget Activity 4. Tactical Programs		
23741A	Product Improved Vulcan Air Defense System	Restart of product improvement program last funded in FY 1981.
23744A	Aircraft Modifications	New program to provide for preplanned product improvement of existing helicopters.
63316A	Advanced Rocket Control System	New program, content is SECRET "Limited Distribution — Special Access Required."
63741A	Meteorological Equipment Development	New program for Advanced Development of global positioning system and remote sensor for tactical weapon systems.
63767A	Combat Service Support Control System	New program to develop capacity to process and analyze data in support of administrative and logistics support functions and to share this data with other control systems.
64604A	Mobility	New program to develop a replacement medium truck.
64722A	Education and Training Systems	New program to develop demonstrations of prototype training methods and devices.

4. Classification. Classified information is identified by use of brackets [ ]. The abbreviation OADR used in the classification block throughout this document means Originating Agency Determination Required.

5. **Economies, Efficiencies and Management Improvements.**

a. Value engineering projects resulted in avoidance savings of $12.8 million which demonstrate how much higher the Army's budget plan would have been without this economies, efficiencies and management improvement action.

b. Fast payback capital tools and equipment purchased under the productivity capital investment program resulted in avoidance savings of $12.3 million which demonstrate how much higher the Army's budget plan would have been without this economies, efficiencies and management improvement action.

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#6 — DEFENSEWIDE MISSION SUPPORT

SECTION 2

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63706A

Title: Identification Friend or Foe (IFF) Equipment Developments

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	8069	6129	8281	14109	Continuing	Not Applicable
D243	IFF Developments	4985	3151	3363	3340	Continuing	Not Applicable
D297	IFF NATO	3084	2978	4918	10769	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The ability to detect and engage targets has advanced faster than the ability to positively identify them with the likely result that either weapons will not be used at their maximum range, or high levels of fratricide will occur. This program is directed toward the development of techniques and equipment to identify aircraft and ground combat vehicles with high reliability. Programs include (1) improvement of current Mark XII air defense IFF interrogators and transponders, (2) development of noncooperative IFF signal processors for major Army air defense system (Hawk, Patriot) and combat surveillance systems (Joint STARS, STARTLE), and (3) development of a new, cooperative IFF system in coordination with NATO, for both air defense and battlefield applications, called the NATO Identification System (NIS). The air defense portion of NIS is referred to as Mark XV, while the ground combat portion is termed Battlefield IFF (BIFF). NIS hardware will be fabricated by US firms, but the hardware will be compatible with NATO systems.

C. (U) COMPARISON WITH FY 1993 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1992	FY 1993	FY 1994	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	8069	6129	8281	Continuing	Not Applicable
Funds (as shown in FY 1993 submission)	9469	6146	11020	Continuing	Not Applicable

Program Element: #63706A

Title: Identification Friend or Foe (IFF) Equipment Developments

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

Decrease in FY 1982 funds is a result of delay in NATO IFF development and reallocation of funds for higher priority projects. The funding decrease of $17 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The reduction of funding in FY 1984 is due to a delay in execution of Advance Development resulting in smaller funding requirements in that fiscal year.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The efforts of this program are planned and accomplished in close coordination with the work under Program Element #63725F (Combat Identification Technology); #63515N (Advanced Identification Techniques); #63267N (NATO Identification System); and #64725F (Combat Identification Systems). The Air Force is the lead service in this tri-Service effort. Programs are coordinated by the Air Force Systems Program Office (SPO) under the Tri-Service Charter. This coordination effort is designed to avoid possible duplication of effort. The Mission Element Need Statement (MENS) was approved in October 1980. A Trilateral Memorandum of Understanding to exchange technical information on the design and development of the NATO Identification System (NIS) was signed in May 1980 with the United Kingdom and the Federal Republic of Germany.

F. (U) WORK PERFORMED BY: Army IFF activities are managed by the Combat Surveillance and Target Acquisition Laboratory at Fort Monmouth, NJ, under the US Army Electronics Research and Development Command, Adelphi, MD. The MIT Lincoln Laboratory of Lexington, MA, the Georgia Institute of Technology and the Systems Planning Corporation, Arlington, VA, are providing technical expertise to the program. The noncooperative IFF work for Hawk is being performed by Scope Electronics of Reston, VA. Work on Mark XII improvements has been performed by Hazeltine Corporation of Greenlawn, NY. and Teledyne Electronics of Newbury Park, CA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D243 — IFF Developments:** Directed toward developing special signal processing techniques for noncooperative identification and improving present IFF capabilities, to enable better identification of hostiles and friends with malfunctioning transponders. Includes the development of improvements to the present Mark XII equipment to extend the useful system life until a new family of IFF equipment can be developed and fielded. In FY 1982, a contract was awarded for the design/fabrication and demonstration of a novel adaptive null steering antenna concept for aircraft transponders to increase antijamming (A-J) performance. The noncooperative IFF (NCIFF) processor for air defense was improved and field-tested with a Hawk system. Feasibility investigations of incorporating the techniques into the PATRIOT and SGT YORK were initiated, as well as investigations of performing noncooperative identification of combat vehicles. Automatic noncooperative identification feasibility using electro-optical devices was initiated. Rotor blade signature analyses were performed. The efforts will be continued in FY 1983, and additional initiatives will include: Expanding Aircraft

Program Element: #63709A

Title: Identification Friend or Foe (IFF) Equipment Developments

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

signature data base to include helicopters; development of signal processors for ground vehicle classification and identification; and awarding a contract to develop a processor for the noncooperative identification of aircraft with PATRIOT and SGT YORK. In FY 1984, IFF demonstration processors will be fabricated for Patriot and Sergeant York Air Defense Systems. Also, the development of signal processors for ground moving and stationary vehicle classification and identification will continue. Tests will be conducted with ground vehicle classification and identification processors with selected radars. Completion for the design, fabrication, and demonstration of the adaptive null steering antenna concept for aircraft transponders will be accomplished.

2. (U) D297 — IFF NATO: Existing methods of identification are inadequate based on the present postulated scenario in Central Europe. The effectiveness of command and control links (if not jammed) will be severely reduced by the intermingling of friendly and enemy forces, while the existing MARK XII air defense IFF system may suffer from electronic countermeasures. For ground targets, visual observation will not provide capabilities consistent with the ranges of modern target acquisition and weapon systems. A Joint Service IFF Program was established in 1979, with the primary objective being the timely definition and introduction of the NATO Identification System (NIS). This project is directed toward participating in this program to overcome identification shortfalls by conducting the necessary design and hardware efforts to determine the most cost-effective design and to obtain agreement with our NATO allies. In FY 1982, a request for proposal (RFP) was issued for advanced development Mark XV hardware, and proposal evaluation commenced. This was a tri-Service effort led by the Air Force. A Defense Systems Acquisition Review Council I (DSARC I) is planned for third quarter FY 1983 to decide whether a demonstration and validation (Advanced development) phase will be executed. Contract award by the Air Force for one or two demonstration and validation contracts is anticipated which will be partially funded from this project as the Army share. The Army will continue to support the Tri-Service Mark XV Demonstration and Validation phase for air defense applications and complete system definition for battlefield applications. In FY 1984 the fabrication of the Mark XV hardware will continue. Army funds will provide support to the tri-Service program. Fabrication of hardware accounts for the significant increase in FY 1984 funding.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63707A

Title: Communications Development

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7621	8696			Continuing	Not Applicable
D246	Tactical Communications Systems Development	4665	5797	1921	7673	Continuing	Not Applicable
D437	Advanced Communications Concept Development	2956	2899			Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Army needs tactical microwave radio relays to provide high reliability/availability under extremes of signal conditions (jamming and weather effects). Command posts need mobile millimeter wave radios for reduced visual/Radio Frequency (RF) signatures, less vulnerable to Electronic Countermeasures (ECM), Electromagnetic Pulse (EMP) and jamming, and reduction of frequency congestion. An alternative is needed to bulky, heavy, and costly metallic cable communication which is also vulnerable to EMP and interception. Antenna systems require advances in survivability, efficiency, put-up/take-down times, bandwidth, and radiation pattern. An urgent need exists to overcome radio operational deficiencies imposed with present antennas by reducing visibility (improve survivability), increasing efficiency and bandwidth especially for Nap-of-the-Earth (NOE), Military Operation in Urban Terrain (MOUT), and for frequency hopping radio. The need for dispersal as emphasized by recent studies such as "Air-Land Battle 2000," and verified by recent events in Lebanon, points to distributed command posts (CP) as the means for survival. Existing antennas and their fixed radiation pattern, which renders them more vulnerable to interference and hostile ECM, are not suitable for distributed CPs. The Army needs VHF tactical radios which are not vulnerable to natural and hostile interference in data and voice communications. Current and proposed radios are vulnerable to these deficiencies and require sophisticated frequency management control. Present High-Frequency (HF) radios require highly trained operators, excessive warm up/tuning time, high power consumption, and cannot adequately cope with todays ECM environment. Processing present digital signals/messages requires the services of equipment operators to perform too many skilled functions and/or the complexity of additional circuitry and bulky modules. The requirement for covert means of communications on the battlefield increases each decade, particularly for armor and air communications. This program exploits the most advanced technology of fiber optics, millimeter and microwave transmission characteristics, and microprocessor control of antenna systems, high-frequency and VHF radio systems, and signal-hiding to meet the Army needs and overcome deficiencies of present systems. Advances in signal processing through exploitation of Very High Speed Integrated Circuits (VHSIC) will meet complex processing needs. Operation of the Communications Systems Design Center (CSDC) provides the means to characterize, design, implement, and test evolutionary communications systems, design improvements, provide problem solutions, and validate new system concepts.

Program Element: #63707A Title: Communications Development

DOD Mission Area: #345 — Tactical Communications Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	7621	8696		Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	6318	6720		Continuing	Not Applicable

(U) The FY 1982 increase reflects increased program efforts to insert Very High Speed Integrated Circuits (VHSIC) technology in existing hardware. The funding decrease in FY 1983 is a result of a pro rata application of General Congressional reductions to the RDTE,A appropriation. The FY 1984 decrease is a result of a reallocation of $2.324 million from project D246 to the TRI-TAC Program.

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Program Element #61102A (Defense Research Sciences), Project AH48 (Communications Research); Program Element #62701A (Communication-Electronics), Project AH92 (Communication-Electronics; Program Element #63723A (Command and Control) Project D180 (Dispersed Command Post Prototype); Program Element #64701A (Communications Engineering Development); Program Element #28010A (Tri-Service Tactical Communications Program). Work performed on the Quick Erect Antenna Mast (QEAM) and the Broadband Vehicular Antenna was funded under Project D437 prior to FY 1982. Technology advances in fiber optics, millimeter waves, microwaves, and HF radio under Project AH92 have progressed to advanced development and future technology results of AH92 will continue into advanced development. A joint Army/Air Force program provides for Advanced Development of a fiber optic communications system to replace metallic cable system based on the CX 4566 (26 pair cable). Related research and studies are performed by the Air Force and Navy. Coordination is accomplished by Department of the Army reviews, through exchange of technical reports and attendance at scientific meetings and conferences. There is no unnecessary duplication of effort.

F. (U) WORK PERFORMED BY: A total of sixteen (16) contracts whose total cost is $10,119,000. In-house development will be performed by the US Army Communications Electronics Command, Ft. Monmouth, NJ.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

Program Element: #63707A

Title: Communications Development

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

1. (U) D246 — Tactical Communications System Development: The Digital Microwave Radio development will provide new capability for digital data links to meet the threat of Electronic Countermeasures (ECM). A family of Millimeter Wave (MMW) radios will supply urgent communicative needs for survivable mobile command posts and new signal hiding/covert capability between vehicles and shelters operating at and near the battle area. Development of Fiber Optic (FO) cable communications systems will permit replacement of costly/vulnerable metallic cables and provide command posts with mobility and survivability against ECM and nuclear Electromagnetic Pulse (EMP). Broadband vehicular antennas with improved efficiency and minimum tuning will meet the needs of the new frequency hopping radios. High power antennas developed for use with transceiver multiplexers and high power amplifiers will reduce proliferation of antennas at command posts and help override enemy jamming. This project will meet the need for a small disposable, lightweight squad radio transceiver. High Frequency (HF) development will revitalize the Army role in high-frequency radio, using results of Project AH92 to overcome deficiencies of presently fielded HF radios. A Quick Erect Antenna Mast will improve reaction time for communications systems, enable standardization and interchangeability of mast components, greatly reducing proliferation of masts and providing both mobility and variable height capability. FY 1982 Accomplishments: Successfully completed the MMW Multichannel Command Post (MCPR); this advanced the state-of-the-art in electronically tunable radios. Completed FO missile payout system and transitioned management to Missile Command (MICOM). This system provides communications for antiarmor weapons capable of defilade-to-defilade operation. Started a joint Army/Air Force contract for the FO Transmission System — Local Distribution (FOTS-LD) to replace 26 pair metallic cable. Redefined the Quick Erect Antenna Mast (QEAM) program from an engineering development status to system-related advanced development and prepared a Draft Letter of Agreement (LOA). Started two parallel contracts to develop and fabricate four breadboard models of an adaptive HF receiver/transmitter (R/T). FY 1983 Program: Start advanced development contract for the MMW Mobile Intercept Resistant Radio (MISR) addressing user needs for covert communications and C^3 between tracked vehicles and hand-held tripod-mounted applications. Start contract for a FO distribution 2km system using voice and data busses to interconnect elements of the distributed command post. Start contracts for a FO Linear Optical Modem and an enhanced missile payout system. Complete the adaptive HF R/T contracts and demonstrate operational feasibility techniques in a tactical HF net. Start advanced development of Electronic Counter-Countermeasures (ECCM) demonstration hardware based on results of Project AH92 for HF radio. FY 1984 Planned Program: Start contract for a high-power broadband VHF antenna and prepare procurement work directive for a tactical long-wire antenna. Start procurement on QEAM for wideband power amplifiers and a notch filter. Use result of concept evaluation and prepare a Quick Erect Antenna Mast (QEAM) requirements document for engineering development or production. Start contract to design and implement lightweight, low-cost MMW radio repeaters; complete the enhanced FO missile payout system and transfer management to MICOM; start development of intrusion-resistant FO system; start contract for advanced development models and specifications for the Digital Microwave Radio; start development of the HF modem for transmission and reception of facsimile; teletype and digital secure voice in a 3KHz channel; conduct tests with HF channel simulation; complete VHF high-power broadband antenna and start contract for tactical HF long-wire antenna. Prepare QEAM program for transition to engineering development.

2. (U) D437 — Advanced Communications Concept Development: This project pursues the concept development of advanced communications techniques in the areas of tactical radio systems. A Small Unit Radio (SMR) development will meet the needs for a squad radio compatible with a nonfrequency-hopping SINCGARS radio with inherent ECCM features and low cost. Other VHF tasks will provide a solid state high-power (500w)

Program Element: #63707A | Title: Communications Development

DOD Mission Area: #346 — Tactical Communications | Budget Activity: #4 — Tactical Programs

amplifier to defeat the jamming threat to present and future VHF-FM radios, develop a Quick Erect Command Post Antenna to provide mobility for rapid deployment needs, VHF channeling applique to maintain interoperability with NATO by adaptive channel selection, radiated power control and meteor trail reflection techniques. MMW radio tasks will provide covert signal-hiding capability for armor and helicopter elements, eliminating the unreliable visual signaling techniques (hands, lights, flags). A MMW multichannel combining effort (multiplex/combiner) will meet the need for down-the-hill cable replacement. Early technology insertion of Very High Speed Integrated Circuits (VHSIC) Signal Processing chips will meet the need for cost savings benefits into PLRS/PJH programs. An operational Communications System Design Center will support the laboratory program to characterize, design, implement, and test evolutionary communications system design improvements, provide problem solutions, and validate new system concepts. This will meet the need to avoid costly mistakes and interoperability problems before and during the fielding of new systems. FY 1982 Accomplishments: Completed baseline design for the zero Intermediate Frequency (IF) receiver, constructed braseboard model using analog circuitry and started contract to modify braseboard model using digital circuitry. Completed design of cross-coupled phase Lock Loop receiver theoretical design. Started contract for three models of a 500-watt Radio Frequency (RF) power amplifier. NASA was funded to provide for a special program to develop engineering breadboards for feasibility design of air-to-ground data links. FY 1983 Program: Start contract to develop the Small Unit Radio and complete the 500-watt amplifier contract. Start programs to develop the MMW Multiplexer/Combiner, the MMW Armor/Air Covert Net, VHSIC Signal Processing Technology Insertion, and the VHF Command Post Antenna. The results of the completed Zero IF and Phase Lock Loop contracts will be utilized in the Small Unit Radio (SMR). Improved Message Facility (IMF) interface testing and set up communications links to test systems in the areas of FO, microwaves, and net radio; Capability measurements determined for the AN/TTC-39 switch, High-Speed Data Buffer TD-1065, and the Digital Secure Voice Terminal (DSCT); develop simulation capability and set up interface module and patching facilities. FY 1984 Planned Program: Start VHF Command Post (CP) Antenna contract. Complete development to form/factor/fit PJH with VHSIC. Test networks simulation package as designed. Start evaluation of FO components and determine capability of microwave radios in a severe and noisy environment. Start development of the Burst Error Correcting Encoder and the Solid State UHF Power Amplifier. Continue development of MMW Multiplexer/Combiner, MMW Armor/Air Covert Net and the Small Unit Radio.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63711A

Title: Aircraft Survivability Equipment (ASE)

DOD Mission Area: #371 — Self-Protection

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7291	3553	3158	12077	Continuing	Not Applicable
D653	Aircraft Survivability Equipment	7291	3553	3158	12077	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program includes the advanced development efforts to provide US and allied aircraft with self-protection against enemy infrared, radar, optical/electro-optical, and laser air defense threats. The program is the continuation of efforts to achieve the survivability and enhanced combat effectiveness required to accomplish the Army attack, scout, assault, and Special Electronic Mission Aircraft (SEMA) mission requirements. The program is structured to preclude Service duplication as it reflects the Army's responsibility for the implementation of a Tri-Service Memorandum of Agreement (MOA) reached in 1977. The MOA gives the Army the responsibility for developing/procuring Aircraft Survivability Equipment (ASE) associated with helicopters and small "low-performance" fixed-wing aircraft. This program responds to the Required Operational Capability (ROC) ASE. ASE is needed for both currently fielded and future Army aircraft in order to survive to accomplish combat missions and reduce combat attrition to acceptable levels.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	7291	3553	3158	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	12162	3563	25516	Continuing	Not Applicable

FY 1982 reflects restructuring of $4271 thousand to higher priority Army requirements plus $600 thousand reprogramed to Program Element 64711A. The funding decrease of $10 thousand in FY 1983 is a result of pro rata application of general Congressional reductions in the RDTE,A appropriation. The decrease of $22252 thousand in FY 1984 represents a shift in the program to bring it in line with current Army priorities and a shift of emphasis into engineering development. The remaining FY 1984 reduction of $106 thousand resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

Program Element: #63711A Title: **Aircraft Survivability Equipment (ASE)**

DOD Mission Area: #371 — **Self-Protection** Budget Activity: #4 — **Tactical Programs**

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This program is conducted in conjunction with Program Element (PE) #64711A (Aircraft Electronic Warfare (EW) Self-Protection System), Project #D665 (Aircraft Survivability Equipment), also managed by the Project Manager for Aircraft Survivability Equipment (PM-ASE), and PE #63215A (Joint Survivability Investigations), Project #D079 (Joint Survivability Investigations), of which PM-ASE is the Senior Army Representative. In 1977, the Services signed a Memorandum of Agreement outlining the responsibilities for tri-Service development and production of the Aircraft Electronic Warfare Self-Protection (AEWSP) systems for helicopters and selected fixed-wing aircraft. The Army is responsible for radar and laser warning receivers for most helicopters and selected fixed-wing aircraft, radar jammers for attack and other selected helicopters/fixed-wing aircraft, infrared (IR) jammers for small helicopters and designated low/slow fixed-wing aircraft, and pulse doppler missile warning detectors for helicopters and selected fixed-wing aircraft. The Navy is responsible for infrared (IR) jammers for large helicopters, continuous wave (CW) radar jammers for selected Navy aircraft and Army special electronic mission aircraft (SEMA), and ultraviolet (UV) missile warning detectors for selected helicopters and fixed-wing aircraft. The Air Force is responsible for infrared (IR) missile warning detectors for fixed-wing aircraft and selected helicopters. International coordination is achieved through North Atlantic Treaty Organization (NATO), NATO Army Armaments Group (NAAG), and Quadripartite Working Groups.

F. (U) WORK PERFORMED BY: US Army Aviation Research and Development Command (AVRADCOM), St. Louis, MO; US Army Electronics Research and Development Command (ERADCOM), Electronic Warfare Laboratory (EWL), Ft. Monmouth, NJ; US Army Armament Research and Development Command (ARRADCOM), Dover, NJ; Applied Technology Laboratory, Ft. Eustis, VA. Contractors: ITT Corporation, Nutley, NJ; TRACOR, Inc., Austin, TX; Hughes Helicopter, Culver City, CA; Calspan Corporation, Buffalo, NY; Dalmo-Victor, Belmont, CA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D653 — Aircraft Survivability Equipment: The objective of this project is to establish the technical feasibility and military potential of passive and active countermeasure equipment for the increased combat effectiveness and survivability of Army aircraft in a hostile air defense environment composed of Radar, Infrared, Optical/Electro-Optical, and Laser Directed Weapon Systems. This equipment has application to Special Electronic Mission Aircraft (SEMA) and all rotary-wing aircraft. In FY 1982, development of the Smith Modulator (monopulse), Millimeter Wave, and Digital Radio Frequency Memory Modular Upgrades for the AN/ALQ-136 Radar Jammer was continued. Tasks were initiated to expand the pulse rate response of AN/APR-39 Radar Warning Receiver into the pulse doppler high pulse repetition frequency (PRF) domain and to develop a radio frequency expendable decoy for the M-130 dispenser system. Definition of a dual chaff cartridge resulting in doubling the capacity of the current chaff round fired from the M-130 dispenser was completed. Development was initiated for a fuel fire vulnerability reduction system for the AH-1S. The nitrogen inerting component of the Survivability Aircraft Vulnerability Improvement Program (SAVIM) system is being expedited and will be incorporated into the AH-64 production. In FY 1983, the design and DT/OT I of the modular upgrades for the AN/ALQ-136 Radar Jammer will be completed. Development of AN/APR-39 Radar Warning Receiver high pulse repetition frequency (PRF) upgrade will continue. In FY 1984, DT/OT I will be completed for the AN/APR-39 Radar Warning Receiver high Pulse Repetition Frequency (PRF) upgrade. Development of

Program Element: **#63711A** Title: **Aircraft Survivability Equipment (ASE)**

DOD Mission Area: **#371 — Self-Protection** Budget Activity: **#4 — Tactical Programs**

the AN/ALQ-169 Optical Warning Receiver against passive direct view/electro-optical fire control systems will be reinitiated. The AN/ALQ-169 provides bearing and range to threats in addition to warning. Development of direction-finding and long-wavelength response upgrades for the AN/AVR-2 Laser Warning Receiver will be initiated. To improve training, development of modifications to the Tactical Radar Threat Generator to incorporate Millimeter Wave, Laser and Forward-Looking Infrared (FLIR) components will be initiated along with basic radar subclutter tracking improvements via either pulse doppler or Moving Target Indicator (MTI) techniques.

H. *(U)* PROJECTS OVER $10 MILLION IN FY 1994: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#63713A** Title: **Army Data Distribution System (ADDS)**

DOD Mission Area: **#343 — Theater Communications** Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): *($ In Thousands)*

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	17454	34293	25823	28892	56157	186465
	QUANTITIES						*
D370	PLRS/JTIDS Hybrid (PJH)	17454	34293	25823	28892	56157	186465

* 20 JTIDS developmental prototype Class 2 terminals are being purchased with funds from this program and are reflected in Program Element #64702 (Joint Tactical Information Distribution System (JTIDS)), Project #D451 (Army Support of JTIDS).

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Automated battlefield systems require near-realtime, secure, jam-resistant data communications. Current communications systems are limited by restricted data handling capacity, EW vulnerability, voice/data contention, a lack of adequate automatic relay capabilities, and poor mobility. The Army Data Distribution System (ADDS), also known as the PLRS/JTIDS Hybrid (PJH), will selectively product improve components of the Position Location Reporting System (PLRS), and utilize hardware developed by the Joint Tactical Information Distribution System (JTIDS) program. By taking advantage of the advanced state of development of these two projects, it will be possible to produce an integrated and synergistic system to satisfy the Army's stated data distribution requirements and overcome existing deficiencies earlier than would otherwise be possible. Without this program the Army's automated systems will have limited effectiveness in an electronic combat environment on the mobile battlefield of the future. The ADDS will support data communications requirements in the five functional areas of maneuver control, fire support, air defense, intelligence/electronic warfare, and combat service support. Development work is being carried out in a flexible five-phase program. Phase 1, system definition/concept evaluation, and Phase 2, verification of PLRS/JTIDS interoperability, are complete. Phase 3/4 (Advanced Development), system interface with other systems and initial prototype evaluation, was started in FY 1982. Phase 5 (Engineering Development), an evaluation of a full system prototype, will begin in FY 1984.

Program Element: #63713A Title: Army Data Distribution System (ADDS)

DOD Mission Area: #343 — Theater Communications Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	17454	34293	25823	85049	186465
Funds (as shown in FY 1983 submission)	18664	32886	19657	Continuing	Not Applicable

Reduction of $1210 thousand in the FY 1982 funding level is a result of reprograming after revision of the funding profile before award of the ADDS Phase 3/4 contract which resulted in a lower FY 1982 commitment. The funding increase of $1407 thousand in FY 1983 is the net result of: a $93 thousand decrease due to a pro rata application of general Congressional reductions to the RDTE,A appropriation; and a $1500 thousand increase due to reprograming of funds for the ADDS program. The funding increase of $6166 thousand in FY 1984 is the net result of: a $448 thousand reduction which resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE program; a $14 thousand increase from revised civilian pay pricing indices; and a $6600 thousand increase caused by program restructuring and revised cost estimates for continuation of Phase 3/4 and initiation of the ADDS final test and demonstration phase, Phase 5.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Program Element (PE) #63713A (Communications Development), Project #D137 (Joint Tactical Information Distribution System (JTIDS)), accomplished the Phase I concept definition and evaluation for the ADDS program in FY 1980/1981. The current Project #D370, under PE #63713A was established in FY 1981. PE #64727A (Command and Control), Project #DC98 (Position Location Reporting System (PLRS)), and PE #64702A (Joint Tactical Information Distribution System (JTIDS)), Project #D451 (Army Support of JTIDS), are integrally related programs. The ADDS and the Army participation in JTIDS are centrally managed by one Project Manager under Army Charter. Through this central management, the Army and Department of Defense insure that no unnecessary duplication of efforts occur.

F. (U) WORK PERFORMED BY: Management by Project Manager, Position Location Reporting System/Tactical Information Distribution System (PLRS/TIDS), Fort Monmouth, NJ. In-house developing agencies are the US Army Communications-Electronics Command (USACECOM), Fort Monmouth, NJ, and elements of the US Army Electronics Research and Development Command (USAERADCOM), Fort Monmouth, NJ. Contractual efforts are provided by MITRE Corporation, Bedford, MA; Hughes Aircraft Company (Ground Systems Group), Fullerton, CA; and The Singer Company (Kearfott Division), Little Falls, NJ.

Program Element: #63713A | Title: Army Data Distribution System (ADDS)

DOD Mission Area: #343 — Theater Communications | Budget Activity: #4 — Tactical Programs

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D370 — PLRS/JTIDS Hybrid (PJH)**

a. **(U) Project Description:** The Army Data Distribution System (ADDS), or PLRS/JTIDS Hybrid (PJH), is a selected product improvement and combination of two other programs, the Position Location Reporting System (PLRS), entering production in FY 1983, and the Joint Tactical Information Distribution System (JTIDS) in full-scale development. The program was initiated by the Army in recognition of the potential of combining PLRS and JTIDS to meet the critical need for a data distribution, position location, identification, and automatic reporting system in support of Army battlefield automated systems. The ADDS will satisfy this requirement. The heart of the system is the Net Control Unit (NCU) which performs net management and control functions. There will be five NCUs in a typical deployed division. Enhanced PLRS User Units (EPUU) will be furnished to users that have limited data requirements in forward areas of the division, while JTIDS Class 2 terminals will be provided to users with higher throughput data requirements associated with equipment such as TACFIRE and the AN/TSQ-73. Without this data communications system, highly sophisticated weapons systems will not operate to their full potential, and the Air Defense community, in particular, will not have a responsive means of exchanging early warning, cueing, aircraft identification, and weapons command/control information among their component systems.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Phase 2 concluded with successful demonstrations to the Army user community using PLRS and JTIDS hardware operating in Field Artillery, Close Air Support, and Air Defense scenarios. The Phase 3/4 (Advanced Development) contract to develop the PLRS product improvements, design interfaces to battlefield systems, and develop the system network management software was awarded 30 March 1982 and is progressing on schedule. The conclusion of this phase in 1984 will result in a complete ADDS design and operational prototype.

(2) **(U) FY 1983 Program:** Continue the Phase 3/4 contract.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Continue Phase 3/4 and award Phase 5 (Engineering Development) contract to fabricate PLRS modification kits, integrate additional JTIDS terminals, and conduct the final ADDS test and demonstration phase.

(4) **(U) Program to Completion:** Award contract for PLRS Pre-Planned Product Improvement (P3I) and JTIDS integration in FY 1985, complete Phase 5 and comprehensive DT/OT-II in FY 1987.

Program Element: #63713A

Title: Army Data Distribution System (ADDS)

DOD Mission Area: #343 — Theater Communications

Budget Activity: #4 — Tactical Programs

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Definition/Evaluation (Phase 1)	July 1979	July 1979
PLRS/JTIDS Interface (Phase 2)	June 1980	June 1980
Prototype & Interface with other systems (Phase 3/4)	March 1982	March 1982
ASARC II	3Q FY 1984	Not Shown
Phase 5	3Q FY 1984	1Q FY 1984
Milestone Decision Review (MDR) IIIA	4Q FY 1985	4Q FY 1986
MDR IIIB (formerly ASARC III)	4Q FY 1987	4Q FY 1986
First Unit Equipped (FUE)	2Q FY 1988	4Q FY 1986

The FY 1983 submission indicated Phases 3 and 4 as separate milestones. During FY 1982, Phases 3 and 4 were combined to streamline the program, and the contract was awarded on schedule. The Phase 5 award, MDR IIIB (ASARC III), and FUE have been adjusted to reflect changes in the PLRS production award dates and availability of PLRS equipment required for ADDS, Phase 5.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63718A

Title: Electronic Warfare Vulnerability/Susceptibility

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	14869	24869	19002	26775	Continuing	Not Applicable
D234	Surface/Surface Weapon Electronic Warfare	3558	5691	4849	7433	Continuing	Not Applicable
D267	Air Defense/Missiles Vulnerability/Susceptibility	7519	12795	7910	9990	Continuing	Not Applicable
D626	C^3 Systems Vulnerability/Susceptibility	3792	6383	6243	9352	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Since an enemy's use of electronic warfare (EW) could greatly reduce the effectiveness of US Army electronic/electro-optical dependent systems, the objectives of this program are to: determine the susceptibility to EW of US Army missile and communications electronic systems and provide to US Army developers recommendations on electronic counter-countermeasures (ECCM) circuits and devices for missile, communications-electronic (CE), and night vision/electro-optical (NV/EO) systems that will reduce the vulnerability of US systems to enemy EW operations.

Program Element: #63718A

Title: Electronic Warfare Vulnerability/Susceptibility

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	14869	24869	19002	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	17776	25164	32199	Continuing	Not Applicable

The decrease in FY 1982 is due to reprograming to meet high-priority Army Requirements. The funding decrease of $295 thousand in FY 1983 is a result of pro rata application of general Congressional reductions ot the RDTE,A appropriation. The decrease in FY 1984 reflects reprograming to accommodate higher priority Army efforts within current budget constraints; the number of systems to undergo electronic warfare vulnerability/susceptibility investigations will be reduced and the extent of some investigations will be curtailed.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The work performed under this program element is being performed by the US Army Electronics Research and Development Command (ERADCOM), Electronic Warfare Laboratory (including OMEW), Fort Monmouth, NJ, and White Sands Missile Range, NM. Results of the susceptibility investigations, as well as appropriate electronic counter-countermeasures (ECCM) recommendations, are provided to the other Army development commands; e.g., the Missile Command (MICOM) and Communications-Electronics Command (CECOM). Other related research and studies are performed by the Air Force in Program Elements (PEs) #63750F (Countermeasures Advanced Development); #63716F (Electronic Warfare Technology); #63743F (Electro-Optic Warfare). Navy work is done in PEs #63796N (Airborne Electromagnetic and Optical systems); #63797N (Surface Electromagnetic and Optical Systems); and #24573N (Navy Cover and Deception Programs). Coordination is accomplished by exchange or technical reports, attendance at scientific meetings and conferences, joint development projects, and reviews conducted by the Office of the Secretary of Defense (Under Secretary of Defense for Research and Engineering). This coordination prevents unnecessary duplication of effort within the Defense establishment.

F. (U) WORK PERFORMED BY: In-house research, development, and missile system susceptibility analyses are conducted by the Office of Missile Electronic Warfare (OMEW), US Army Electronics Research and Development Command (ERADCOM), White Sands Missile Range (WSMR), NM. In-house research, development, and communications electronics vulnerability/electronic CM analyses are conducted by the Electronic Warfare Laboratory, ERADCOM, Ft. Monmouth, NJ. Major contractor support is provided by the Physical Science Laboratory, New Mexico State University, Las

Program Element: #63718A

Title: Electronic Warfare Vulnerability/Susceptibility

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

Cruces, NM; Sanders Associates, Nashua, NH; Stanford Research Institute, Menlo Park, CA; GTE Sylvania, Mountain View, CA; American Electronics Laboratory, Lanedale, PA; and Raytheon, Goleta, CA. Contractors will perform on approximately 18 contracts with a total dollar value of about $5 million for the program element.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. (U) D234 — Surface/Surface Weapon Electronic Warfare: All electronic-dependent weapon systems are susceptible to electronic countermeasures (ECM). The degree of susceptibility coupled with an assessment of the threat, economics, technical and tactical feasibility of implementing ECM provides a measure of a weapon system's vulnerability. To insure that US Army weapon systems are capable of effectively operating under severe ECM environments, all weapon systems must be systematically analyzed and subjected to laboratory and field ECM investigations early in development and throughout their life cycle. FY 1982 accomplishments — Pershing II captive flight tests and analysis were performed, simulations conducted, and instrumentation developed for live firing ECM development tests (DT II). Provided vulnerability assessments of HELLFIRE and AH-64 Target Acquisition Designation Sight (TADS) for Army Systems Acquisition Review Council/Defense Systems Acquisition Review Council (ASARC/DSARC) III. Developed discrete chaff model for low-medium air defense missile fuzes, and initiated analysis of modified PATRIOT fuze, including plans for captive carry fuze tests. Conducted laboratory tests of ECCM-modified HELLFIRE seekers. Performed simulations and field tests of TOW-2. Performed susceptibility/vulnerability analyses of several precision guided fire-and-forget infrared/millimeter wave (IR/mmw) seekers for Sense and Destroy Armor (SADARM), Multiple Launch Rocket System (MLRS) and Advanced Indirect Fire Systems (AIFS). FY 1983 goals — Conduct live firing tests of Pershing II and COPPERHEAD missiles under threat ECM environments. Perform chaff tests of modified PATRIOT fuze and conduct analysis of SGT YORK fuze susceptibilities. Laboratory investigations of HELLFIRE smart laser seekers will be performed, and studies of improved TADS and infrared/radio frequency (IR/RF) seekers will be initiated. Simulations and field tests of TOW-2 will be conducted. Laboratory field tests and analysis of SADARM and MLRS precision guided munitions will be performed, and promising ECCM techniques investigated. Live firing tests of ECCM-modified HELLFIRE seekers for SADARM, MLRS, and advanced precision guided munitions will be conducted. Specifications will be developed and contracts awarded for upgrading test instrumentation and threat-emulating ECM-devices. FY 1984 plans — Pershing II ECM line firing tests will be completed and electronic counter-countermeasures (ECCM) recommended. Analysis of Patriot fuze captive carry chaff test data will be performed and promising ECCM techniques investigated. Live firing tests of ECCM-modified HELLFIRE seekers will be performed. Laboratory and field tests of prototype infrared/radio frequency developmental seekers for SADARM, MLRS, and advanced precision guided munitions will be conducted. Specifications will be developed and contracts awarded for upgrading test instrumentation and threat-emulating ECM devices.

2. (U) D267 — Air Defense Missiles Vulnerability/Susceptibility: This project supports the development of US Army air defense weapon systems by: providing an assessment of the vulnerability of these weapons to electronic countermeasure techniques; identifying specific areas of vulnerability; and making counter-countermeasure recommendations to reduce system susceptibilities. Electronic warfare threat simulator devices are

Program Element: #63718A

Title: Electronic Warfare Vulnerability/Susceptibility

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

developed and laboratory/field experiments performed to provide a quantified data base for the vulnerability assessments. Timely ECCM recommendations are provided to the missile developer and a quantification of performance in an EW environment is provided prior to the production decision. In FY 1982, ECM vulnerability investigations were conducted and ECCM design recommendation was made to the developer on Stinger, Stinger-POST, PATRIOT, Improved HAWK, Sgt York, Chaparral, ROLAND, other Army missile systems and associated fuzes. Theoretical analysis was performed on Stinger-POST, Chaparral/Chaparral-Rosette Scan Seeker (RSS)/Night Chaparral, PATRIOT, and Sgt York. EW simulations were performed on Stinger, Stinger-POST, and PATRIOT air defense weapons and the AN/ALQ-144 infrared jammer. The contract was awarded for development of Modular Advanced Test Jammer (MATJAM) to provide a validated threat environment for testing radio frequency (RF) air defense system. Plans for Deployment Verification Readiness tests for the US ROLAND were completed. Government maturity tests on the Sgt York Gun system to provide data base for ASARC/DSARC and PATRIOT Unit I, II, and III tests were completed. The PQT testing of the Missile ECM Upgrade (MEU) product improvement for HAWK and the PQT testing of the Stinger-POST missile system were completed. Firing tests and flyby experiments were conducted against advanced electro-optic countermeasure (EOCM) devices. A comprehensive EOCM simulation effort was conducted to support the Stinger-POST ASARC. In FY 1983, ECM vulnerability investigations will be conducted on Stinger, Stinger-POST, PATRIOT, Improved HAWK, Sgt York, Chaparral, Night Chaparral, Chaparral-Rosette Scan Seeker, Short-Range Air Defense System (SHORADS) C^3, and Directed Energy weapons. The results of the vulnerability investigation of Stinger-POST will be provided to the January 1983 ASARC. The PATRIOT Follow-On Evaluation (FOE), missile round life tests (MRLT), component and system design confirmation (CDC/SDC) tests, and the heavy-load system demonstration will be completed. Laboratory/field experiments and missile flight simulation will be conducted to quantify electro-optical counter-countermeasures (EOCCM) design improvements to Stinger-POST and to evaluate the performance of the Chaparral Rosette Scan Seeker (RSS). Early production unit testing will be conducted on the Sgt York. ROLAND deployment verification tests will be completed. Performance verification testing (PVT) of High Power Illuminator (HPI) reliability, availability, and maintainability (RAM) and missile ECM upgrade of the HAWK will be conducted. Development of the MATJAM will continue. The ultraviolet infrared scene generator will be delivered and used in simulation to support the Stinger-POST EOCCM improvement program. Directed Energy program will be formulated and analysis/vulnerability assessment of candidate of Directed Energy weapons will be initiated. Initial EW analysis will be conducted on the air supported threat defense program. A program will be implemented to determine subsystems vulnerability in areas such as the advanced Short-Range Air Defense (SHORAD) weapon systems, command and control SHORAD system battle area surveillance radars and identification friend or foe (IFF) systems. ECCM design recommendations will be made to insure operational effectiveness of air defense weapon systems in an EW environment. In FY 1984, ECM vulnerability investigations will be conducted on Stinger, Stinger-POST, PATRIOT, Improved HAWK, Sgt York, Chaparral, Night Chaparral, Chaparral-Rosette Scan Seeker, Short-Range Air Defense Systems (SHORADS) C^3, and Directed Energy weapons. The EW testing associated with the PATRIOT growth program will be initiated. Improved Standoff Jammer (SOJ) and two chaff systems for the PATRIOT growth program will become operational. Test planning and test material requirements for the Air Supported Threat Defense (ASTD) will be developed. Two prototype MATJAM systems will be delivered for acceptance testing. Product Qualification Test (PQT) of Phase III Product Improvement Program of HAWK will be performed. Plans and initial preparation will be made to conduct analysis and testing of the advanced short-range air defense weapons system. Initial production tests and preparation for follow-on EW tests will be performed on the Sgt York. Field/laboratory testing

Program Element: #63718A | Title: Electronic Warfare Vulnerability/Susceptibility

DOD Mission Area: #374 — Multi-Mission Technology and Support | Budget Activity: #4 — Tactical Programs

and simulations will be conducted, to quantify EOCCM performance of Stinger-POST and Chaparral-RSS. Investigation of the vulnerability of Directed Energy weapon to electronic countermeasures will continue, and support will be provided to battlefield modeling simulations to insure the most cost effective design/deployment for Directed Energy weapons is adopted.

3. *(U)* **D626 — C³ Systems Vulnerability/Susceptibility:** The objectives of this project are to (1) determine susceptibility/vulnerability of command control communications (C³) systems, surveillance/target acquisition radars, and night vision/electro-optical devices to hostile electronic warfare (EW); (2) recommend and demonstrate electronic counter-countermeasures (ECCM) fixes to developers and users; and (3) ensure that foreign electronic warfare threats are considered throughout development and incorporating optimized/cost effective ECCM techniques, communications systems, surveillance/target acquisition radars, and night vision/electro-optics devices can be fielded that will ensure that critical weapon systems will perform their assigned mission in the face of a severe and sophisticated EW threat. FY 1982 accomplishments: EW vulnerability/ECCM analyses and tests continued on Single Channel Ground and Airborne Radio System (SINCGARS), Position Location Reporting System, PLRS/JTIDS Hybrid (PJH) Artillery and Mortar Locating Radar (FIREFINDER) ECCM project improvements, and Modular Integrated Communications Navigation System (MICNS) for the Army's Remotely Piloted Vehicle (RPV). Updated technical plan for detailed vulnerability analysis of optical/electro-optical devices was prepared and coordinated. Assessment schedules for accelerated programs were established. Initiated assessment of baseline TOW nightsight. FY 1983 plans: Continue PJH EW vulnerability/ECCM assessment efforts. Recommend optimal ECCM approach for network routing/rerouting controls. Plan and conduct reactive jamming tests on SINCGARS. Begin development of fast frequency-hopping capability as ECCM improvement for SINCGARS. Plan and conduct comprehensive EW analyses/tests of data links (MICNS/RPV, Sperry, etc.). Plan testing of Firefinder ECCM product improvements. Start fabrication of EW threat instrumentation to support field testing of improved high frequency and multichannel communications. Establish basic electro-optical vulnerability assessment facility with continued development of field evaluation capabilities. Conduct vulnerability assessments of baseline TOW nightsight and direct-view optics and baseline Chaparral and M1 Abrams nightsight. FY 1984 plans: Analyze and test ability of new communications systems, target acquisition radar and night vision devices to operate in hostile electronic warfare (EW) threat environment. Develop computer simulations to assist in conducting EW vulnerability assessments and fabricate EW threat instrumentation to replicate known and postulated threats to be used during field testing. Conduct vulnerability assessments of baseline devices such as Advanced Helicopter Program Mast-Mounted Sight (AHIP/MMS) and selected hardened night vision/optical/electro-optical devices.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63720A

Title: Chemical/Biological Detection, Warning, and Sampling Materiel Concepts

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	12616	7870	28855	47950	Continuing	Not Applicable
D165	Biological Detection, Warning, and Sampling Materiel Concepts	- 0 -	- 0 -	- 0 -	1400	Continuing	Not Applicable
D601	Chemical Detection, Warning and Sampling Materiel Concepts	12616	7870	28855	46550	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: There is an urgent need to provide all Services with improved chemical and biological detection and warning systems which will provide United States (US) forces with an early warning of an approaching chemical and biological agent attack and reconnaissance capability so that field commanders are aware of contaminated environments and the extent and nature of the contamination. Current detection and warning systems lack necessary response time, sensitivity, agent specificity, and off-target detection capability; are logistically burdening; and are labor intensive. Failure to correct these deficiencies would seriously jeopardize the survivability of US Forces in the event of chemical/biological attack.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	12616	7870	28855	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	10014	17892	20411	Continuing	Not Applicable

Program Element: #63720A

Title: Chemical/Biological Detection, Warning, and Sampling Materiel Concepts

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

A restructuring of chemical-biological program elements was made between the FY 1983 and FY 1984 submissions. Project #D601 (Chemical Detection and Warning Materiel) was moved from Program Element #63721A (Chemical/Biological Protective Materiel Concepts) to this program element. This places all chemical-biological protective materiel under Program Element #63721A and all detection and warning materiel under Program Element #63720A. This restructuring facilitates better management of chemical-biological program execution. Funds shown above reflect the restructured program. The increase of $2602 thousand in FY 1982 was due to expanded contractual and test requirements in the XM21 Scanning Infrared Remote Alarm, Chemical (SCI-REACH) and XM 85/XM 86 Automatic Liquid Agent Detector (ALAD) programs. The increase was minimized by a decrease in the XM22 Automatic Chemical Agent Detector and Alarm (ACADA) funding requirement due to revised user requirements, late technology maturity, and extensive contracting negotiations. The funding decrease of $10022 thousand in FY 1983 is a result of Congressional direction in the FY 1983 Appropriations Act and pro rata application of general Congressional reductions to the RDTE,A appropriation. The $8444 thousand increase in FY 1984 is due to expanded contractual requirements for the XM21 SCI-REACH and the XM22 ACADA programs; increased estimate to initiate development of a combined Nuclear, Biological, Chemical (NBC) remote detector system; and a revision (decrease) of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: No comparable work is done by other Services. DOD Directive 5160.5 established the Joint RDTE program for Chemical/Biological Defense and assigned the Army Executive Agent responsibility. The Army is responsible for Basic Research, Exploratory Development, and the subsequent technology base for all Services. Coordination is maintained with the other Services to provide the required detection and warning materiel and to avoid duplication of effort. Coordination and cooperation are maintained with allied countries via Data Exchange Agreements and through meetings of North Atlantic Treaty Organization (NATO) Panel VII-NBC Defense. Companion Engineering Development (ED) work is being done under Program Element #64724A (Chemical Defense Materiel), Project #D020 (Chemical Detection, Identification, Warning, and Sampling Materiel). Related Exploratory Development work is being conducted under Program Element #62706A (Chemical Defense and General Investigations), Project #A553 (Chemical-Biological Defense and General Investigations).

F. (U) WORK PERFORMED BY: In-house: US Army Chemical Systems Laboratory, Aberdeen Proving Ground, MD; US Army Test and Evaluation Command, Aberdeen Proving Ground, MD. Contracts: Honeywell, St. Petersburg, FL; Bendix, Towson, MD; CALSPAN, Buffalo, NY; and Brunswick, Orlando, FL.

Program Element: #63720A

Title: Chemical/Biological Detection, Warning, and Sampling Materiel Concepts

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D601 — Chemical Detection, Warning, and Sampling Materiel Concepts**

a. **(U) Project Description:** Conduct Advanced Development on new concepts for detection and monitoring of chemical agent contamination including remote and local point-source Nuclear, Biological, Chemical (NBC) sensing detectors and automatic alarms; detection and identification kits and robotic sensors; and handheld monitors for the detection, early warning, and identification of liquid or aerosol, persistent and nonpersistent chemical contamination. Equipment will be used for alerting field troops to chemical attack, for reconnaissance and survey of NBC battlefields, and monitoring for identification of clean areas and the degree of exposure to chemical agents.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Tasks during FY 1982 include XM21 Scanning Infrared Remote Alarm, Chemical (SCI-REACH); XM85/XM86 Automatic Liquid Agent Detector (ALAD); XM22 Automatic Chemical Agent Detector and Alarm (ACADA); and XM272 Detector Kit for Chemical Agents in Water. During FY 1982, reduced size and weight of XM21 alarm through redesign of electro-optical components, improved reliability of detector cooler, completed design testing of detector and initiated prototype fabrication, selected microcomputer and completed breadboard testing and completed design characterization of the thermal electric generator. Continued AD prototype design, test, and design review; fabricated development and operational test hardware; breadboarded a new telemetry concept which was listed, accepted, and prototyped; and initiated the deployment analysis, cost and operational effectiveness analysis, and development test I. During FY 1982, the XM22 ACADA AD contract was awarded. In addition, concepts were fully tested to select the best one and characterize the AD prototype. Established the overall system design and design parameters for contract effort. During FY 1982, AD was essentially completed for the XM272 Water Kit with successful completion of all development and operational testing; creation of a technical data package (TDP) suitable for procurement; redrafting of the expanded technical manual; and production of a pilot run of 60 units against the TDP prior to release for type classification and first production. Because of the success of the XM272 Water Kit AD prototype, type classification directly from AD was recommended and accepted by the user.

(2) **(U) FY 1983 Program:** Development of the XM21 will be suspended as a result of Congressional action with respect to the FY 1983 appropriation. The XM21 program will be restructured to permit resumption of Advanced Development (AD) in FY 1984. AD will be continued on the XM85/XM86 ALAD, XM22 ACADA, and XM272 Water Kit. The XM85/XM86 ALAD will complete AD including the fabrication of test hardware,

Program Element: **#63720A**

Title: **Chemical/Biological Detection, Warning, and Sampling Materiel Concepts**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems**

Budget Activity: **#4 — Tactical Programs**

development and operational testing, and preparation of the decision package for approval to proceed to full-scale development under Program Element #64724A. The XM22 ACADA will continue AD including initiating integrated circuit design, discrimination algorithms preparation, and fabrication of engineering design prototypes. The XM272 Water Kit will be type classified upon receipt of the approved Required Operational Capability anticipated early in FY 1983. Subsequently, first production will be undertaken for this stock fund item.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** AD will be continued on the XM21 SCI-REACH and XM22 ACADA. The XM21 will complete prototype test, and fabricate development and operational test hardware; complete design of the thermal electric generator and fabricate test prototypes; complete agent detection/discrimination algorithm; and prepare development and operational test plan. For the XM22, fabrication of DT/OT I prototype will be initiated and the coordinated test plan will be finalized. AD will be initiated on the NBC Reconnaissance System and the NBC Detector Remote which will be based on laser principles. The NBC Detector Remote will be a principal part of the NBC Reconnaissance System.

(4) **(U) Program to Completion:** This is a continuing program.

c. **(U) Major Milestones:** Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#63721A**

Title: **Chemical/Biological Protective Materiel Concepts**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	11180	8628	3107	9012	Continuing	Not Applicable
DE80	Chemical Protective Materiel Concepts	- 0 -	- 0 -	474	1422	Continuing	Not Applicable
DE81	Decontamination Materiel Concepts	4200	2674	523	2346	Continuing	Not Applicable
DJ30	Collective Protection Materiel Concepts for Armored Vehicles	5300	5450	1182	- 0 -	Continuing	Not Applicable
D604	Collective Protection Materiel Concepts	1680	504	928	5244	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Soviet Union has long recognized and appreciated the ability of chemical-biological weapons to inflict casualties, degrade combat effectiveness, and disrupt the battlefield. The USSR continues to maintain and improve its formidable capability to conduct chemical-biological warfare operations. Consequently, the US military must have the capability to survive and conduct sustained operations in a chemical-biological warfare environment. Failure to correct user-identified deficiencies in chemical-biological defensive materiel would seriously jeopardize the survivability of US forces in the event of a chemical-biological attack. The Army has been assigned Executive Agent responsibility for conducting chemical-biological defense research and development for the Department of Defense. This program element addresses the urgent need to provide all Services with defensive materiel to protect individuals and groups from threat chemical-biological agents. The program element provides for the conduct of Advanced Development for all the Services in respiratory protection materiel; means to decontaminate skin, clothing, equipment, and terrain; collective protection equipment for vans, vehicles, and shelters; and collective protection systems for armored vehicles.

Program Element: #63721A

Title: **Chemical/Biological Protective Materiel Concepts**

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	11180	8628	3107	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	10012	8650	8388	Continuing	Not Applicable

A restructuring of chemical-biological defense program elements was made between the FY 1983 and FY 1984 submissions. Project #D601 (Chemical Detection, Warning and Sampling Materiel Concepts) was moved from this program element to Program Element #63720A. This places all chemical-biological protective materiel under Program Element #63721A and all detection and warning materiel under Program Element #63720A. The restructuring facilitates better management of chemical-biological program execution. Funds shown above for the FY 1983 submission reflect the restructured program. In FY 1982, an increase of $1168 thousand was required to correct and verify by retesting deficiencies uncovered in the operational testing of the XM20 Simplified Collective Protection Equipment and the XM13 Portable Decontamination Apparatus and to cover an increase in the cost of the 5-ton truck used in the XM16 Jet Exhaust Decontamination and Smoke System. The funding decrease of $22 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. In FY 1984, the decrease of $5281 thousand is the result of a combination of the decision to adopt a turbine bleed air collective protection system rather than the Hybrid Collective Protection Equipment (HCPE) System for the M1E1 tank, program planning adjustments from armored vehicle collective protection and decontamination materiel to other, higher priority Army requirements, and a revision of the anticipated inflation in the proposed Army RDTE budget. The M1E1 tank decision takes advantage of the high-pressure bleed air available from a turbine engine to replace the electric blowers and dust prefilters used with the HCPE System and thereby reduces the size and weight of the M1E1 collective protection system. Much of the remainder of the turbine bleed air system uses hardware developed for the HCPE System.

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands) Not applicable.

E. (U) RELATED ACTIVITIES: Department of Defense Directive 5160.5 assigns the Army responsibility for research, exploratory development, and advanced development in chemical-biological defense for all Services and for engineering development for the Army and for joint requirements of the Army with other Services. In order to meet other Services' needs and to prevent unnecessary duplication of effort, execution of this responsibility is coordinated through the Joint Development Objectives Guide (JDOG), joint working groups, and periodic joint reviews of the Joint Chemical-Biological Research, Development, Test, and Evaluation Program. Supporting exploratory development work is performed under Program Element #62706A

Program Element: #63721A

Title: Chemical/Biological Protective Materiel Concepts

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

(Chemical Defense and General Investigations). Succeeding engineering development efforts are performed under Program Element #64725A (Chemical Defense Materiel).

F. (U) WORK PERFORMED BY: In-house: Chemical Systems Laboratory, Aberdeen Proving Ground (APG), MD; Test and Evaluation Command, APG, MD; Army Materials and Mechanics Research Center, Watertown, MA; Army Tank-Automotive Command, Warren, MI; Human Engineering Laboratory, APG, MD; Arctic Test Center, Fort Greely, AK; and Tropic Test Center, Panama. Contractor: Brunswick, Marion, VA; All-Bann Enterprises, CA; Bendix, Towson, MD; and Brunswick, Deland, FL.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DE80 — Chemical Protective Materiel Concepts:** This project supports advanced development (AD) efforts in individual respiratory protection to provide protection against threat chemical-biological agents which are effective through the respiratory tract. Efforts focus on providing required levels of protection with minimal breathing resistance or degradation of performance. Although classified as a new start, this project is, in fact, part of a continuing program to develop improved respiratory protection systems. No development efforts were conducted in FY 1982 or are planned for FY 1983 since all respiratory protection systems in development during this period are in engineering development or exploratory development. In FY 1984, advanced development will be initiated on a Power Respiratory System consisting of a lightweight, manportable blower-filter-mask assembly for use by aircrews, reconnaissance and decontamination personnel, and selected combat vehicle crewmen. The system will reduce breathing resistance and heat stress and provide improved protection for personnel who must operate in contaminated areas under high heat stress conditions for sustained periods without collective protection equipment. During FY 1984, the AD contract will be awarded, the system concept established, and engineering tests will be initiated to characterize prototype specifications.

2. **(U) DE81 — Decontamination Materiel Concepts:** This project supports advanced development (AD) efforts in materiel to decontaminate skin, clothing, equipment, and terrain. Since many chemical-biological agents inflict casualties on contact and persist in target areas for long periods and prolonged wearing of protective equipment degrades performance, it is necessary to provide rapid, effective means of decontaminating chemical-biological agents. During FY 1982, AD was continued on the XM13 Portable Decontamination Apparatus (DAP), XM16 Jet Exhaust Decontamination and Smoke System (JEDSS), and XM15 Interior Surface Decontamination System (ISDS). The XM13 is presently undergoing an Operational Test IA (OT IA) to establish a better operational Reliability, Availability, and Maintainability (RAM) and logistics data base. The XM16 completed AD prototyping and Development Test I (DT I). The XM15 completed AD prototyping and fabrication of test hardware. During FY 1983, AD will be completed on the XM13 Portable Decontamination Apparatus with subsequent type classification and first production. AD will be completed in midyear on the XM16 Jet Exhaust Decontamination and Smoke System (JEDSS) and the prototype moved to full-scale development under Program Element #64725A, Project #DF97. AD on the XM15 Interior Surface Decontamination System (ISDS) will be completed in October 1983 with subsequent transition to full-scale

Program Element: #63721A

Title: Chemical/Biological Protective Material Concepts

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

development under Program Element #64725A, Project #DF97. AD will be initiated on the Personal Equipment Decontamination System (PEDS) in FY 1983 to satisfy the requirement to decontaminate chemical-biological (CB) protective clothing in the field. In FY 1984, AD will be continued on the Personal Equipment Decontamination System (PEDS) and initiated on the Multipurpose Decontaminant. PEDS will provide a means of decontaminating the CB overgarment and alleviate the logistics burden which would be imposed by the current concept of discarding contaminated overgarments. PEDS will use a nonaqueous decontamination mechanism since the CB overgarment cannot be decontaminated using current and developmental water-based laundry/decontamination systems. Water-based systems remove the charcoal from the CB overgarment and degrade its effectiveness. PEDS complements the Mobile Combat Field Clothing Decontamination System being developed under Program Element #63747 (Soldier Support/ Survivability). This system provides an energy-efficient means of laundering and, except for the CB overgarment, decontaminating individual clothing. During FY 1984, fabrication of PEDS test hardware will be completed, preparation of the preliminary Technical Data Package (TDP) will continue, and DT/OT I will be started. Multipurpose Decontaminant will be a low-cost, concentrated, low- or non-corrosive decontaminant to replace current decontaminants which are too corrosive for general use and, due to their bulk, impose a logistic burden. During FY 1984, the AD contract will be awarded and Development Test (DT)I will be initiated for the Multipurpose Decontaminant.

3. *(U)* **DJ30 — Collective Protection Material Concepts for Armored Vehicles:** To meet the threat of chemical-biological warfare, Congress directed in the FY 1978 Department of Defense (DOD) Appropriations Act (PL 95-79) that the Army prepare a plan to provide nuclear-biological-chemical (NBC) protection for combat vehicles in development or procurement by 1981, which was done. Subsequently, a threat assessment and review of the Army's tactical doctrine for operating in a chemically contaminated environment resulted in an Army plan for providing NBC collective protection for fielded as well as developmental combat vehicles and their crews. The provision of collective protection for combat vehicle crews provides improved protection; contributes to reducing the performance degradation imposed by individual protective equipment; and, when complemented by a micro- or macro-climatic cooling system, allows sustained operation in a chemical-biological environment under moderately warm to hot climatic conditions with little or no crew performance degradation due to heat stress. This project provides for the development of new and improved collective protection equipment and subsystem components including filter elements for combat vehicles and manages the development of cooling systems for combat vehicle crews. The project will culminate in the preparation of Technical Data Packages (TDP) and transition hardware to assist weapon system project managers in integrating or designing collective protection into their weapon system. The collective protection system will be incorporated into weapon systems by the weapon system project managers and type classified as a component of new or improved weapon systems. During FY 1982, Hybrid Collective Protection Equipment (HCPE) prototypes and engineering hardware test units were developed, Engineering Development Testing (EDT) I was largely completed, investigations of combat vehicle chemical-biological vulnerability reduction measures were continued, and an evaluation of tank gunner performance degradation in individual protection equipment was completed. During FY 1983, EDT I will be completed, TDP finalization and EDT II will be initiated, and fabrication of transition hardware will be initiated. In FY 1984, development of the HCPE and subsystem components will be completed, and the TDP and transition hardware will be provided to weapon system managers.

Program Element: **#63721A**

Title: **Chemical/Biological Protective Materiel Concepts**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems**

Budget Activity: **#4 — Tactical Programs**

4. **(U) D604 — Collective Protection Materiel Concepts:** This project supports advanced development (AD) of collective protection equipment for vans, vehicles, and shelters and special-purpose chemical-biological shelters. Meets user requirements for contamination-free environments for essential command and control, maintenance, communications, and recuperation functions which cannot be adequately performed using individual protection equipment. During FY 1982, the project completed AD prototyping, hardware fabrication, and initiation of Development and Operational Test I (DT/OT I) for the XM20 Simplified Collective Protection Equipment (SCPE). In FY 1983, AD will be completed on the XM20 SCPE including an expanded Development and Operational test program, the XM20 will be type classified directly from AD, and initial production will begin. During FY 1984, AD will be initiated on an Advanced Collective Protection System that will provide a fully modularized, lightweight, low-power filtration system incorporating impermeable and agent-resistant materials and integrated protective entrances for tactical vehicles, vans, and shelters. The Advanced Collective Protection System will minimize the power, weight, and bulk penalties imposed by the current family of Modular Collective Protection Equipment (MCPE) and will eventually replace the current MCPE family. In FY 1984, the AD contract will be awarded, the AD design will be established, and fabrication of the AD prototypes will be initiated.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63723A

Title: Command and Control

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	22788	19945	23892	34957	Continuing	Not Applicable
D101	Tactical Automation	3059	4772	9617	11277	Continuing	Not Applicable
D185	Military Software Standardization	2887	3690	5867	5868	Continuing	Not Applicable
D186	Military Computer Family	16842	9705	5910	11643	Continuing	Not Applicable
D335	Communicative Technology	- 0 -	1778	2498	6169	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: To provide commanders with needed near-realtime battlefield information, the fielding of survivable battlefield automated systems must be accelerated. To meet this goal, this program will provide a family of standard compatible computers and peripherals (Military Computer Family) and transportable software products and tools to include Ada, the standard DOD high-order computer programing language. It will also provide a family of multilevel MCF secure operating systems and distributed processing techniques to increase battlefield survivability. It will provide computer resource management policy, procedures, and training to assure reduction of computer resource proliferation.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	22788	19945	23892	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	20939	22133	41232	Continuing	Not Applicable

Program Element: #63723A

Title: Command and Control

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

Increase of $1849 thousand in the FY 1982 funding level is a result of reprograming and redirection to the technical C³I thrusts. The funding decrease of $2188 thousand in FY 1983 is a result of Congressional direction in the FY 1983 Appropriations Act and pro rata application of general Congressional reductions to the RDTE,A appropriation. The reduction of $17340 thousand in the FY 1984 funding level resulted from reprograming to higher priority requirements and a revision of the anticipated inflation in the Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This project is related to all Army battlefield automation systems, since it will provide a standard family of computers, peripherals, and selected software for those systems. The instruction set architecture, NEBULA, to be used in MCF is under joint Air Force-Army management and control. MCF is an Army computer standardization project oriented to the technologies of 1984 and beyond with provision for continuing competition and technology insertion. There is a close relationship between the MCF Project and Program Element 62704F, Very High Speed Integrated Circuits (VHSIC). Related programs being carried on by the other Services are the Navy's Naval Embedded Computer System (NECS) and AN/AYK-14 Programs and the Air Force's MIL-STD-1750 Program. Activities of the other Services are carefully studied to avoid duplication. This project is related to Program Element #23726A, Army Field Artillery Tactical Data Systems (AFATDS), Program Element 62701A, Communications Electronics, Program Element #62746A, Tactical Automation Technology, Program Element #64102A, Missile Minder (AN/TSQ-73); and other command and control programs by developing new technology, tools, equipment, interfaces, and systems engineering for these systems. An Ada Joint Program Office (AJPO) has been established by the Under Secretary of Defense for Research and Engineering to manage the common Ada effort. The Army's Ada effort has been coordinated with AJPO and received their acceptance that there is no unnecessary duplication of effort among the Army, the other Services, or the Department of Defense (DOD). Coordination to avoid duplication and provide guidance is accomplished through the Department of Defense Computer Resources Technology Panel of the Management Steering Committee for Embedded Computer Resources, meetings between project managers of Services and agencies, and DOD reviews.

F. (U) WORK PERFORMED BY: Raytheon, Sudbury, MA; RCA, Moorestown, NJ; Softech, Inc., Waltham, MA; General Electric, Syracuse, NY; Boeing, Seattle, WA. There are fourteen additional contractors with contracts totaling $3,553,447. In-house developmental efforts are performed by the Army Communicative Technology Office, US Army Communications-Electronics Command, Ft Monmouth, NJ.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D101 — Tactical Automation:** This project includes development efforts in the areas of: computer security, operating systems, trusted data base management systems, distributed processing, validation of computer systems, computer resource management standardization and artificial intelligence are being performed to solve the security problem, increase survivability of battlefield automated systems and reduce computer resource

Program Element: #63723A

Title: Command and Control

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

proliferation. FY 1982 work was initiated to develop secure operating systems for Military Computer Family (MCF), and to develop an experimental distributed processing facility and an MCF Validation System. Nine volumes of Computer Resource Management (CRM) guidebooks were completed and distributed. A draft Product Line Management (PLM) Catalog of standard computer equipment to be used until MCF becomes available was distributed. In FY 1983, it is planned to validate the MCF Advanced Development Models, integrate the Ada Language System (ALS), present ALS for DOD certification, complete development of initial transitioning documentation for ALS, initiate specifications for secure operating systems for MCF, develop distributed processing techniques, establish a PLM laboratory, initiate acquisition of a network of computers suitable for artificial intelligence (A/I) development, and begin to develop a System using A/I. In FY 1984, the secure operating systems for MCF will be implemented, a distributed processing implementation of a portion of the maneuver battlefield functional areas will be developed, the formulation of a distributed secure operating system on a distributed processing network will be started, the development of a local area network for distributed processing will be initiated. CRM work will continue as will the acquisition of artificial intelligence equipment and development work in this area, complete development and enhance ALS; apply ALS to additional target computers, support transitioning of ALS and enhance documentation. This is a continuing program.

2. (U) **D185 — Military Software Standardization:** The objective of this project is to develop the Ada Language System (ALS) and the Ada and ALS education and transitioning initiative. This is needed to standardize the computer language used by battlefield automated systems with resultant reduction in support and training costs. In FY 1982, ALS development continued and the ALS curriculum development was started. In FY 1983 it is planned to release the final user's guide for Ada. In FY 1984, it is planned to complete the development of the ALS.

3. (U) **D186 — Military Computer Family:** The objective of this project is to develop a family of standard computers and peripherals for Army-wide use in battlefield automated systems, in order to eliminate computer proliferation, enhance battlefield survivability, simplify software development and support, and reduce costs of logistics, maintenance, and training. In FY 1982, the MCF Design Plans were completed, and the fabrication of MCF AD Models was initiated. The MCF AD Models are to be delivered in FY 1983, validation of models will be performed and full-scale development contracts will be awarded. In FY 1984, full-scale development contracts will be awarded and the MCF Validation System development will be completed. This system will be used to validate the NEBULA Instruction Set and MCF interfaces. It will also be used for extended MCF testing to include multi-computer and reliability tests. MCF technology insertion design will be conducted and internal efforts will begin for future MCF development.

4. (U) **D335 — Communicative Technology:** This project satisfies the need for general-purpose information delivery systems that will provide efficient, cost effective, and timely delivery of maintenance and instructional information to the soldier at his place of work. It establishes the foundation for a phased evolution of electronic training and technical documentation systems into integrated distribution and delivery systems for the Army. This project was initiated in FY 1983. During this year, a contract will be awarded for fabrication and testing of the Electronic Information Delivery System (EIDS) brassboard which marks phase I of the design and development of the Advanced Development (AD) of the EIDS. This AD effort will continue throughout FY 1984 to include an operational evaluation of the AD EIDS model and design and development of the "militarized" EIDS. An

Program Element: #63723A

Title: Command and Control

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

In-process Review is scheduled for FY 1984, to determine if the program should advance to full-scale development or be advanced directly into production.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: 63726A

Title: Combat Support Equipment

DOD Mission Area: #213 — Land Combat Engineer Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6117	6906	7853	21235	Continuing	Not Applicable
DG01	Combat Engineer Equipment	2572	4762	2789	7982	Continuing	Not Applicable
DG14	Container Distribution Equipment	200	122	2452	3225	Continuing	Not Applicable
DK39	General Support Equipment	- 0 -	- 0 -	- 0 -	4454	Continuing	Not Applicable
DK41	POL Distribution Systems	2305	941	1201	2180	Continuing	Not Applicable
D428	Tactical Rigid-Wall Shelters	1040	1083	1411	1055	Continuing	Not Applicable
D526	Marine Oriented Logistics Equipment	- 0 -	- 0 -	- 0 -	2339	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Army requires new and advanced land combat service support equipment to meet the logistics support and mobility requirements of the current and future battlefield. The effectiveness and survivability of the combat forces in a hostile situation are highly dependent on logistics support. Vital cargo such as fuel, ammunition, food, water, and medical supplies must be delivered to field units as required, at the right time and location, and in useable condition. Current systems are labor intensive, approaching obsolescence, and do not possess the high-speed maneuverability consistent with the Air-Land Battle 2000 concept. Increased use of commercial containerships and fuel tankers to efficiently transport the large volumes of combat supplies requires military equipment capable of offloading, transporting, and distributing containerized cargo and bulk fuels. Providing essential logistics resupply equipment is a primary objective of this program. This program also provides materiel that will increase the Army's tactical mobility and battlefield survivability, while reducing the logistics burden. New tactical bridging will improve capabilities for crossing rivers and other natural barriers. A containerized ammunition loading system will provide a capability for sustained rapid outloading of ammunition containers. New water purification equipment will efficiently provide potable water from any source, including nuclear-, biological-, and chemical-contaminated ones. Tactical rigid-wall shelters will enhance protection of personnel and equipment from battlefield and environmental threats (nuclear, chemical, ballistic, electromagnetic, and extreme environments), promote standardization and improve maintainability by minimizing the number and type of shelters, improve transportability by conforming to international standards, and provide increased versatility through modular design.

Program Element: **63726A** Title: **Combat Support Equipment**

DOD Mission Area: **#213 — Land Combat Engineer Support** Budget Activity: **#4 — Tactical Programs**

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	6117	6908	7853	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	6707	8113	13781	Continuing	Not Applicable

The reduction in the FY 1982 funding level is a net result of reprograming to higher priority Army requirements partially offset by increased effort in fuel distribution systems, Project DK41. The funding decrease in FY 1983 is the result of reprograming of funds for the 105mm Gun Enhancement, and pro rata application of general Congressional reductions to the RDTE,A appropriation. Decrease of $5,928 thousand in FY 1984 is due to reduction in scope of effort planned in Project DG01 partially offset by an increase in Project D428 to fund high-priority testing of chemical and electromagnetic interference protective shelters and associated complexing systems and a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Coordination to avoid duplication and provide program guidance is accomplished through the Department of Defense Joint Intermodular Steering Group, the Joint Committee on Tactical Shelters, the Program Advisory Group for Bulk Petroleum Fuels Distribution, the Water Resources Management Action Group, and the DOD Executive Agent for Land-Based Water Resources. Related Exploratory Development programs are in Program Element (PE) #62723A (Clothing, Equipment, and Shelter Technology) and PE #62733A (Mobility Equipment Technology). Items in this PE progress to Engineering Development in PE #64717A (General Combat Support).

F. (U) WORK PERFORMED BY: In-house efforts are performed by the US Army Mobility Equipment Research and Development Command, Fort Belvoir, VA, and the US Army Natick Research and Development Laboratories, Natick, MA. Current contractors include Kaiser Aerospace Electronics Corp., Oakland, CA; Automatic Truck Loading Systems, Inc., Carlisle, PA; Diversified Data Corp., Springfield, VA; Foster-Miller Associates, Incorporated, Waltham, MA; ICO Positive Seal Corp., Odessa, TX; Radian Corp., Alexandria, VA; BDM Corp., McLean, VA; United Technologies Corp., South Windsor, CT; Southwest Research Institute, San Antonio, TX; Science Applications, Inc., McLean, VA; Uniroyal, Inc., Mishawaka, IN; Fiber Sciences Div. of EDO Corp., Salt Lake City, UT; Fiber Materials, Inc., Biddeford, ME; Exxon Materials Div., Greer, SC; Garrett Corp., Phoenix, AZ; Brunswick Corp., Marion, VA; Electrospace Systems, Inc., Richardson, TX; and Kamon Avidyne, Burlington, MA.

Program Element: **63726A** Title: **Combat Support Equipment**

DOD Mission Area: **#213 — Land Combat Engineer Support** Budget Activity: **#4 — Tactical Programs**

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DG01 — Combat Engineer Equipment:** This project includes the development of a new assault bridge for the heavy force to replace the Armored Vehicle Launched Bridge now in use. The new system will meet the needs of the heavy force for the 1990s for longer spans to permit assault crossing of larger gaps and carrying heavier loads. Preliminary design was initiated in FY 1982. In FY 1983 preliminary design will be completed and prototype development initiated. Fabrication of advanced development prototypes will continue in FY 1984. Also included is the development of systems to assure access to and egress from gap-crossing sites by tactical vehicles and a system to improve the Army's tunnel detection capability. In FY 1982 component development of access/egress systems continued leading to initiation of prototype fabrication in FY 1983. Development Test I/Operational Test I (DTI/OTI) for both the access/egress and tunnel detection systems are scheduled for FY 1984.

2. **(U) DG14 — Container Distribution Equipment:** The Army requires a functional, responsive, integrated supply distribution system to provide an efficient capability for moving containerized and general cargo from source to user elements in the combat area, including missions in undeveloped areas. The program includes component/subsystems development and feasibility assessment of items to support logistics resupply. In FY 1982, design of apparatus for installing dunnage in commercial containers, a subsystem of the Prestaged Ammunition Loading System (PALS), was completed. In FY 1983 the design of the PALS will be completed with fabrication of demonstration hardware and six transfer vehicles following in FY 1984. Design of a dock facility will be initiated in FY 1984.

3. **(U) DK41 — POL Distribution Systems:** Critical deficiencies exist in current Army capabilities to supply Army and other Services' needs for fuel in theater operations during wartime, particularly in support of tank/armored vehicle operations in undeveloped areas. Efforts leading to engineering development of various systems, equipment, and techniques for receipt, storage, transport and dispensing of fuel and associated products are included. Logistics support and training packages were updated for the Bulk Fuel Tank Assembly in FY 1982. Development Test I/Operational Test I (DTI/OTI) hardware was fabricated/procured for the Petroleum Hoseline System, Arctic Fuel Dispensing System and Pipeline Outfit, Petroleum. In FY 1983 DTI/OTI will be completed for the Bulk Fuel Tank Assembly, the Development Acceptance In-Process Review (IPR) will be conducted and the system type classified. The Petroleum Hoseline System will complete DTI/OTI and a Validation IPR will be conducted. Engineering design testing will be completed on the Arctic Fuel Dispensing System and a special IPR will be conducted to type classify the Pipeline Outfit, Petroleum. In FY 1984 the Bulk Fuel Tank Assembly will progress to the production base, the Petroleum Hoseline System will move to full-scale development, components of the Arctic Fuel Dispensing System will enter onsite user tests and the Technical Data Package will be completed for the Pipeline Outfit, Petroleum.

4. **(U) D428 — Tactical Rigid-Wall Shelters:** This program will provide shelter systems affording environmental protection from worldwide climatic conditions and eliminate proliferation of special-purpose shelters, vans, and pods. Initial effort is concentrated on designs that meet International Organization For Standardization standards to improve transportability, reduce costs by minimizing number and types, and incorporate hardening

Program Element: **63726A** Title: **Combat Support Equipment**

DOD Mission Area: **#213 — Land Combat Engineer Support** Budget Activity: **#4 — Tactical Programs**

against tactical nuclear weapons, chemical warfare agents, fragmentation weapons, and electromagnetic interference (EMI). In FY 1982 and prior years, a chemical protection kit for the nonexpandable shelter was fabricated. Work was started on a chemical-protective kit for the one-side expandable shelter. EMI protection kits providing attenuation of 60 decibels were fabricated. A basic complexing kit and shelter alignment device were fabricated and testing initiated. These allow for manually positioning shelters and expanding the usable workspace. Investigation of alternate materials for shelter panels to optimize design by reducing weight and cost was initiated. Nuclear-hardened panel specimens were designed for shock tube tests in support of the basic hardening program. In FY 1983 the nonexpandable chemical-protective shelter, the 60-decibel EMI-protective nonexpandable shelter, and the prototype basic complexing kit and shelter alignment device will be tested. The one-side expandable shelter design will be refined, and design of an EMI complexing system providing protection against chemical warfare agents will be initiated. Fabrication of a prototype shelter with optimum panel materials and design of an extendable building prototype and low-cost alternative for greatly increasing shelter space will be initiated. Shock tube tests of nuclear panels will be completed. In FY 1984 the nonexpandable chemical-protective and EMI shelters will be moved into full-scale development. The chemical-protective and EMI shelters and their complexing system will be tested. The prototype optimum panel shelter and the expandable building prototype will be evaluated.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#63730A**

Title: **Tactical Surveillance System**

DOD Mission Area: **#322 — Tactical Intelligence and Related Activities for Tactical Land Warfare**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	14984	22164			Continuing	Not Applicable
D560	Tactical Surveillance System	14984	22164			Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element supports the portion of the Army's Tactical Exploitation of National Capabilities (TENCAP) program advanced development work which is directed toward developing a tactical support system to receive, process, and disseminate intelligence/information from multiple sources which locates enemy units, activity, and targets representing a general tactical threat. Systems developed will be the primary source of intelligence on enemy second-echelon forces. Such intelligence/information is essential to the tactical commander to enable him to fight and win while outnumbered in a high-intensity conflict. The tactical commander must have the capability to locate, identify, engage, and attrite superior enemy forces at maximum range to insure that a manageable combat power ratio exists in the main battle area. In the TENCAP program, advanced techniques are applied to exploit deep reconnaissance information which, in general, is not otherwise obtainable, and then provide that information to tactical commanders in a sufficiently timely and useful form to allow them to maneuver and target their forces to defeat the enemy. This program is described in further detail, at a higher classification level, in the Tactical Intelligence and Related Activities (TIARA) Congressional Justification Book (CJB).

Program Element: #63730A

Title: **Tactical Surveillance System**

DOD Mission Area: **#322 — Tactical Intelligence and Related Activities for Tactical Land Warfare**

Budget Activity: **#4 — Tactical Programs**

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	14984	22164		Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	14984	22227		Continuing	Not Applicable

(U) The FY 1983 decrease is due to pro rata application of general Congressional reductions to the RDTE,A appropriation. The FY 1984 increase is due to realignment within the TENCAP program.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Technological developments designed to shorten the time required to collect and disseminate information are related to this development. These areas include automated reconnaissance procedures, communications and high data rate compression technologies, and tactical identification and targeting. The use of satellite communications is being considered. This work is coordinated with appropriate departments and agencies. Program Element (PE) #64740 (Tactical Surveillance Systems) covers engineering development (ED) work related to this program.

F. (U) WORK PERFORMED BY: RCA Corp., Camden, NJ; Aerospace Corp., El Segundo, CA; US Army Electronics Research and Development Command (ERADCOM), Adelphi, MD; Ford Aerospace Corp., Palo Alto, CA; Systems Planning Corp., Arlington, VA; MRJ, Inc., McLean, VA; DBA, Inc., Melbourne, FL; Science Applications Inc., La Jolla, CA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

Program Element: #63730A

Title: Tactical Surveillance System

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

1. **(U) Project: D560 — Tactical Surveillance System**

a. **(U) Project Description:** Tactical Exploitation of National Capabilities (TENCAP) Program — This project supports the advanced development of a tactical support system to collect, process, and disseminate intelligence/information which locates and identifies enemy units, activity, and targets representing a tactical threat. ADV techniques are employed to provide essential intelligence information to the Corps Commander's All Source Analysis Center (ASAC) in near-realtime (NRT). In the ASAC, this data is fused with Human Intelligence (HUMINT), Signals Intelligence (SIGINT), Photographic Intelligence (PHOTINT), and other source data to provide a composite picture of the battlefield. This project is closely coordinated with the TENCAP and SENSOR programs of other Services and other Army Information/Fusion systems.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1992 Accomplishments:** Continued development of interface for testbed and new sensors. Continued development of improved communications and interfaces with Interim Tactical ELINT Processor (ITEP) and All Source Analysis System (ASAS). Began Interim Tactical Imagery Exploitation System (ITacIES) development.

(2) **(U) FY 1993 Program:** Continue ITacIES advanced development. Begin operator training for ITacIES. Support TENCAP exercises. Continue software development for integrating data from a new national sensor. Begin Engineering Support for USAF Program. Begin advanced development for direct downlink from national systems.

(3) **(U) FY 1994 Planned Program and Basis for Budget Year Request:** Complete development for two ITacIES to be deployed to tactical corps. Begin operational evaluation of ITacIES. Continue support for USAF Program. Continue advanced development for direct downlink from national systems.

(4) **(U) Program to Completion:** This is a continuing program.

c. **(U) Major Milestones:** Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63732A

Title: Combat Medical Materiel

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	190	224	7717	8441	Continuing	Not Applicable
D836	Combat Medical Materiel	190	224	7717	8441	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element supports the advanced development required to field new and improved medical equipment essential for provision of field combat casualty care. These systems should be capable of handling large numbers and varieties of combat injuries in the environment of the high intensity battlefield and highly mobile divisions. The goal is to reduce logistical support requirements by increasing resource and personnel efficiency through use of advanced technology. Army need is defined in Level II Mission Area Analysis, Combat Service Support, Medical, and by requirements documents from the Academy of Health Sciences, Combat Developments and Health Care Studies Directorate, Ft. Sam Houston, TX.

C. (U) *COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY:* *($ in Thousands)*

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	190	224	7717	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	190	224	260	Continuing	Not Applicable

The increase in funds above those shown in FY 1983 submission is needed to move several field medical materiel systems from exploratory development to advanced development which include: oxygen-carrying battlefield resuscitation fluid (Stroma-Free Hemoglobin), pyrogen-free water for injectables, laser-protective spectacles, high-technology combat medical aid for identification/location, triage, and treatment of combat casualties, and protective containers for field medical devices. Items are needed to increase sustainability and to decrease supply, storage, and logistical burdens associated with whole blood and other intravenous resuscitative fluids, prevent laser eye injuries, and to save lives on the modern battlefield. Funding requirements are current industry estimates to continue development of these items and perform extensive safety and efficacy studies to meet rigid requirements of the Food and Drug Administration.

Program Element: #63732A | Title: Combat Medical Materiel

DOD Mission Area: #215 — Land Warfare Support | Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The program contains items and systems that have progressed to advanced development or are anticipated to progress to advanced development from related exploratory development Program Element #62772A (Combat Casualty Care Treatment Technology). Related engineering development Program Element is #64717A (General Combat Support), Project #D832 (Combat Medical Materiel). The Joint Technology Coordinating Group for Combat Casualty Care of the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee insures the coordination of Air Force and Navy systems by yearly joint program review and monthly discussions of this coordinating group.

F. (U) WORK PERFORMED BY: Presently, all work is performed in-house by the US Army Medical Bioengineering Research and Development Laboratory, Ft. Detrick, MD, and Letterman Army Institute of Research, Presidio, San Francisco, CA. However, extramural efforts will be required to support FY 1984 advanced development of listed field medical materiel items.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D836 — Combat Medical Materiel: The purpose of this project and need are as outlined under paragraph B. 1982 accomplishments were: steam vacuum pulse and ethylene oxide sterilization system prototype units were transitioned to engineering development and transferred to Program Element #64717A, project #D832. Goals for FY 1984-1985 are to bring forward from exploratory development the protective containers for field medical devices and the field generation of sterile pyrogen-free water for injectables. The major goal is to proceed to advanced development with the total system of resuscitative fluids to include the pilot plant production of modified Stroma-Free Hemoglobin.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63740A

Title: Division Air Defense Command and Control (SHORAD C² System)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9171	1000	2692	- 0 -	- 0 -	25919
D593	Short-Range Air Defense Command and Control	9171	1000	2692	- 0 -	- 0 -	25919

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Short-range air defense (SHORAD) command and control is provided through three major elements: A sensor to provide aircraft position data, command and controlling information provided by data processing subsystems to enhance the air defense system gunner's capability in effectively engaging the target, and a communications medium which provides for the exchange of controlling and sensor information. The present manual SHORAD control system furnishes these elements with unacceptable effectiveness. When considering the improved short-range air defense weapon capabilities and the increased capability of threat aircraft, the present control system does not support the force commander's requirement to manage air defense and use weapons effectively. The shortfalls in the flow of air battle information result in slow, error-prone dissemination of air defense control orders by SHORAD commanders, incomplete and inaccurate engagement information to SHORAD gunners, and untimely and inaccurate sensor data to the entire system. The impact of these shortfalls causes missed opportunities to engage enemy aircraft, the useless expenditure of air defense munitions through the simultaneous engagement of a single aircraft by two or more weapon systems, and increased risk to friendly aircraft. A new SHORAD command and control system is necessary to improve the effectiveness of SHORAD weapons and overcome present shortfalls by integrating weapons, sensors, and data devices into a functional system. This will be accomplished through the use of digital processing of target information, improved dissemination or air threat warning and weapon control orders, and the introduction of additional instrumentation to allow timely and accurate presentation of appropriate battle information at the gunner position. Data for Airspace Management will be provided by the SHORAD C² system to support the airspace management element. An automated interface will allow Air Defense information to be provided to other battlefield automated systems. To support earliest practical deployment of a viable command and control system that fulfills a near-term requirement, the maximum use will be made of already-developed hardware.

Program Element: #63749A

Title: Division Air Defense Command and Control (SHORAD C² System)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	9171	1000	2692	- 0 -	25919
Funds (as shown in FY 1983 submission)	9171	4399	8344	211347	245499

The funding decrease of $3.4 million in FY 1983 is a result of Congressional direction in the FY 1983 Appropriations Act. This program progresses to Engineering Development (ED) in FY 1984. The decreased funds in FY 1984 represent fewer requirements since ED is executed in 2nd quarter FY 1984 and will then be funded through PE #64741A. The additional to completion and total estimated cost for Engineering Development are reflected in CDS for PE #64741A.

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This system interfaces with all short range air defense (SHORAD) weapons to include: Roland (PE #63709), Chaparral (PE #23730), DIVAD gun (PE #64318), Vulcan (PE #23741), Stinger (PE #64306) and SHORAD C² (PE #64741). The operation and/or configuration of the above systems will be directly affected by the SHORAD command and control system. Unnecessary duplication of effort will be avoided by continued direct contact and exchange of status information between and among the project offices involved. PE #64741A (SHORAD C²) *supports Engineering Development to begin in FY 1984.*

F. (U) WORK PERFORMED BY: Program Management will be performed by the Project Manager, Air Defense Command and Control Systems (ADCCS), assigned to the US Army Missile Command (MICOM), Redstone Arsenal, AL. Concept Definition is being performed by the Army Missile Laboratory at MICOM.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Project D593 — Short-Range Air Defense Cmd & Control. A Short-Range Air Defense Command and Control (SHORAD C²) System will improve the effectiveness of SHORAD systems by providing precise and timely target information, including tentative target identification, to the SHORAD gunner. Additionally, the system will alert maneuver elements and SHORAD units. In FY 1982 an Army (in-house) effort was accomplished that refined system requirements, defined system configuration alternatives, defined test and evaluation

Program Element: #63746A

Title: Division Air Defense Command and Control (SHORAD C² System)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

and Integrated Logistic Support (ILS) requirements, and defined system concept and acquisition strategy. In FY 1983 the Army will prepare and release requests for proposal which will support Engineering Development contracts for a SHORAD C² system. Additionally, the Army will complete a cost and operational effectiveness analysis (COEA), develop scopes of work for major contractors, and evaluate submitted contractor proposals. All above pre-Engineering Development (ED) work will be completed during the first quarter FY 1984. The program will progress to ED in second quarter FY 1984.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63741A

Title: Meteorological Equipment Development

DOD Mission Area: #218 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	- 0 -	2717	3607	Continuing	Not Applicable
D158	Meteorological Equipment & Systems	- 0 -	- 0 -	2717	3607	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The primary thrust of this program is to conduct advanced development of meteorological equipment and systems essential to the planning and conduct of Army combat operations. This program addresses present deficiencies in the Army's ability to rapidly acquire, process, and disseminate meteorological parameters that affect deployment and operations of weapon systems. These data are of particular significance for artillery ballistic computations, sound ranging, chemical, biological, and nuclear prediction. Development of equipment includes the Global Positioning System Sonde ceiling height/visibility sensor and a remote wind sensor for tactical reports. The Automatic Meteorological Station, AN/TMQ-30, will provide realtime meteorological data for support of Airborne, Army, Aviation, Artillery, Smoke and Chemical agent employment or defense. The Army presently has no system in the field that can provide these low-level atmospheric sensings. Advance development of other essential items will be conducted under this program in the outyears.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands) Not applicable, this is a NEW START in FY 1984.

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands) Not Applicable

E. (U) RELATED ACTIVITIES: Program Elements #61102A, B53A (Atmospheric Sciences); #62111A, AH71 (Atmospheric Investigations); and #64726, (Meteorological Equipment and Systems). Requirements are coordinated with the Army-Air Weather Service Meteorological Equipment Coordination Committee. As a result of Committee Coordination, equipment is being developed to meet Army and Air Force requirements. Coordination on meteorological equipment development with NATO allies is accomplished in Panel XII (Meteorology), NATO Army Armaments Group. Several NATO nations have expressed an interest in purchasing items of US equipment currently under development. Coordination with the National Weather Service and nonmilitary organizations developing meteorological equipment for civilian use is accomplished through the Under Secretary of Defense for Research and Engineering (USDR&E) participation on the Interdepartmental Committee for Applied Meteorological Research (ICAMR), and through the Annual Symposium on Meteorological Observations and Instrumentation, sponsored by the American Meteorological Society.

Program Element: #63741A

Title: Meteorological Equipment Development

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

F. (U) WORK PERFORMED BY: *This program is the responsibility of the US Army* Atmospheric Sciences Laboratory, Electronics Research and Development Command, White Sands Missile Range, NM.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D158 — Meteorological Equipment and Systems (NEW START): This project conducts Advanced Development of meteorological systems in support of the field Army. Within this project the development of the sonde to support the Global Positioning System is required because the LORAN/OMEGA Sonde will become obsolete. Also, the ceiling height/visibility sensor enhances the effectiveness of electro-optical sensitive weapons. The remote wind sensor for tactical rockets is required for free-flight rocket wind correction along the trajectory path. This project was not funded in either FY 1982 or FY 1983. In FY 1984, development of the Global Positioning Sonde will be initiated. A technical data package will be prepared and contract awarded for sonde development.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63745A

Title: Tactical Electronic Support Measures (ESM) Systems

DOD Mission Area: #373 — Tactical Surveillance, Reconnaissance, and Target Acquisition

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7381	6701			Continuing	Not Applicable
D925	All Source Analysis System	7381	6701			Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The past decade has witnessed major technical advances and the introduction of increasingly sophisticated weapons and intelligence gathering systems into the strategic and tactical operations of military forces, both friendly and opposing. Army commanders at all echelons must have an intelligence system which will provide early detection, identification, and location of these enemy critical nodes in order to employ our own forces and weapons for effective enemy attrition. This program supports completion of the advanced development of the Signals Intelligence/Electronic Warfare Subsystem (SEWS) of the All Source Analysis System (ASAS), for operation of timely and effective combat intelligence and electronic warfare (EW) information and control of intelligence/EW assets.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	7381	6701		Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	7381	6720		Continuing	Not Applicable

In FY 1982 and prior, this program element included Project #D907 (Tactical Electronic Surveillance Systems). Project D907 funding profile is now contained in Program Element #63766A (Tactical Electronic Surveillance Systems). The funding decrease of $19 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The decrease in funding in FY 1984 resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

Program Element: #63745A

Title: Tactical Electronic Support Measures (ESM) Systems

DOD Mission Area: #373 — Tactical Surveillance, Reconnaissance, and Target Acquisition

Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The following current related Services/agencies' Program Elements (PE) apply: #64321A (Joint Tactical Fusion Program) and #35885G (Tactical Cryptologic Program). There is no unnecessary duplication of effort among the Services and agencies.

F. (U) WORK PERFORMED BY: The major contractor for the current advanced development effort is RCA Corporation, Burlington, MA. In-house developing organizations are: US Army Electronics Research and Development Command (ERADCOM), Adelphi, MD; US Army Electronic Warfare Laboratory, Fort Monmouth, NJ; US Army Materiel Development and Readiness Command (DARCOM), Alexandria, VA and the Program Manager, Joint Tactical Fusion Program.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D925 — All Source Analysis System: Based on summer 1980 Congressional guidance to redirect the BETA project, the Services prepared a Joint Tactical Fusion Development and Acquisition Program Plan. It combined the Army Technical Control and Analysis Center (TCAC) projects, the All Source Analysis System (ASAS), and the Battlefield Exploitation and Target Acquisition (BETA) project with the Air Force Enemy Situation Correlation Element (ENSCE, formerly ATFD) in a joint program for the full-scale development and fielding of an ASAS for the Army and ENSCE for the Air Force. This program supports the ASAS development by providing for the advanced development and prototype fabrication of one corps-level, five-shelter model of a Signal Intelligence/Electronic Warfare Subsystem (SEWS). The software developed and integrated into this corps-level model is also required by the Technical Control and Analysis Center — Division (TCAC-D). The TCAC-D is a Quick-Reaction Capability (QRC) program for the European divisions and one US unit. The Joint Tactical Fusion acquisition strategy is based upon an evolutionary approach that makes maximum use of current fusion-related efforts. It takes an existing software baseline, develops a compatible hardware set for the tactical environment, and provides for the incremental development of software tailored to user needs and experience. With the fielding of TCAC-D, the project will be oriented to software and hardware improvements that address immediate user needs on the fielded TCAC-D or identified in user evaluation of the Corps Model SIGINT EW Subsystem (SEWS) as well as the transferring of experience with fielded systems to the ASAS development program. In : Acceptance Testing (both hardware and software) will be conducted. The TCAC(D) will be fielded in Europe and in the US. A software improvement program will be implemented. MICROFIX Microprocessors will be integrated with TCAC(D). Hardware product improvements will be initiated to include an improved disc and core memory upgrade. Transfer of lessons learned and appropriate software will be fed into the ASAS development. In FY 1984: Additional requirements for TCAC(D) (if any) will be determined. Assess needs for training support and post-deployment software support. Software improvement will continue. Integration with MICROFIX microprocessor will be expanded. The Product Improvement program will continue with improved automated interfaces with division sensors to be implemented with the addition of a front end communications processors. Program to completion: The project allows planned software improvements essential to TCAC(D)

Program Element: #63745A

Title: Tactical Electronic Support Measures (ESM) Systems

DOD Mission Area: #373 — Tactical Surveillance, Reconnaissance, and Target Acquisition

Budget Activity: #4 — Tactical Programs

operation. Other longer term user-identified needs will be factored into the engineering development program for ASAS Program Element 64321A (Joint Tactical Fusion Program).

H. (U) PROJECTS OVER $10 MILLION IN FY 1994: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63746A

Title: Single Channel Ground and Airborne Radio System (SINCGARS-V)

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	13999	16911	2459	- 0 -	- 0 -	99270
	Quantities						8
D555	Single Channel Ground and Airborne Radio Subsystem (SINCGARS)	13999	16911	2459	- 0 -	- 0 -	99270

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the advanced development of the Very High Frequency (VHF) Single Channel Ground and Airborne Radio System (SINCGARS-V) and selected ancillary devices. SINCGARS is the future combat net radio (push-to-talk netted operations) replacing the current VRC-12 series, and is the primary means of communications for armor, artillery, and infantry forces. It is used primarily from brigade down to platoon. Configurations consist of manpack and vehicular subsystems. In addition to providing a radio with improved maintainability and reduced size and weight, SINCGARS-V will satisfy the need for a tactical radio system to operate in an electronic countermeasure (ECM) environment.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	13999	16911	2459	- 0 -	99270
Funds (as shown in FY 1983 submission)	13682	17662	- 0 -	- 0 -	97484

The FY 1982 estimate of $13682 thousand versus the actual expenditure of $13999 thousand is a result of program contract modification that expedited documentation required by the Government. The funding decrease of $951 thousand in FY 1983 is a result of reprograming of funds for Army Data Distribution System and pro rata application of general Congressional reductions to the RDTE,A appropriation. The funding increase in FY 1984 is to reinitiate development on subassembly of the system, that was deferred in 1982.

Program Element: #63746A

Title: Single Channel Ground and Airborne Radio System (SINCGARS-V)

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army Funds (current requirements)	- 0 -	19600	50800	138100	4367300	4576000
Quantities (current requirements)	- 0 -	650	3200	8250	256000	277000

The difference in total estimated costs shown in this submission and previous submissions is a result of Army decision to accelerate production rates; additional quantities will be procured during FY 1983-1986.

E. (U) RELATED ACTIVITIES: Program Element 64751A, SINCGARS Engineering Development; Program Element 62701A, Communications Electronics; Program Element 63707A, Communications Development; and Program Element 64701A, Communications Engineering Development, provide exploratory, advanced, and engineering developments of related and supporting single-channel net radio equipment. There is no known duplication of effort within the Army or DOD. Memorandums of Understanding MOU's have been established with the Air Force and Navy.

F. (U) WORK PERFORMED BY: Contractors are: Cincinnati Electronics Corp, Cincinnati, OH; ITT Aerospace/Optical Division, Ft. Wayne, IN. In-House developing organization is the US Army Communications-Electronics Command (CECOM). The National Security Agency (NSA) is responsible for development of the COMSEC Module (VANDAL).

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D555 — Single Channel Ground and Airborne Radio Subsystem (SINCGARS-V): The objective of this task is to develop a new family of combat net radios (manpack and vehicular configurations) and selected ancillary devices. Development goals include: (1) modularity and commonality of components; (2) interoperability with combat net radios of NATO allies; and (3) capability of operating in a nuclear environment. The system will be capable of operating with or without COMSEC, with or without electronic counter-countermeasures (ECCM), or as a total system; it will transmit voice, tactical data and record traffic to include teletype and facsimile. Critical ancillary devices are being developed to support the total system being fielded. These include: A Vehicular Intercom System designed to replace the antiquated AN/VIC-1; Audio Traneducers designed to increase intelligibility of radio signals; and the Steerable Null Antenna Processor (SNAP-11) designed to operate with frequency hopping SINCGARS-V radios. In FY 1982, the Army streamlined the direction of the program to expedite the fielding of the radio. The new

Program Element: **#63746A** Title: **Single Channel Ground and Airborne Radio System (SINCGARS-V)**

DOD Mission Area: **#345 — Tactical Communications** Budget Activity: **#4 — Tactical Programs**

program will field a radio system (a division set) in July 1985 vice July 1986. Two contractors, both developing the slow hopping technique, provided advance development models with their ECCM modules in August 1982 for limited laboratory and operational testing prior to production award. The fast frequency contract was terminated, since the requirement for that technology currently is not required. Development of one deferred item, the data adapter, was resumed. In FY 1983, the funds requested are required for SINCGARS-V maturation testing; development of deferred items; preparation for the ASARC/DSARC; and development of Technical Data Package for the next phase of the program. In FY 1984 funding of manpack/ vehicular configuration together with those associated subsystems previously deferred will continue. Items deferred in FY 1981 due to restructuring the contracts will enter engineering development phase to allow production. DT/OT I will be conducted on the Vehicular Intercom and Audio Transducer Programs. In addition, DT/OT I will be initiated on the Steerable Null Antenna Processor (SNAP-II). FY 1984 is last program year for advanced development effort. Program Initial Operational Capability (IOC) is scheduled for July 1985. This project will be continued in Program Element 64751A, Project Number D282.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63747A

Title: Soldier Support/Survivability

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3204	2245	4506	7108	Continuing	Not Applicable
D610	Food Advanced Development	1330	1191	1128	2005	Continuing	Not Applicable
D669	Clothing and Equipment	1874	1054	3378	5103	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program is designed to meet the needs of the individual soldier for modernization of clothing, individual equipment, and field service support equipment, new subsistence items, and tactical food service systems. Items to be developed under this program are essential for improving the combat effectiveness of the soldier, assuring compatibility of the soldier's clothing and equipment with new weapons systems, and increasing his survivability and effectiveness on the battlefield. Prototype items and concepts will be developed and tested to generate preliminary data relative to producibility, cost, and capability of prototypes to meet a defined operational need. The program allows for generation of projected life cycle cost and evaluation by developer and user prior to the decision to enter full-scale development. The food research requirements provide for Advanced Development of new foods and equipment for the Army, Navy, Air Force, Marine Corps, and Defense Logistics Agency, and constitute a part of the Department of Defense (DOD) Food Research, Development, Testing, and Engineering (RDT&Eng) Program managed by the Army. This includes efforts to respond to DOD and other Services' requirements relative to their special operational needs for food and food service requirements, as well as to address jointly those needs common to two or more Services. Allocation of funds to the various food program efforts is based on priorities assigned by the Joint Formulation Board comprised of representatives from all military services and the Defense Logistics Agency. New items of clothing, individual equipment, and field service support equipment will improve the effectiveness and survivability of the individual soldier through: better cold and hot weather protective clothing; individual equipment for noise attenuation; and protection against nuclear flash, chemical and biological agents; increased protection from visual and electronic detection; and improved personal hygiene. New food systems and components will ensure a responsive food system anywhere in the worldwide military mission areas, many of which are outside the sphere of the continental United States (CONUS) commercial food distribution system. Overall emphasis in food development is to reduce the number of combat food service personnel, minimize food procurement cost, and reduce overall food logistic support requirements.

Program Element: #63747A Title: Soldier Support/Survivability

DOD Mission Area: #215 — Land Warfare Support Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	3204	2245	4506	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	3134	2251	5855	Continuing	Not Applicable

The funding increase of $70 thousand in FY 1982 is a result of reprograming to the aircrew cold weather clothing system, a higher priority project. The funding decrease of $6 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The funding decrease of $1246 thousand in FY 1984 is a result of a reduction in scope of efforts from prior plans in order to fund higher priority Army requirements. The remaining FY 1984 reduction of $103 thousand resulted from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Each of the military services performs work to develop its Service-peculiar items of clothing and individual equipment. To prevent duplication of effort, close coordination is maintained through joint working groups, Joint Service agreements, and circulation of requirement documents. Many of the items developed under this program are now used by other Services. Work in clothing and individual equipment is also performed in Program Element #62723A (Clothing, Equipment, and Shelter Technology), Project #AH98 (Clothing and Equipment Technology), and in Program Element #64713A, (Combat Feeding, Clothing and Equipment), Project #DL40 (Clothing and Equipment). The DOD Food RDTE Program is a fully coordinated Joint Services effort, and related work is conducted in Program Element #62724A (Joint Services Food Systems Technology), Project #AH99 (Joint Services Food/Nutrition Technology), and Program Element #64713A Combat Feeding, Clothing and Equipment), Project #D548, (Military Subsistence Systems). Basic research in support of both the food and clothing programs is conducted in Program Element #61102A (Defense Research Sciences), Project #AH52 (Equipment for the Soldier).

F. (U) WORK PERFORMED BY: In-house work in this program is performed by the US Army Natick Research and Development Laboratories, Natick, MA; US Army Test and Evaluation Command, Aberdeen Proving Ground, MD; US Army Research Institute of Environmental Medicine, Natick, MA; US Army Mobility Research and Development Command, Ft. Belvoir, VA; and US Department of Agriculture, Stored Products and Insects Research and Development Laboratory, Savannah, GA. Examples of contractors are Air Cruisers Co, Belmar, NJ; Hamilton Standard, Windsor Locks, CT; Analytics, Inc, Willow Grove, PA; and Langdon Protective Covers, Wichita, KS.

Program Element: #63747A

Title: Soldier Support/Survivability

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D610 — Food Advanced Development:** The project is concerned with developing combat food service equipment, rations, and systems with its major thrust directed at solving military service requirements. The program/project is essential because it is the means for the Services to modernize their combat food service logistics with the ultimate goal to increase the combat-to-support-force ratio while improving support to the individual soldier. The FY 1982 thrust was directed toward the replacement of obsolete field food service equipment with particular emphasis on food service systems to complement and support the highly mobile weapon systems being introduced into the combat force, initiation of Advanced Development of the Army's field feeding system, and continued development on the Marine Corps assault packet. The key accomplishments of the FY 1982 program were (1) Equipment — demonstrated the technical feasibility of a continuous field bread bakery, developed the prototype supplemental field kitchen kit for the combat field feeding system, and developed an energy-efficient heat pipe griddle for the Air Force tactical kitchens; (2) Rations — successful development of an assault packet and Arctic ration, completed development of the technical data packages for 70 foods to be used in tray pack ration in support of the new combat field feeding system; (3) The assault packet with supplement for Arctic use was field tested in Norway. In FY 1983, the main thrust is directed at the Advanced Development of combat food service systems and field rations. A sizable investment will be made in the development and testing of combat food service systems; e.g., the Army Combat Field Feeding System. It is planned to complete the field testing, production testing, and procurement document validation of the assault packet; continue development on the Arctic ration; continue to develop technical data packages in support of production testing of military foods. In FY 1984, continue Advanced Development of military-unique, logistically advantageous foods to include the Marine Corps assault packet; continue Advanced Development of highly mobile combat field feeding systems and related equipment to provide food service for field hospitals; and initiate Advanced Development of field bakery systems for the Marine Corps.

2. **(U) D669 — Clothing and Equipment:** This project will provide for development of new items of clothing, individual equipment, and field service support equipment, which will improve the effectiveness and survivability of the individual soldier through: better cold and hot weather protective clothing; individual equipment for noise attenuation; protection against nuclear flash, chemical and biological agents; increased protection from visual and electronic detection; and improved personal hygiene. Progress in FY 1982 includes successful completion of Development Testing I and initiation of Operational Testing of the airbeam-supported Transportable Helicopter Enclosure. This shelter will provide a high-mobility capability for maintenance and emergency repair of attack, scout, and utility helicopters under worldwide climatic extremes. In the clothing area, tests of a model liquid microclimate conditioning system aboard an M1 Tank verified its capability of significantly reducing heat stress. Preparation of the acquisition plan for this microclimate cooling system was initiated. Developed aircrew clothing system ensemble consisting of six major items and conducted physiological evaluation. The combat vehicle crewman ballistic noise-attenuated helmet concept design was completed. The helmet was evaluated for human factors, ballistic casualty reduction, impact protection, heat stress, and sound attenuation. FY 1983 program includes plans to complete Operational Testing of the Transportable Helicopter Enclosure, analyze results and make any required design modifications, conduct validation in-process review, and move to Engineering Development; complete Advanced Development of microclimate cooling for armored vehicle crewmen; and conduct

Program Element: **#63747A** Title: **Soldier Support/Survivability**

DOD Mission Area: **#215 — Land Warfare Support** Budget Activity: **#4 — Tactical Programs**

Development/Operational Testing of an aircrew clothing system for cold weather. In FY 1984, initiate design of accessories to allow heating and cooling for the Transportable Helicopter Enclosure to permit worldwide use and conduct contractor testing at environmental extremes. Initiate design of a Mobile Combat Field Clothing Decontamination System and award contract for prototypes. This system will significantly reduce power requirements and water consumption as compared with the current field laundry and increase the Army's capabilities to decontaminate combat clothing other than the CB overgarment in the field. The system cannot be used to decontaminate the CB overgarment since a water-based decontamination scheme removes much of the charcoal from the overgarment and degrades its effectiveness. The Mobile Combat Field Clothing Decontamination System complements the Personal Equipment Decontamination System developed under Program Element #63721A (Chemical/Biological Protective Materiel Concepts), which provides the means of decontaminating the chemical overgarment. Complete Advanced Development of the cold weather aircrew clothing system to achieve a 30% weight reduction and move to Engineering Development. Initiate work on a microclimate cooling system for aircrew members operating in hot climates and in chemically toxic environments; laser and ballistic protective eye armor; a combat chemical-protective uniform; and a multipurpose overboot to provide combined environmental and chemical protection.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63750A

Title: Drug and Vaccine Development

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5073	8771	12593	14653	Continuing	Not Applicable
D808	DOD Drug and Vaccine Development	5073	8771	6981	8085	Continuing	Not Applicable
D809	Drug and Vaccine Development/Medical Defense Against BW	- 0 -	- 0 -	5612	6568	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for advanced development of systems for drugs and vaccines to meet the needs of the Department of Defense (DOD) to protect combat forces against naturally occurring endemic diseases and biological warfare (BW) agents. The prevention and treatment of diseases which affect military operations depend upon the DOD capability to develop vaccines and drugs. Requirements are identified in the Long-Range Research, Development, and Acquisition Plan, Letters of Agreement, and Letter Requirements. This program is part of the Army thrust in Biotechnology.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	5073	8771	12593	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	5073	8796	12957	Continuing	Not Applicable

The FY 1983 decrease is the result of pro rata application of general Congressional reductions to RDTE,A appropriation. The FY 1984 decrease is the result of a revision to the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not applicable.

Program Element: #63750A

Title: Drug and Vaccine Development

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

E. (U) RELATED ACTIVITIES: This program element is supported by basic research in the following: Program Element #61102A (Defense Research Sciences), Project BS10 (Military Disease Hazards Research) and Project BS12 (Science Base/Medical Defense Against BW); Program Element #62770A (Military Disease Hazards Technology), Project A870 (DOD Medical Defense Against Infectious Diseases) and Project A871 (Medical Defense Against BW); and Program Element #63763A (Industrial Base/Vaccines and Drugs), Project D607 (Industrial Base/BW Vaccines and Drugs) and Project D610 (Industrial Base/Vaccines and Drugs). Items developed in this program element will transition to Program Element #64758A (Drug and Vaccine Development), Project D647 (Drug and Vaccine Development/Medical Defense Against BW) and Project D649 (Drug and Vaccine Development). At the direction of the Congress, Army and Navy infectious disease research efforts were consolidated in FY 1982 into a single DOD program with the Army designated lead agent and responsible for planning, programing, and budgeting for the DOD infectious disease program. Navy scientists will continue to participate in the execution of the program. The consolidation plan will prevent any duplication of effort between the two Services.

F. (U) WORK PERFORMED BY: Approximately 44 percent of the research is conducted at Walter Reed Army Institute of Research and its field unit in Thailand and the US Army Medical Research Institute of Infectious Diseases, Fort Detrick, Frederick, MD. Elements of the Naval Medical Research and Development Command participate in drug and vaccine development under Army program management. Approximately 56 percent of the work is accomplished through contracts with industries and universities. The top five contracts are with Herner and Co., Arlington, VA; Bio-Med, Inc., College Park, MD; Hazleton Laboratories America, Inc., Vienna, VA; Starks Associates, Buffalo, NY; and Ash Stevens, Inc., Detroit, MI. Six other contractors are funded in the amount of $1,978,680.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D608 — Drug and Vaccine Development:** This project supports the advanced development and field testing of militarily critical drugs and vaccines to meet DOD specific needs. Significant accomplishments in FY 1982 include the successful completion of human safety and tolerance trials of two new drugs effective against two of the most important parasitic diseases, malaria and leishmaniasis. Mefloquine, the current drug most effective against drug-resistant malaria, was successfully tested in large clinical trials in various tropical countries. In FY 1983, ongoing studies with existing antimalarial drugs will continue, and new drugs will enter safety testing. Development of malaria, pseudomonas, and epidemic/endemic typhus vaccines will continue. In FY 1984, field testing of promising new antiparasitic drugs will be initiated and evaluation of malaria, pseudomonas, and typhus vaccines will continue. Also, field testing of a new genetically engineered shigella-typhoid vaccine will begin.

2. **(U) D609 — Drug and Vaccine Development/Medical Defense Against BW:** The purpose of this project is to further develop BW vaccines and drugs that have shown promise in the early program of drug screening and candidate vaccine development. In FY 1984, testing of a Rift Valley fever vaccine will be completed. Rift Valley fever is a viral disease endemic in Africa and the Middle East that also has possibilities as a biological weapon. Testing of toxoids to prevent botulinum poisoning will be initiated.

Program Element: #63750A

Title: Drug and Vaccine Development

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

H. (U) PROJECTS OVER $10 MILLION IN FY 1994: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#63751A**

Title: **Medical Defense Against Chemical Warfare**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2620	2916	47772	50712	Continuing	Not Applicable
D993	Medical Defense Against Chemical Warfare	2620	2916	47772	50712	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This advanced developmental program element is an essential component required for the Department of Defense to achieve fielding of the component medical materiel that will provide an effective capability for medical defense against chemical warfare agents. Meeting the joint service requirements for development of medical life support materiel addressing the threat on the chemical battlefield has been delegated to the US Army Medical Research and Development Command. Development and ultimate fielding of specific materiel and drugs in support of a Medical System for Individual Protection will be pursued. Provisions for maximum soldier survivability, enhanced patient and soldier decontamination capabilities, and effective management of chemical warfare casualties will be integrated into an effective system for use on the integrated battlefield designed to aid in preserving the tactical edge of US forces. Requirements identified are defined in Joint Service Operational Requirements (JSOR) and Letters of Agreement (LOA).

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	2620	2916	47772	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	2933	2924	39632	Continuing	Not Applicable

The FY 1982 reduction represents an adjustment for travel, consultants, inflation indices, and OSD deferrals. The FY 1983 decrease is the result of a pro rata application of Congressional reductions to the RDTE,A appropriation. The FY 1984 increase is a result of DA action to increase the end item developmental emphasis of the US Army Medical Research and Development Command.

Program Element: #63751A

Title: Medical Defense Against Chemical Warfare

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army Funds (current requirements)	- 0 -	- 0 -	3650	- 0 -	- 0 -	3650

The $3650 thousand is for construction of a drug assessment facility at the US Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD, that will increase the capability to conduct research with chemical agents. Reprograming of these MCA funds to support #63751A occurred after the submission of the FY 1983 Congressional Descriptive Summaries.

E. (U) RELATED ACTIVITIES: Program Element #61102A (Defense Research Sciences), Project #BS11 (Chemical Warfare Agent Effects and Antidotes); Program Element #62734A (Medical Defense Against Chemical Agents), Project #A875 (Medical Defense Against Chemical Agents); Program Element #63764A (Medical Chemical Defense Life Support Materiel), Project #D995 (Medical Chemical Defense Life Support Materiel), and Program Element #64757A (Medical Chemical Defense Life Support Materiel), Project #D846 (Medical Chemical Defense Life Support Materiel), support this program element. Duplication of effort by the US Army Medical Research and Development Command is avoided within the Army through central program management. Coordination and collaboration with the Air Force and Navy, as required of the Army as the Executive Agency for DOD chemical defense efforts, avoid inter-Service duplication; a Memorandum of Agreement with the Air Force and the Joint Technology Coordinating Group for Medical Chemical Warfare Defense of the Armed Services Biomedical Research Evaluation and Management Committee are the vehicles for avoiding inter-Service duplication. Quadripartite and NATO nations are also coordinated with through meetings and data exchange annexes.

F. (U) WORK PERFORMED BY: Approximately 29 percent of research is performed in-house at the US Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD; Walter Reed Army Institute of Research, Washington, DC; and the US Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, Frederick, MD. The remaining 71 percent is performed under contract. The five major contractors performing work under this program element are Ash Stevens, Inc., Detroit, MI; Bio-Med, Inc., College Park, MD; Herner and Company, Arlington, VA; SRI International, Menlo Park, CA; and Survival Technology, Inc., Bethesda, MD. There are 10 additional contractors with an additional contract dollar value of $685,879.

Program Element: #63751A

Title: **Medical Defense Against Chemical Warfare**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems**

Budget Activity: **#4 — Tactical Programs**

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D993 — Medical Defense Against Chemical Warfare.**

a. **(U) Project Description:** This project provides the medical departments of the Department of Defense with the required advanced development program needed to achieve a modern and viable capability for providing medical defense against chemical warfare agents. With the US Army Medical Research and Development Command having been delegated the responsibility to meet joint Service requirements for development of specific medical life support materiel to counter the chemical battlefield threat, advanced system development of medical materiel is being pursued. The project funds advanced development of an integrated medical system for individual protection. The system will include specific pretreatment/prophylactic, antidotal, and therapeutic drugs which will provide the soldier maximum protection and survivability on the chemical and nuclear battlefield as well as the equipment and materiel used to manage chemical, nuclear, and conventional casualties on the integrated battlefield. In the drug development area, this project will support advanced development efforts on formulation stability and final dosages studies and limited safety studies in humans for compounds identified as pharmacologically safe and efficacious in Program Element #63764A.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** During FY 1982 tests were initiated to determine the formulation stability of pyridostigmine bromide, a leading potential nerve agent pretreatment compound for nerve agent poisoning. Prototype development of a chemical warfare agent protective patient wrap was initiated under contract with Natick Laboratories. An improved formulation of a promising antiradiation drug was prepared and tested. Two advanced development programs for noninvasive diagnostic equipment for use with conventional and chemically contaminated casualties were begun. A cooperative contractual effort with the US Air Force was established for development of a gas-powered individual resuscitator.

(2) **(U) FY 1983 Program:** During FY 1983 the following programs will be emphasized: autoinjector development; pyridostigmine stability studies; noninvasive diagnostic equipment; antiradiation compounds; and gas-powered individual resuscitators. During FY 1983 the following program should be initiated: advanced development efforts for a system of new oximes showing promise as nerve agent antidotes; a "buddy-aid" resuscitator to replace the M1 resuscitation tube; and diagnostic equipment for determining the degree of chemical agent exposure on casualties. A continued major emphasis will be placed on clinical safety and efficacy of new nerve agent antidotes and compounds to be used as decontaminants.

Program Element: #63751A

Title: **Medical Defense Against Chemical Warfare**

DOD Mission Area: #276 — **Defensive Chemical and Biological Systems**

Budget Activity: #4 — **Tactical Programs**

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** The advanced development of chemical casualty care systems will be expanded. Drug development efforts will simultaneously encompass formulation stability and final dosage studies and limited human safety studies of several compounds such as new oximes as nerve agent antidotes; pyridostigmine as a nerve agent pretreatment; a polymeric resin showing promise as a new generation of skin decontaminant; and 4-Dimethylaminophenol (4-DMAP) and hydroxycobalamine as an anticyanide antidote. They will be conducted in parallel to field expeditiously this system for protection against the threat of the chemical battlefield. Advanced development of medical materiel will continue with testing of the several noninvasive diagnostic items, surgical gloves, and resuscitators. Additional advanced development efforts will be initiated to develop diagnostic equipment capable of determining the degree of casualty exposure to chemical agents, field bandages that provide protection against chemical contamination, and a new skin decontamination kit involving polymeric resin technology.

(4) **(U) Program to Completion:** This is a continuing program.

c. **(U) Major Milestones:** Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63755A

Title: Tactical Electronic Countermeasures Systems

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	17793	20397			Continuing	Not Applicable
DK11	Classified Program	- 0 -	- 0 -				
DK12	Communications Electronic Countermeasures Systems	7870	8440			Continuing	Not Applicable
DK13	Non-Communications Electronic Countermeasures Systems	4087	8462			Continuing	Not Applicable
DK14	Expendable Jammers	5752	3172			Continuing	Not Applicable
D251	Protective Electronic Warfare Equipment	84	323			Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The objective of this program is to provide for validation/advanced development of electronic warfare systems to assist the tactical Army (brigade, division, and corps) commander in denying, destroying, disrupting, and deceiving hostile command and control communications and radars associated with weapons systems, maneuver forces, and other threats of immediate value to the commander. Overcoming current capability shortfalls and equipment deficiencies is of prime importance to the Army tactical commander. This program provides for tactical systems which, by exploiting technical superiority, will serve as force multipliers to assist in offsetting Warsaw Pact numerical, mobility, and firepower superiority. A complementary mix of airborne and high-survivability ground assemblies will provide 24-hour, all-weather coverage in depth.

Program Element: #63755A

Title: Tactical Electronic Countermeasures Systems

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	17793	20397		Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	17793	19451		Continuing	Not Applicable

Increase in FY 1983 of $946 thousand is due to reprograming to begin an Airborne Radar Jamming System for the High Technology Light Division. Increase in FY 1984 is for the Airborne Radar Jamming System, initiation of the DK11 Classified Program, and reprograming to DK14 to accelerate the drone expendable jammer program.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Other appropriations are consolidated in the Congressional Descriptive Summary for Program Element #64750 (Tactical Electronic Countermeasures Systems) for clarity and audit.

E. (U) RELATED ACTIVITIES: Related electronic warfare developments are conducted by the Air Force and Navy. Air Force developments are conducted in Program Elements #63716F (Electronic Warfare Technology) and #63743F (Electro-Optic Warfare). Navy developments are found in Program Elements #25764N (Electronic Warfare Countermeasures Response); #63521N (Surface Electronic Warfare); and #63797N (Surface Electromagnetic and Optical Systems). Coordination is maintained between the Services to maximize the interchange of technical data and minimize duplication of effort. Coordination is accomplished by the exchange of technical reports, attendance at scientific meetings and conferences, joint participation of subgroups and working panels of the Technical Cooperation Program, and by the Joint Tri-Service Electronic Warfare Panel. In addition, formal requirements documents of each Service are exchanged and reviewed by the other Services. Coordination is also accomplished as part of the program reviews conducted by the Office of the Secretary of Defense (Under Secretary for Defense for Research and Engineering).

F. (U) WORK PERFORMED BY: US Army Electronic Warfare Laboratory, Fort Monmouth, NJ; the US Army Signal Warfare Laboratory, Vint Hill Farms Station, Warrenton, VA; US Army Materiel Development and Readiness Command, Alexandria, VA. The major contractors are: ESL Incorporated, Sunnyvale, CA; GTE Sylvania, Mountain View, CA; and RCA Corporation, Camden, NJ.

Program Element: **#63755A** Title: **Tactical Electronic Countermeasures Systems**

DOD Mission Area: **#374 — Multi-Mission Technology and Support** Budget Activity: **#4 — Tactical Programs**

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: DK12 — Communications Electronic Countermeasures Systems: This project develops the electronic warfare (EW) systems that will be used by the Army to attack the enemy's communications and deny him the ability to effectively command and control his forces. These systems will enable the Army to fight on the fluid modern battlefield against a numerically superior enemy. They are designed to attack the enemy's voice radio communications and data communications. The FY 1982 program developed automatic test equipment software for the QUICK FIX heliborne communications intercept, direction finding, and jamming system. This software will allow effective maintenance of the system when it starts fielding in FY 1986. Automatic data processing efforts to support electronic warfare developments were also funded in FY 1982. The FY 1983 program will continue development of test software for QUICK FIX and automatic data processing support. These communications are The FY 1984 program will continue QUICK FIX test software development, and electronic warfare automatic data processing support.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: DK11 — Classified Program**

a. **(U) Project Description:** Project is classified. Information will be provided upon request.

2. **(U) Project: DK13 — Non-Communications Electronic Countermeasures Systems:**

a. **(U) Project Description:** This project develops the electronic warfare systems On the modern battlefield, radar surveillance and target acquisition will play an essential role. These systems will allow the enemy to pinpoint Army forces and will provide effective targeting for his extensive artillery assets. The systems developed under this project will They will also defeat his They will substantially improve the effectiveness of our own air defense systems.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** The FY 1982 program consisted of two efforts. First, substantial tactical automatic data processing software support was provided to electronic warfare system developers. A software support center was established at the Electronic Warfare Laboratory, Fort Monmouth, NJ. This center will support all electronic warfare efforts of the Electronics Research and Development Command and provide a post deployment software support center for fielded systems. Second, the proposal for the Air Defense Electronic Warfare System (ADEWS) was finalized and released to industry. ADEWS

Program Element: #63755A | Title: Tactical Electronic Countermeasures Systems

DOD Mission Area: #374 — Multi-Mission Technology and Support | Budget Activity: #4 — Tactical Programs

(2) (U) FY 1983 Program: Development of the Electronic Warfare Laboratory software support center will continue, and automatic data processing support to system developers will be expanded. The contracts for the Air Defense Electronic Warfare System will be awarded. Two contractors will be selected for a 2 ½-year advanced development effort. This advanced development effort is expected to take advantage of developments already completed for the Navy and Air Force to allow for an accelerated development of ADEWS. Development will begin on the Airborne Radar Jamming System for the High Technology Light Division. This program will mount portions of the ALQ-99 Jammer in the UH-60 BLACKHAWK helicopter. The ALQ-99 was developed by the US Navy and is presently in service.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: FY 1984 will continue the advanced, dual development of the Air Defense Electronic Warfare System and tactical automatic data processing software support. In addition, development will continue on the Airborne Radar Jamming System (AJARS) for testing in the High Technology Test Bed at Fort Lewis, WA. This development will integrate portions of the Navy-developed ALQ-99 radar jammer into the BLACKHAWK helicopter. The system will be tested

(4) (U) Program to Completion: This is a continuing program.

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Contract Award	1st Quarter FY 1983	2nd Quarter FY 1982
DT I/OT I	4th Quarter FY 1984	2nd Quarter FY 1984

Slip caused by delay in receipt of the final feasibility study report and its impact on preparation and release of the request for proposal.

3. (U) Project: DK14 — Expendable Jammers

a. (U) Project Description: Expendable jammers provide the tactical commander with the capability to deny the enemy effective use of his communications at specific locations on the ground. Since they are low power, they can be employed without disruption to friendly communications. The jammers work in both the barrage and search modes and do not require extensive intelligence support for targeting. Expendable jammers are a cost effective way to achieve a jamming capability for the Army.

Program Element: **#63755A** Title: **Tactical Electronic Countermeasures Systems**

DOD Mission Area: **#374 — Multi-Mission Technology and Support** Budget Activity: **#4 — Tactical Programs**

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** The FY 1982 program completed advanced development of the microwave jammer designed to be carried on an unmanned aerial vehicle. The jammer Substantial advances were made in the artillery delivered jammer program. Firings were conducted at the Yuma Proving Ground, AZ demonstrating the capability to use a 155-millimeter howitzer to deliver barrage jammers. Six jammers were carried by each artillery shell, and the jammers were successfully ejected from the shells and operated upon impact with the ground.

(2) **(U) FY 1983 Program:** In FY 1983 the microwave jammers will be tested in cooperation with the Air Force against Soviet radar equipment. Plans are to use an Air Force unmanned aerial vehicle since it is available. The jammers have been developed The artillery jammer program will continue with the objective of completing the required development test/operational test I firings in FY 1984.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** During FY 1984 the artillery delivered jammer firings will result in artillery firing table and safety data which will support a decision to make the move to full-scale development under Program Element #64750A. During FY 1984 the communications expendable jammer unmanned aerial vehicle program will begin at an expanded level due to reprograming from lower priority Army programs. This program will take advantage of technology developed under the artillery-delivered program to produce communications jammers that will be seeded from an unmanned aerial vehicle. The program will be integrated with the

(4) **(U) Program to Completion:** This is a continuing program.

Program Element: #63755A

Title: Tactical Electronic Countermeasures Systems

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

c. (U) Major Milestones: (Artillery Delivered)

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
DT I/OT I	4th Quarter FY 1984	Not Shown

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#63764A**

Title: **Medical Chemical Defense Life Support Materiel**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	34614	38938	34459	Continuing	Not Applicable
D995	Medical Chemical Defense Life Support Materiel	- 0 -	34614	38938	34459	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This nonsystems advanced development program element supports the Department of Defense requirement to develop medical defense against chemical warfare (CW) agents. As the Executive Agent for the Department of Defense, the US Army Medical Department has the responsibility to develop for prevention and treatment effective drugs that meet joint Service requirements to counter the threat of the chemical battlefield. This effort will provide financial incentive for the pharmaceutical industry to undertake the private capital commitment required to develop militarily unique drugs for which there is no public market. Because of the urgent need for effective drugs, advanced development efforts for several drugs will be conducted in parallel, which will require significant initial funding outlays. The ability to produce and field required prophylactic and treatment CW drugs, as well as antiradiation drugs which provide maximum soldier survivability with minimum adverse effects on the integrated battlefield is dependent on the ability to stimulate development of a pharmaceutical industrial base for militarily unique drugs. Requirements are defined in the Joint Development Objectives Guide (JDOG) and Justification for Major New Start Needs Statements (JMNSNS).

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	- 0 -	34614	38938	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	- 0 -	36189	30430	Continuing	Not Applicable

Program Element: #63764A

Title: Medical Chemical Defense Life Support Materiel

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

The FY 1983 decrease is the result of pro rata application of general Congressional reductions to RDTE,A appropriation and proposed reprograming of $1472 thousand for the High Technology Light Division. The increase in FY 1984 funding is a result of DOD action to expand and accelerate the development of the pharmaceutical industrial manufacturing base for military unique drugs.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This program element is supported by Program Element #61102A (Defense Research Sciences), Project #BS11 (Chemical Warfare Agent Effects and Antidotes); Program Element #62734A (Medical Defense Against Chemical Agents), Project #A875 (Medical Defense Against Chemical Agents); Program Element #63751A (Medical Defense Against Chemical Warfare), Project #D993 (Medical Defense Against Chemical Warfare); and Program Element #64757A (Medical Chemical Defense Life Support Materiel), Project #A848 (Medical Chemical Defense Life Support Materiel). Duplication of effort within the Army is avoided by central management of the Program on the Medical Aspects of Chemical Defense at the US Army Medical Research and Development Command. Coordination and collaboration with the Air Force and Navy, as required of the Army as Executive Agency for the DOD Chemical Defense effort, avoids inter-Service duplication. Within the framework of a Memorandum of Agreement with the Air Force and through the Joint Technology Coordination Group for Medical Chemical Warfare Defense of the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee, such coordination is accomplished. Coordination with quadripartite and NATO nations through meetings and data exchange annexes is also used to avoid duplication of effort.

F. (U) WORK PERFORMED BY: This is a new start in FY 1983. No contractors nor in-house efforts are currently funded by this program element/project, due to Continuing Resolution Authority (CRA) restrictions.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D995 — Medical Chemical Defense Life Support Materiel**

a. **(U) Project Description:** This advanced development project will provide an industrial manufacturing base to produce large standard lots of pharmaceutical-grade compounds having potential as antidotes, prophylaxes, therapeutic and pretreatment compounds, decontaminants, and radioprotective drugs. The drug development efforts include synthesis, pilot plant production and safety, efficacy, and toxicity studies in animal models to support an Investigational New Drug (IND) application to the Food and Drug Administration (FDA). After approval of the IND, initial human clinical studies will determine the bioavailability, metabolism, and tolerance for candidate drugs.

Program Element: #63764A

Title: **Medical Chemical Defense Life Support Material**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems**

Budget Activity: **#4 — Tactical Programs**

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Not Applicable.

(2) **(U) FY 1983 Program:** This effort, principally contractual, will initiate production of pharmaceutical-grade compounds which include pyridostigmine (nerve agent pretreatment), 4-dimethylaminophenol (4-DMAP) and hydroxycobalamine (potential cyanide antidotes), Dimercaptosuccinic acid (DMSA) and Dimercaptopropane sulfonate (DMPS) (antivesicant drugs), and decontamination resins. They represent promising new pretreatment and therapeutic entities for the G-agents, lewisite, and cyanide as well as those that facilitate decontamination of soldiers and casualties. Efforts will include submission to the Food and Drug Administration of Investigational New Drug (IND) Applications, pilot plant scale-up, and, after approval of the IND, initial pharmacologic and toxicologic studies in humans.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** The funding of this project in FY 1984 will continue to support the pharmaceutical industrial manufacturing base required for expeditious fielding of anti-CW drugs. Data generated will support the IND applications for each of the candidate antidotal compounds. The INDs will permit controlled clinical trials for needed data in humans including tolerance, safety, and bioavailability of these new drugs. Production of compound, such as pyridostigmine, 4-DMAP, hydroxycobalamine, DMSA, DMPS, and decontamination resins, initiated in FY 1983, will be continued in FY 1984. Additional compounds such as new oximes and antiradiation compounds may also be commenced.

(4) **(U) Program to Completion:** It is anticipated that this will be a continuing program.

c. **(U) Major Milestones:** Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63766A

Title: Tactical Electronic Surveillance Systems

DOD Mission Area: #322 — Tactical Intelligence and Related Activities For Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6530	5687			Continuing	Not Applicable
D907	Tactical Electronic Surveillance Systems	6530	5687			Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program (PE 63766A/D907) was in Program Element 63745A prior to FY 1983. The program encompasses the Army's Tactical Exploitation of National Capabilities (TENCAP) initiatives. The scope of the program is to identify and/or refine initial design concepts and to provide advanced development through prototype fabrication and testing. The past decade has witnessed major technical advances and the introduction of increasingly sophisticated weapons and information gathering systems into the strategic and tactical operations of military forces, both friendly and opposing force. Army commanders at all echelons must have an information system which will provide early detection, identification, and location of these enemy critical nodes in order to employ our own forces and weapons for effective enemy attrition. The systems in this program provide for the development of national information collection interfaces with tactical operations. Advanced techniques are applied to exploit information from a variety of national controlled sensors which, in general, is not otherwise obtainable, and then provide that information to the tactical command and control environment in a sufficiently timely and useful form to assist the commander in defeating the enemy. This program is described in further detail, at a higher classification level, in the Tactical Intelligence and Related Activities (TIARA) Congressional Justification Book (CJB).

Program Element: #63766A

Title: Tactical Electronic Surveillance Systems

DOD Mission Area: #322 — Tactical Intelligence and Related Activities For Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	6530	5687		Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	6530	9703		Continuing	Not Applicable

(U) The FY 1983 program was reduced as directed by Congressional guidance. The FY 1984 decrease is due to realignment within the TENCAP program and reprograming to higher priority Army programs.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Related developments are conducted by the Air Force, Navy, and national agencies. Coordination is effected by the exchange of technical reports, attendance at scientific meetings and conferences, joint participation in subgroups and working panels. In addition, formal requirements documents of each Service are exchanged, reviewed, and commented upon by other Services. Coordination is also accomplished as part of the program reviews conducted by the Office of the Secretary of Defense (Under Secretary for Research and Engineering).

F. (U) WORK PERFORMED BY: Aerospace Corporation, El Segundo, CA; US Army Electronics Research and Development Command (ER-ADCOM), Adelphi, MD; US Army Communications Research and Development Command, Ft Monmouth, NJ; MRJ, Inc., Fairfax, VA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D907 — Tactical Electronic Surveillance Systems: This project supports advanced development of tactical systems to receive data from national, theater, and organic sensors, process and correlate these data, and disseminate resultant information. Advanced techniques are used to provide hostile identity and location to the corps commander's All Source Analysis Center (ASAC) in near-realtime (NRT). In the ASAC, the data are fused with ther source data to provide a composite picture of the battlefield. This project is closely coordinated with the TENCAP and SENSOR programs of other Services and with other Army information/fusion systems. Three additional (ITEP) systems were deployed on schedule during FY 1982, and joint program efforts were continued. Based on ITEP experience and approved national systems advanced configuration, design for fully operational (TEP) to be developed in consonance with the future national sensor mix and the All Source Analysis System (ASAS) will begin in FY 1983. Analysis of developing national sensors with the objective of enhancing tactical utility

Program Element: #63760A

Title: Tactical Electronic Surveillance Systems

DOD Mission Area: #322 — Tactical Intelligence and Related Activities For Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

early in the program will continue in FY 1983. In FY 1984 the Army will continue joint programs to enhance tactical utility of current national sensors. The Army also will continue analysis of developing national sensors. Continue design of fully operational TEP.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63707A

Title: Combat Service Support Control System (CSSCS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	- 0 -	481	194	Continuing	Not Applicable
D091	Combat Service Support Control System	- 0 -	- 0 -	481	194	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides: the combat service support battlefield functional area with an automated capability to process and analyze data for internal, functional command and control purposes; for an element of the force organization's command and control network by sharing selected information with the other control systems; and key command-related information to support the force commander's decision process. The program is required in order to satisfy development of a control system to assist the commander in the execution of his administrative and logistic support responsibilities. It assists the commander and relates to the Army mission by acquiring and processing administrative and logistics support information relative to all elements that support the force as defined in the Army's Battlefield Interface Concept.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands) Not Applicable. This program is a new start in FY 1984.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Program Element 64712, Army Command and Control System (ACCS) Systems Engineering, Project D324, Force Control; Project D323, Subordinate System Interoperability. There is no unnecessary duplication of effort within the Army for research and development of this control system.

F. (U) WORK PERFORMED BY: Contractors to be determined. In-house developing organizations are: US Army Computer Systems Command, Ft Belvoir, Va; US Army Logistics Center, Ft Lee, VA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D091 — Combat Service Support Control System (NEW START): No previous descriptive summary has ever been submitted. Prior work has not been conducted under another project or program. There is no existing automated system currently employed to acquire combat service support (CSS) functional data. CSS data required by service support control centers must be manually

Program Element: #63767A

Title: Combat Service Support Control System (CSSCS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

extracted from current functional systems or manually generated by the functional operators and transmitted electrically or by courier to the service support control center for manual consolidation, analysis, and distribution. There is, therefore, a need to move rapidly to collect, store, analyze, and disseminate Combat Service Support (CSS) information to support the functions of command, control, and resource management in the tactical area. The growing complexity, speed, and lethality of modern warfare dictates the requirement for the CSS commander and his staff to provide critical functional information much more quickly than heretofore experienced. This control system must be available by the mid-to-late 1980s to coincide with the planned introduction of automation in all battlefield functional areas as well as the command and control automation support being introduced by the Maneuver Control System. The Combat Service Support Control System resides at one of the five functional nodes of the Army's Command, Control and Subordinate System (CCS^2). These nodes include maneuver control, air defense, fire support, and intelligence/electronic warfare. Resource management data will be provided to the commander by an exchange of information between the automated functional systems at the CCS^2 nodes and the Service Support Control System. During FY 1984, RDT&E funding will support functional requirements analyses, establishment of a system prototype and preparation of solicitation material for the concept validation phase.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#63770A**

Title: **Joint Surveillance and Target Attack Radar System (JOINT STARS)**

DOD Mission Area: **#217 — Land Warfare Surveillance and Reconnaissance**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	1995	412	- 0 -	- 0 -	2407
D201	Battlefield Data Systems	- 0 -	1995	412	- 0 -	- 0 -	2407

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The US Army lacks the capability to locate, track, and attack moving targets beyond ground line of sight. This is a significant operational deficiency. The speed of modern combat makes it critically important that division and corps commanders have a responsive, realtime capability to detect, locate, and monitor moving formations out to the enemy's second-echelon units, to allow concentration of friendly combat power at critical times and places, and to employ their organic firepower at maximum ranges. Within the Joint Surveillance and Target Attack Radar System (JOINT STARS) program elements, the Army will develop an airborne surveillance and target acquisition system that will provide this critically needed capability. The JOINT STARS program results from a merger of the Army's Battlefield Data System (BDS) program and the Air Force PAVE MOVER program. The Joint program objective is to develop a radar to be mounted on the Army's OV-1D (MOHAWK) airframe and the USAF's TR-1 airframe that will provide the capability to locate, track, and attack targets beyond ground line of sight. Target data will be distributed to ground stations at all user echelons via secure data link. Development of this ground station is included in the Joint Program objectives. The Joint system will locate moving targets at extended ranges during the day or night, and under most weather conditions. It will be designed to perform successfully in the electronic countermeasures and air defense environments forecast for the -and-beyond timeframe. It will allow the analysis necessary to determine the enemy's tactical development in time to position countering friendly forces and firepower.

Program Element: #63770A

Title: Joint Surveillance and Target Attack Radar System (JOINT STARS)

DOD Mission Area: #217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	- 0 -	1995	412	- 0 -	2407
Funds (as shown in FY 1983 submission)	- 0 -	1891	5429	TBD	TBD

The reduction of funding level in FY 1984 is due to Army program restructuring. The funding increase of $104 thousand in FY 1983 is a result of congressional direction in the FY 1983 Appropriations Act.

This is a joint Army/Air Force program with a new program element which takes the place of last year's BDS program elements 63753A and 64753A. There were no Congressional Descriptive Summaries for this program in FY 1983. The funding presented in paragraph A represents current Army data based on levels established for the BDS program.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The JOINT STARS program combines the Army's Battlefield Data System (Program Element #63753A, Project #D201; Program Element #64753A, Project #D202), the Product Improvement Proposal to provide an electronically scanned antenna for the AN/APS-94F radar on the OV-1D aircraft (Program Element #64221A, Project #D208), and the Air Force's PAVE MOVER program (Program Element #64616F, Projects #2814 and #2727, and Program Element #63747F). This merger ensures, since there are no other Service programs addressing the JOINT STARS requirement, that there is no duplication of effort within either the Army, Air Force, or the Department of Defense. The program management structure is outlined in a Joint Memorandum of Agreement. The Program Manager is appointed by the Air Force; the Deputy Program Manager by the Army. The Program Office is manned jointly, ensuring that day-to-day Army/Air Force coordination is maintained. The entire joint program is monitored by a DOD Oversight Committee with membership from the Army, Air Force, and OSD.

F. (U) WORK PERFORMED BY: Contractors have not yet been selected. Army efforts involve the Materiel Development and Readiness Command and the Electronics Research and Development Command. The Air Force effort is directed by the Electronic Systems Division of the Air Force Systems Command.

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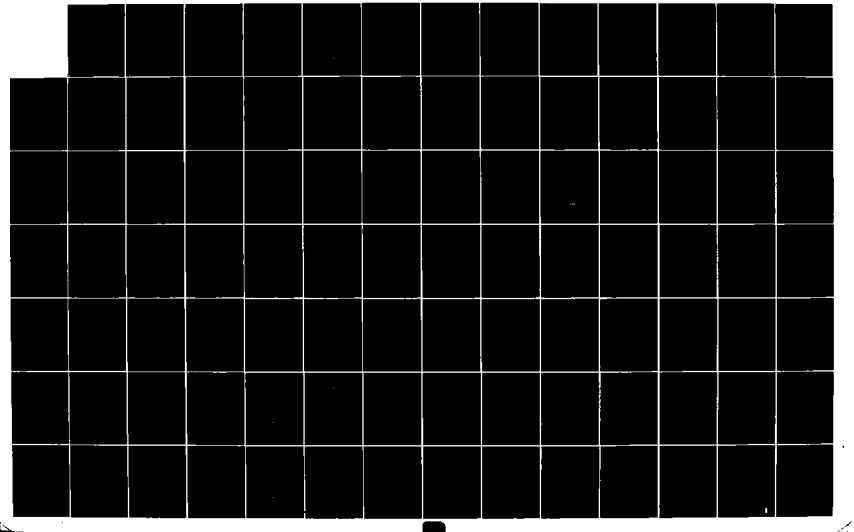

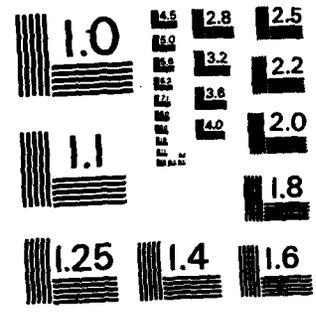

Program Element: **#63770A**

Title: **Joint Surveillance and Target Attack Radar System (JOINT STARS)**

DOD Mission Area: **#217 — Land Warfare Surveillance and Reconnaissance**

Budget Activity: **#4 — Tactical Programs**

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D201 — Battlefield Data Systems: The 19 May 1982 Under Secretary of Defense Research and Engineering memorandum formed a joint program office to develop a common core radar which will provide moving and fixed target detection, tracking, and weapons guidance capability designed to satisfy the battlefield reconnaissance, surveillance, and target attack roles of both the Air Force and Army. It merged the Air Force's ongoing Assault Breaker/PAVE MOVER program with the Army's emerging Battlefield Data System (a lower cost alternative to SOTAS), and designated the Air Force as the Executive Service with the Army as the Participating Service. In FY 1983, studies were conducted for the purpose of defining the JOINT STARS concept and reducing development risk. Study efforts to reduce development risk will be continued and completed in FY 1984. It should be noted that an approved acquisition strategy and Program Management Plan have not yet been formulated. This plan will answer questions that pertain to activities beyond those outlined herein. A Program Management Plan is expected to be presented early in CY 1983.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64202A

Title: Aircraft Weapons

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3550	686	558	- 0 -	Continuing	Not Applicable
DL62	Aircraft Rocket Subsystems	2931	686	558	- 0 -	Continuing	Not Applicable
D133	Aircraft Gun-Type Weapons	619	- 0 -	- 0 -	- 0 -	- 0 -	104019

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The work conducted under this program is essential to support the development and test of improved attack helicopter weapon subsystems (excluding missiles) in order to provide increased operational effectiveness and mission capability of Army aviation in the conduct of the land battle. The program objective is to support the continuing requirement for low-cost, reliable, easily maintainable, lightweight and effective armament subsystems for attack helicopters. Development and testing of new 2.75-inch rocket warheads with an improved motor will be accomplished in order to substantially increase the lethality of the secondary armament systems for both the AH-64 APACHE and AH-1S COBRA/TOW.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirement)	3550	686	558	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	3495	686	576	- 0 -	50545

Increase of $55 thousand in the FY 1982 funding level is a result of reprogramming required to complete MK66 Rocket Motor and Multipurpose Submunition Warhead type classification as well as funding required to initiate refinement of the rocket fire control equations for the AH-1S COBRA/TOW helicopter. The FY 1984 decrease resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

Program Element: #64202A

Title: Aircraft Weapons

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable

E. (U) RELATED ACTIVITIES: Close liaison is maintained with other Services and industry to avoid duplication of effort. The Army participates in the Tri-Service Joint Technical Coordinating Group for Air-Launched Non-Nuclear Ordnance, an organization chartered at the major field command level. This group provides a medium for exchange of technical information and determination of joint use implications. An Army representative serves on the Air Munitions Requirements and Development Committee, an organization within the Office of the Secretary of Defense. One of the functions of this committee is the establishment of joint Service requirements and developement of air munitions. The Naval Ordnance Station, Indian Head, MD, the original developer of the MK66 motor, has been retained as the primary design agency for the MK66 Mod 1 motor, with the Army having program management responsibility. Related Program Elements are #64207A (Advanced Attack Helicopter); #64212A (COBRA/TOW); #63206A (Aircraft Weapons); and #62201A (Aircraft Weapons Technology).

F. (U) WORK PERFORMED BY: Contractors: Breed Corp., Fairfield, NJ; BEI Corp., Amden, AK; Teledyne, Los Angeles, CA. In-House Organizations: US Army Aviation Research and Development Command, St. Louis, MO; US Army Armament Research and Development Command, Dover, NJ; US Army Missile Command, Huntsville, AL; US Army Test and Evaluation Command, Aberdeen Proving Ground, MD; Naval Ordnance Station, Indian Head, MD.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DL62 — Aircraft Rocket Subsystems:** This project supports the development of new rocket subsystems for attack helicopters. A requirement continues for a more reliable, accurate, low-cost, minimum-drag rocket subsystem that provides increased standoff ranges for improved effectiveness and aircraft survivability. Effective range in the direct fire mode has been increased from 4.5 to 6km. The remote set fuse permits target engagements at ranges selectable from 1 to 6km. The new multipurpose submunition warhead provides increased lethality against personnel, material, and light armored targets. Analysis and testing to date indicate a net increase in antipersonnel lethality of greater than 50-1 when compared to the older series rockets; more important is the warhead's capability to penetrate the tops of armor vehicles. FY 1982 accomplishments: Type classification of the Multipurpose Submunition Warhead (MPSM) and MK66 rocket motor; conduct of firing tests to obtain trajectory data; initiation of modification of the AH-1S aircraft fire control equations to accommodate the new round; and initiation of preproduction testing. FY 1983 Program: Completion of preproduction tests and continuation of work on the AH-1S fire control equation modification task. FY 1984 Program: Completion of the AH-1S fire control equation modifications.

2. **(U) D133 — Aircraft Gun-Type Weapons:** This project was completed in FY 1982.

Program Element: #64202A

Title: Aircraft Weapons

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

H. (U) PROJECTS OVER $10 MILLION IN FY 1994: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64204A

Title: Air Mobility Support Equipment

DOD Mission Area: #218 — Land Warfare Associated Air Mobility

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1878	2245	2418	4014	Continuing	Not Applicable
DC32	Ground Support Equipment	956	856	582	1082	Continuing	Not Applicable
DC33	Cargo-Handling Equipment	57	444	479	1371	Continuing	Not Applicable
DC45	Aviation Life Support Equipment	865	945	1357	1561	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Army needs mobile, multi-function Ground Support Equipment (GSE) to reduce the number of obsolete, single-purpose GSE items currently used throughout the aircraft fleet. New GSE will shorten maintenance time and increase mission readiness for both existing and projected aircraft systems. For cargo-handling, the Army needs to develop efficient cargo-handling systems for its cargo and utility helicopters. This need was further highlighted in the Combat Service Support Mission Area Analysis. Current methods of cargo-handling do not maximize the available payload and airspeed capabilities of the aircraft. For survivability, aircrews and support personnel need new and improved individual protective equipment to enhance their survivability and effectiveness in hostile tactical, climatic and nuclear, biological and chemical (NBC) environments. These aviation life support equipment (ALSE) improvements will extend the operational environment of individual crewmembers and standardize protective equipment.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1878	2245	2418	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	2308	2245	6357	Continuing	Not Applicable

The reduction of $430 thousand in FY 1982 is a result of reprograming to higher priority Army requirements. The reduction of $3939 thousand in FY 1984 is the result of a reduction in scope of the ground support equipment project and reprograming to higher priority Army requirements.

Program Element: #64204A

Title: Air Mobility Support Equipment

DOD Mission Area: #218 — Land Warfare Associated Air Mobility

Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Army:						
Sets, Kits, Outfits Funds (current requirements)	6200	1900	5800	9800	On-Going	Continuing
Quantities (current requirements)						
Ground Support Equipment Funds (current requirements)	6100	4500	14900	15000	On-Going	Continuing
Quantities (current requirements)						

The increase of $11773 thousand in FY 1982, $2400 thousand in FY 1983 and $8700 thousand in FY 1984 is a result of assigning a higher priority to shop set complexes and aviation ground power units (AGPU). Since there are many small individual items included in this appropriation, funding this year is shown as a consolidated procurement line. The Sets, Kits, Outfits (SKO) procurement line consolidates 22 individual items including aircraft maintenance shop set complexes for divisional and non-divisional unit/intermediate level maintenance, tool kits and swaging hydraulic repair sets. The ground support equipment procurement line consolidates 24 individual items including test sets, work platforms and general maintenance support equipment as well as the Self-Propelled Crane, Aircraft Maintenance and Positioning (SCAMP) and the Aviation Ground Power Unit (AGPU).

E. (U) RELATED ACTIVITIES: Program Elements #63209A (Air Mobility Support), #62209 (Aeronautical Technology) and #62210A (Airdrop Technology) are closely coordinated with this program element through the actions of the annual OSD Apportionment Review of Aeronautical Technology. Inter-service cargo-handling developments are coordinated through periodic meetings of the Joint Technical Airdrop Group (JTAG), Helicopter Transport Subgroup for cargo-handling systems. The Army provides cargo-handling equipment technology and systems development of common use equipment to all services. This joint effort is partially funded by the US Navy and Marine Corps through a memorandum of agreement. Inter-service

Program Element: #64204A

Title: Air Mobility Support Equipment

DOD Mission Area: #218 — Land Warfare Associated Air Mobility

Budget Activity: #4 — Tactical Programs

coordination for ground power generation is coordinated through the Joint Technology Coordinating Group for Aircraft Survivability. In the area of aviation life support equipment, the Tri-service Life Support Equipment Management Council provides the coordination. These inter-service coordination groups help prevent unnecessary duplication of effort between the Army and other services.

F. (U) WORK PERFORMED BY: H. Koch and Sons, Anaheim, CA; Naval Air Development Center, Warminster, PA; Carleton Controls Corp., Aurora, NY; Radio Corporation of America, Burlington, MA and development contractors to be competitively choosen for programs scheduled in the FY 1983-FY 1985 timeframe. Two additional competitive procurement contracts will be awarded in FY 1983. The developing organization is the US Army Aviation Research and Development Command, St. Louis, MO.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DC32 — Ground Support Equipment:** This project provides Full-Scale Engineering Development (FSED) actions for Helicopter Battle Damage Repair (HBDR), Small Portable Analyzer/Diagnostic System (SPADE), Aircraft Decomination/Deicing/Cleaning System (ADDCS), Helicopter Snow Ski Set (HSSS), Damaged Aircraft Recovery Kit, and Aviation Test Equipment (AVIATE). FY 1982 Accomplishments include award of the Full Scale Engineering Development contract for SPADE and redefinition of technical requirements for the ADDCS. Using APA funds, the contracted and in-house actions for the AVIM shop and Tool Set Complex and AGPU were finalized for early FY 1983 starts. The Helicopter Snow Ski Set FSED was delayed indefinitely due to reprograming of funds to higher Army priorities. The FY 1983 program will continue the FSED of SPADE and initiate FSED for the ADDCS. The FY 1984 program will result in completion of SPADE hardware for initiation of Development and Operational Tests (DT/OT II) and completion of the FSED for ADDCS. The FY 1985 program will result in the completion of the SPADE Phase I program, approval for production, and initiation of the Phase II program (additional aircraft model applicability). Also, in FY 1985, contracted design and fabrication of HBDR Kits will be initiated as a new start. The initial HBDR kits will be for electrical system repair. The SPADE Phase II effort will be continued in FY 1985.

2. **(U) DC33 — Cargo-Handling Equipment:** This project provides FSED actions for the Medium-Lift Helicopter Internal Cargo-Handling System (HICHS) for rapid cargo loading/off-loading; the Low Visibility Load Acquisition System (LOVLAS) for around-the-clock limited visibility, helicopter external load hookup and dropoff; the Advanced Materiel Cargo Sling System (AMCSS) for a lightweight, long-life external cargo sling system; the joint US Army, US Marine Corps Helicopter External Air Transport (HEAT) Kit for aggregation and transport of all required external cargo sling equipment items, and the Helicopter External Cargo Snubbing System (HEXCSS) to snub external cargo to the helicopter to enhance aircraft maneuverability for terrain-following flight in the combat zone. FY 1982 accomplishments consisted of final definition of the HICHS technical requirements. The FY 1983 program will be the initiation of the contracted design and fabrication of the HICHS. The FY 1984 program will consist of initiation of the Development and Operational Tests (DT/OT II) of the HICHS. The FY 1985 program will include completion of the HICHS and approval for production and the initiation of the contracted design and fabrication FSED of the LOVLAS, AMCSS and HEAT Kit efforts as new starts.

Program Element: #64204A

Title: Air Mobility Support Equipment

DOD Mission Area: #218 — Land Warfare Associated Air Mobility

Budget Activity: #4 — Tactical Programs

3. (U) DC45 — Aviation Life Support Equipment: This project provides FSED actions for the Helicopter Oxygen System (HOS), Floatation Kits, Modular Survival System, On-Board Oxygen-Generating System (OBOGS), and the Personal Locator System (PLS). The FY 1982 accomplishments include initiation of FSED for the Modular Survival System, continuation of FSED for the HOS and completion of DT/OT II testing on early configuration Floatation Kits. Initiated ED with US Navy on Refined Floatation Kits. The FY 1983 program will initiate FSED of OBOGS and the PLS, initiate DT II testing of the HOS, and continue FSED on the Floatation Kits. The FY 1984 program completes FSED for the Floatation Kits, continues FSED for OBOGS, and completes OT II for the HOS. The FY 1985 program includes completion of DT/OT II and qualification of OBOGS for reconnaissance and special mission aircraft. Initiates FSED for Aviation Life Support System, Integrated Battlefield (ALSSIB) and new CB Mask and Hot Air Decon System. Continues FSED of the Modular Survival System. Completes ED of the Aircraft Survival Module and PLS.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64207A

Title: Advanced Attack Helicopter (AH64)

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	91874	33629	28333	17141	11752	1229929
	QUANTITIES						9
D425	Advanced Attack Helicopter	91874	33629	28333	17141	11752	1229929

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Army needs a significantly improved tank-killing capability relative to the AH-1 attack helicopter. A sophisticated air defense threat and improvements in the ballistic protection of numerically superior Warsaw Pact armor dictate a more survivable, versatile, and lethal US attack helicopter. The AH-64 has been designed to provide these advantages; as such, it has superior flight performance; an armament capability to defeat a mission equipment package to allow day, night, adverse weather operation, high survivability, and unequalled versatility. The AH-64 is an absolute must for providing a mobile antiarmor capability to US rapid deployment forces that may be deployed to high-temperature, high-altitude areas such as Southwest Asia. Aircraft armament includes the laser-guided HELLFIRE Modular Missile System, 30mm chain gun, and 2.75-inch rockets. The AH-64 will be the Army's primary attack helicopter and will be complemented by the AH-1 series attack helicopters. The APACHE entered production in FY 1982.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	91874	33629	28333	28893	1229929
Funds (as shown in FY 1983 submission)	91874	33725	39448	127274	1339637

The funding decrease of $96 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The funding decrease of $11,115 thousand in FY 1984 is a result of reprograming to higher priority Army requirements from Project D423 (AAH Modification) and application of inflation indices. Project D423 has now been moved to Program Element 23744, Aircraft Modifications with first year of funding scheduled for FY 1985.

Program Element: #64207A

Title: Advanced Attack Helicopter (AH64)

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Army						
Funds (current requirements)	537000	895200	1465600	1414800	1759900	6131300
Quantities (current requirements)	11	48	112	144	200	515
Military Construction, Army						
Funds (current requirements)	- 0 -	8700	- 0 -	- 0 -	- 0 -	8700

The quantity of aircraft to be procured was increased from 446 to 515. An increase of 69 aircraft was achieved by restructuring the procurement and attaining a more efficient production rate. The decrease in total program funding reflects application of Jan 1983 inflation indicies. System-specific Military Construction, Army funds have been added.

E. (U) RELATED ACTIVITIES: The heliborne missile, HELLFIRE, is being developed under Program Element #64310A (Heliborne Missile-HELLFIRE). The 30mm ADEN/DEFA ammunition is being developed under Program Element #64202A (Aircraft Gun-Type Weapons). These related activities are all carefully coordinated to preclude duplication of effort and insure system and delivery compatibility.

F. (U) WORK PERFORMED BY: Hughes Helicopters, Culver City, CA, is the airframe and 30mm gun developer and is responsible for the total weapon system integration. General Electric Company, Lynn, MA, is the manufacturer of the Government-furnished T701 engine. Martin Marietta Aerospace, Orlando, FL, is the contractor for the Target Acquisition Designation Sight (TADS) and the Pilot Night Vision Sensor (PNVS). The Advanced Attack Helicopter (AAH) program manager's office, located at the US Army Aviation Research and Development Command, St. Louis, MO, is responsible for the program. There are 16 major subcontractors providing contractor-furnished equipment to Hughes Helicopters.

Program Element: **#64207A** Title: **Advanced Attack Helicopter (AH64)**

DOD Mission Area: **#212 — Indirect Fire Support** Budget Activity: **#4 — Tactical Programs**

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D425 — Advanced Attack Helicopter (AH-64)**

a. **(U) Project Description:** This project completes the final stages of development for the AH-64, through development and integration of a cost effective composite main rotor blade, and completion of test program sets which allow soldiers in the field to diagnose and repair problems.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Established and defined a program to install and flight test a fuel system nitrogen inerting unit (NIU) which prevents post-crash fires; completed flight test of the T700-GE-701 engine and demonstrated that it met all requirements.

(2) **(U) FY 1983 Program:** Composite main rotor blade qualification and integration will be initiated. Continue final development of ground support equipment and test program sets.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Will complete composite main rotor blade development and conduct bench and flight testing of the blades. Development of time-phased ground support equipment and test program sets will continue.

(4) **(U) Program to Completion:** Development and testing of the final series test program sets will complete in FY 1986.

Program Element: #64207A

Title: Advanced Attack Helicopter (AH64)

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Award Aerial Vehicle Development Contract (Phase I)	June 1973	June 1973
First Flight	September 1975	September 1975
Complete Air Vehicles Fly-Off	September 1976	September 1976
Award Full-Scale Engineering Development Contract (Phase 2)	December 1976	December 1976
Award Competitive Target Acquisition Designation Systems and Pilot Night Vision Systems (TADS/PNVS) Contracts	March 1977	March 1977
Competitive TADS/PNVS Selection	April 1980	April 1980
Complete OT II	August 1981	August 1981
Production Contract Award	March 1982	March 1982
First Production Delivery	February 1984	February 1984
First Unit Equipped (FUE)	FY 1985	FY 1985

Program Element: #64207A

Title: Advanced Attack Helicopter (AH64)

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

I. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. (U) The AAH development program was divided into two phases. Phase 1 was competitive development of the basic aircraft with very limited weapons integration. Phase 2 encompasses the integration of all weapons subsystems into the winning Phase 1 aircraft together with the fabrication and test of three new prototype aircraft built to approximate production configuration. The Phase 2 effort included a competitive development and selection of the Target Acquisition Designation Sight (TADS) and Pilot's Night Vision Sensor (PNVS). Phase 2 was completed in 1982 and is to be followed by development and testing of the remainder of the test program sets for automatic test equipment and composite main rotor blades and Secretary of Defense directed testing of TADS. Significant past developmental program events are as follows:

(1) (U) Competing Advanced Attack Helicopter (AAH) contractors, Bell Helicopter Textron and Hughes Helicopters Inc., completed more than 300 hours of flight testing prior to delivery of two flight vehicles each to the Army on 31 May 1976. The primary objective of Phase 1 testing was flight envelope development, demonstration of structural integrity, and evaluation and verification of aircraft flight handling qualities. The 30mm cannon and 2.75-inch rocket subsystems were given limited in-flight firing tests.

(2) (U) The Army Engineering Flight Activity (AEFA) Edwards Air Force Base, California, conducted Development Test (DT) I during July-September 1976 on competing AAH designs to evaluate flight handling qualities and aircraft performance including in-flight firing of the 30mm cannon and 2.75-inch rocket subsystems. Reliability data were collected by the US Army Test and Evaluation Command (TECOM). The Army selected the Hughes YAH-64 to enter Full Scale Engineering Development (Phase 2), and a contract was awarded on 10 December 1976. (DTI, AEFA Report 74-07-2, TECOM Report 4-AI-100-AAH-010)

b. (U) During Phase 1 Government Competitive Tests (GCT), which included engineering and simulated operational testing, the major deficiencies identified included controllability problems in sideward flight, an unreliable auxiliary power unit and engine starting system, and structural inadequacy of the cooling fan associated with the infrared suppression system. Design changes were made and successfully tested in Phase 2.

(1) (U) Phase 2 development tests (DT) expanded the aircraft flight envelope and evaluated modifications that were proposed to the Phase 1 design. A first modification incorporated a changed empennage, improved automatic stabilization equipment, a refined infrared suppressor, and removed the cooling fan. The Engineer Design Test 1 (EDT-1) was conducted from April through May 1978. Findings indicated improved sideward flight characteristics, improved handling qualities (particularly in the areas of static longitudinal stability, pitch-to-side-slip coupling and control breakout forces), and much improved reliability, availability, and maintainability (RAM) with the removal of the cooling fan. The most significant deficiencies

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discovered during this test include: less than desirable main-rotor-to-canopy clearance; undesirable handling characteristics, with Stability Augmentation System (SAS) off, in left sideward flight and at speeds above 120 knots true airspeed; vibrations at the crew station in excess of specification requirements; and canopy drumming caused by a combination of aircraft vibration and main rotor wake passage. Subsequent to EDT-1, a second set of modifications were installed on the Phase 1 prototypes. These modifications included incorporation of the weapons subsystems (e.g., Target Acquisition Designation Sight (TADS), Pilot Night Vision Sensor (PNVS), and HELLFIRE missile) and airframe-related changes to include a new auxiliary power unit and raised rotor. (EDT-1, AEFA Report 77-36)

(2) (U) The Government conducted an evaluation to confirm the correction of deficiencies in the airframe, during EDT-2, in April 1979. Only one new deficiency was revealed; this was insufficient left pedal during right sideward flight at the most critical wind azimuth and velocity. A basic redesign was undertaken to incorporate a movable stabilizer (stabilator). The first flight of a prototype helicopter with the redesigned stabilator was on 31 October 1979, and all five prototypes received the modification by May 1980. Flight test data indicate that the stabilator had corrected problems associated with flight handling and vibration. (EDT-2, AEFA Report 78-23)

c. (U) Prototypes used during Phase 2 include both early development aircraft from Phase 1 and the three new Phase 2 aircraft. The Phase 1 aircraft had a series of modifications so as to generally conform to the final design. The new Phase 2 aircraft represented the production configuration, and producibility engineering has been implemented.

d. (U) The Army conducted EDT 4 in November 1980. Test results indicated that the previously revealed deficiencies from EDT 1 and 2 had been essentially corrected. EDT 4 was followed by EDT 5 December 1980-January 1981, to assess readiness of the aircraft and subsystems for entry into Operational Test (OT II) and to determine any safety-related problems. Two deficiencies were reported: The first was due to an inoperative fuel transfer system (maintenance problem); the second was due to an unreliable onboard auxiliary power unit (related to installation discrepancies). In addition, a number of subsystem-related discrepancies were found that required action. Correction of the deficiencies and discrepancies was confirmed and validated by Army representatives prior to OT II. Those discrepancies, which because of hardware/software leadtime could not be ready for OT II, were documented and reviewed as changes for incorporation in the production AH-64 configuration. (EDT-4, AEFA Report 80-03); (EDT-5, TECOM Report 4-AI-100-AAH-010)

e. (U) In accordance with the AAH development contract, the following activities developed and tested the aircraft:

(1) **(U) Development Contractor:**

(a) (U) Prototype Aircraft — Hughes Helicopters Inc., Culver City, CA

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(b) (U) TADS/PNVS — Martin Marietta Aerospace, Orlando, FL

(c) (U) 30mm Gun — Hughes Helicopters Inc., Culver City, CA

(d) (U) HELLFIRE Missile — Rockwell International Corporation, Columbus, OH

(2) (U) Test support is provided by Army development and readiness commands with contract consultative services to be obtained as required.

(3) (U) **Service Program Manager:** BG(P) C. E. Drenz, Program Manager — AAH, US Army Materiel Development and Readiness Command.

(4) (U) **Development Test and Evaluation:**

(a) (U) US Army Test and Evaluation Command (TECOM), Yuma Proving Ground, AZ, and Electronics Proving Ground, AZ.

(b) (U) US Army Aviation Research and Development Command (AVRADCOM), St. Louis, MO.

(c) (U) Ballistic Research Laboratory (BRL), Aberdeen Proving Ground, MD.

(d) (U) US Army Aeromedical Research Laboratories (USAARL), Ft Rucker, AL.

(e) (U) US Army Communications Command and Electronics Research Command, Night Vision Laboratories, Ft Monmouth, NJ.

(f) (U) US Army Materiel Systems Analysis Activity (AMSAA), Aberdeen Proving Ground, MD.

(g) (U) US Army Missile Command (MICOM), Huntsville, AL

f. (U) Major test areas and agencies involved are as follows:

(1) (U) **Air Vehicle Tests — DT:** Contractor and Government primary flight test base is Yuma Proving Ground, AZ. For short periods, flight tests are conducted at Edwards AFB, CA.

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(2) (U) Systems Tests — DT: The major site for both contractor and Government systems tests is Yuma Proving Ground (YPG), AZ. Relatively short tests, to examine unique system characteristics, are accomplished away from YPG (e.g., icing tests in northern Minnesota).

g. (U) Future major test schedule: Force Development Test and Evaluation in 1985.

h. (U) Five flying prototypes have been in the test program. In November 1980 the nonsystematized structural flight test helicopter collided with a chase plane, and the AAH was lost to the program. Adjustments to schedules and priority of development efforts were made, resulting in a program that accomplished all critical actions prior to the production decision. Additional TADS flight testing, as directed by the Secretary of Defense Decision Memorandum in April 1982, was successfully completed on 17 November 1982. (AMSAA Interim Note No. A-191 Nov 1982) Flight testing to evaluate microminiaturization of TADs electronics will begin in January 1983.

i. (U) A total of 58 HELLFIRE guided missile firings were conducted. Firings achieved a. The missile was developed by a separate project manager at the US Army Missile Command. Additional HELLFIRE firings off surrogate platforms have been conducted. A total of 136 missiles were fired in the overall missile development program.

j. (U) Testing to validate the integration of the -701 engine has been completed. The -701 engine has met or exceeded all requirements. The test report has not been completed.

k. (U) Reliability, availability, and maintainability (RAM). RAM data collected during testing and specific RAM objectives are listed in paragraph 2f.

l. (U) The total AH-64 system is designed to meet the requirements for worldwide operations. In furtherance of these requirements, and in addition to individual component laboratory environmental tests, the total system has been tested in natural desert environment (YPG), cold environments (Minnesota), temperate environments (California) and simulated environments of the climatic hangar. Environmental conditions, at the component and subsystem level, such as vibration, shock, fatigue, and temperature are also an inherent part of the developmental effort.

(1) (U) Desert Environment (YPG): The majority of AAH development testing was conducted in a desert environment. All Development Test reports address adverse effects, and no discrepancies exist today.

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(2) **(U) Icing Tests/Cold Environment:** Testing was completed the first week of March 1982. The data have been evaluated, and design changes have been made. Test data show that the on-board heating system does not adequately warm the crew. Design changes have been made and tested to solve this problem. Overall, there were only minor problems associated with the icing tests themselves. Additional icing tests are planned on a production aircraft. The test report has not been completed.

(3) **(U) Climatic Hangar:** Several problems in the environmental control unit have surfaced. These problems have been evaluated, and design changes have been incorporated. Other areas of systems operations showed discrepancies that were generally attributable to prototype status of equipment or operating procedures. Testing was accomplished in April 1982. (AEFA Report 80-071 TECOM Report 4-AI-100-AAH-015)

2. **(U) Operational Test and Evaluation:**

a. (U) Operational Test (OT-1) was conducted in September 1976 at Edwards Air Force Base, CA, by the US Army Operational Test and Evaluation Agency (OTEA) in conjunction with Development Test (DT) I. Aircraft flight and detectability characteristics and mission performance in a low-level and nap-of-the-earth (NOE) operational environment were emphasized. Military crews for the competitive flight tests consisted of an Army Engineering Flight Activity (AEFA) test pilot and an experienced attack helicopter pilot from a US Army Forces Command (FORSCOM) unit as copilot/gunner. Operational Army maintenance personnel observed all maintenance activities. The current Army attack helicopter (AH-1S) was concurrently flown on all YAH-64 missions to establish comparative baseline data. OTEA prepared an independent evaluation of OT I which was briefed to the Army Systems Acquisition Review Council in December 1976. OTEA concluded that the Advanced Attack Helicopter (AAH) was suitable for continuation into the next phase. (OT II: FTR OT-046 Sep 76)

b. (U) OTEA conducted the YAH-64 Operational Test II (OT II) during June-August 1981 at Fort Hunter-Liggett, CA, using three aircraft in three major test segments: force-on-force with free play and near-realtime casualty assessment; live fire with HELLFIRE, 30mm, and 2.75-inch rocket subsystems. The specific objectives of this test were to assess operational effectiveness in a realistic operational environment; partially assess the operational reliability, availability, maintainability, and supportability; assess survivability in an operational environment; obtain information on deployment; obtain information on the adequacy of the proposed training programs for operator and maintenance personnel; and obtain data to evaluate the correction of discrepancies discovered during DT/OT I. This test started in June 1981 following several months of training for all maintenance personnel and five months of flight training for the YAH-64 aircrews. All Army player personnel used in this test represented typical Army attack helicopter and aviation maintenance units. (OT II: FTR OT-046 Apr 82)

c. (U) The following test data resulted from OT II:

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(1) (U) **Mission Performance:** The capability of the AH-64 to detect, recognize, engage, and destroy armor and air defense targets during daylight, clear weather scenarios is superior to that exhibited by the baseline AH-1S (modernized COBRA). The AH-64 adds two capabilities to the Army by its ability to fight at night and conduct indirect engagements of threat targets. The AH-64 mission performance is adequate for combat.

(2) (U) **Survivability:** The demonstrated AH-64 survivability against threat weapon systems is superior to the baseline AH-1S (modernized COBRA) in terms of smaller number of losses per battle and reduced opportunities for the threat weapon system to engage the helicopter. The AH-64 survivability is adequate for combat.

(3) (U) **Operational Reliability, Availability, and Maintainability (RAM):**

(a) (U) Mission reliability of the AH-64 exceeded the Decision Coordinating Paper (DCP) goal of 17.0 hours mean time between failure (MTBF), and is adequate for fielding. The reliability of the TADS was marginal in OT II; however, a 500-hour endurance test completed in December 1981 showed an improvement in TADS/PNVS MTBF. TADS difficulties encountered in maintaining boresight, low laser power output noted intermittently during testing, and intermittent ranging have been corrected and fixes have been demonstrated in flight tests. Use of production-type lasers, modified TV and FLIR cameras, as well as boresight module improvements proved successful in eliminating problems relative to boresight accuracy and retention, low laser power output, and intermittent ranging. The limited flight testing of the improvements (approximately 90 operating hours) resulted in one failure. Further flight testing of reliability improvements will be conducted beginning in January 1983 with the production verification testing of the microminiaturized electronics (4-Box) system. The reliability of the 30mm Chain Gun was considered marginal because gun and fire control problems resulted in insufficient data being obtained during OT II to assess a probability. At the end of CY 1981, cumulative firings (31,616 rounds) have resulted in a 0.83 probability of firing a 320-round mission load against a mission criterion of 0.92. During first quarter 1982, the 30mm airborne reliability firing test with an updated configuration was completed. During this test, 7601 rounds were fired from the air, with two stoppages, resulting in a 0.92 probability of firing a mission load. Immediately following, 6780 rounds, of a planned 10,000-round ground reliability test, were fired in March 1982. Cumulative post-OT-II rounds fired (of over 14,000 rounds) with the production configuration allow assessment of the 30mm area weapon subsystem at .92 probability of fire-out for a 320-round complement. Additional 30mm gun firing during the November 1982 TADS flight test, indicate that break-lock problems have been solved.

(b) (U) The overall availability of the AH-64 exceeded the Mission Element Need Statement (MENS) goal of .75, using data from the most representative production configuration helicopter (AV06), and is adequate for fielding.

(c) (U) Maintainability of the AH-64 far exceeded the criterion for maintenance man-hours/flight-hours (MMH/FH). The MMH/FHs observed during OT were 5.65 hours against a criterion of not more than 14.4 hours. The mean-time-to-repair (MTTR) was assessed at 1.4 hours as compared to a criterion not to exceed 0.9 hours at maturity (100,000 hours flight time on a production aircraft). MTTR was hindered by the immature

Program Element: #64207A Title: Advanced Attack Helicopter (AH64)

DOD Mission Area: #212 — Indirect Fire Support Budget Activity: #4 — Tactical Programs

automatic test equipment (ATE), draft maintenance manuals, and limited training available for personnel on the preproduction helicopters used during OT II. As the Army prepares the AH64 for fielding, these items are expected to improve.

(4) (U) **Transportability/Deployability:** The AH-64 has been certified for transport on the C141B as a result of DT. A 406-nautical-mile cross-country flight during the OT II demonstrated the capability of the AH-64 to conduct long-range self-deployability missions. In June and September 1982, the AH-64 was transported to and from Europe on a C-5A, without any problems.

d. (U) Due to the nonproduction configuration of several electrical components onboard the test aircraft, a number of software test program sets (TPS) for the automatic test equipment (ATE) were waived for OT II. Follow-on evaluation (FOE) of these waived TPS is planned to begin in April 1984. Those TPSs that were available during OT II were very effective. (OT II: FTR-OT-046)

e. (U) Twelve HELLFIRE missiles were launched from the AH-64 during this test. The missiles were fired under simulated battlefield conditions using all launch modes, day and night. Moving targets, consisting of remotely controlled target vehicles, were used. Of the 12 missiles launched, 1 was a no-test, 11 out of 11 missiles were scored reliable, 10 out of 10 missiles accurately tracked the laser spot, two were scored as misses due to operator error, and 8 hit the target. (OT II: FTR-OT-046)

f. (U) The reliability, availability, and maintainability (RAM) assessment at OT II was based on data available from OT II and other data accumulated during Phase 2 developmental testing. Army maintenance personnel performed unit and intermediate maintenance support on all systems and subsystems unaided approximately 51 percent of the time, required contractor assistance approximately 32 percent of the time, and passed the maintenance task to the contractor approximately 17 percent of the time. Proper ground support, including most automatic test equipment, was utilized for the test. Operational realism was emphasized. An Army RAM data collection team gathered data throughout the test for determination of AAH reliability and maintainability characteristics. The RAM objectives and OT II results, in terms of maintenance man-hours per flight hour (MMH/FH) and mean times between failures (MTBF), which were assessed at OT II, are listed in paragraph 3 below along with the values to be achieved at full-rate production after completion of the follow-on evaluation. Full maturity of RAM characteristics is expected to occur at approximately 100,000 flight hours on production aircraft.

g. (U) **Operational Test Agencies:**

(1) (U) US Army Forces Command (FORSCOM), Ft McPherson, GA.

(2) (U) US Army Training and Doctrine Command (TRADOC), Ft Monroe, VA.

Program Element: #64307A — Title: Advanced Attack Helicopter (AH64)

DOD Mission Area: #212 — Indirect Fire Support — Budget Activity: #4 — Tactical Programs

h. (U) Independent Operational Test Agency: US Army Operational Test and Evaluation Agency (OTEA), Falls Church, VA.

3. (U) System Characteristics:

Operational/Technical Characteristics*	Objective	Demonstrated Performance**	Current Estimate for Production***
Primary Mission Gross Weight (PMGW) (lbs)	13910	14660	14694
Cruise Airspeed — PMGW (Knots)	145	145	145
Vertical Rate of Climb at PMGW — (feet per minute)	700	900	800
Mission Reliability (Mean time between failure in hours)	19.5	21.1	21.1
Weapon Accuracy (PH) 30mm			
HELLFIRE (stationary targets)			
(moving targets)			
Lateral acceleration (g's)	.25-.35	.29	.25-.35
Endurance (hrs) — Primary Mission	1.83	1.83	1.83
— Alternate Mission	2.5	2.5	2.5
Expendable Ordnance at PMGW			
HELLFIRE Missile	8	8	8
30mm rds	320	320	320
Total Expendable Ordnance Capacity			
HELLFIRE Missile	16	16	16
30mm	1200	1200	1200
2.75" Rocket	76	76	76
Target Recognition (km) Maximum			
Day			
Night			
Target Designation (km) Maximum			
Day			
Night			
Maintenance Man-Hours per Flight Hour	13	5.65	13

Program Element: **#64207A** Title: **Advanced Attack Helicopter (AH64)**

DOD Mission Area: **#212 — Indirect Fire Support** Budget Activity: **#4 — Tactical Programs**

NOTES:
* Performance required at primary mission gross weight, operating within specified mission profiles.
** Computed from Government flight test data and adjusted to the approved production configuration with the T700-GE-701 engine.
*** T700-GE-701 Engine.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64212A Title: COBRA/TOW

DOD Mission Area: #212 — Indirect Fire Support Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	13966	8611	- 0 -	- 0 -	- 0 -	79343
D639	COBRA/TOW	13966	8611	- 0 -	- 0 -	- 0 -	79343

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: This program supports development of a night/obscured battlefield antiarmor capability for the AH-1S, COBRA/TOW, by incorporating Forward Looking Infrared (FLIR) in the TOW missile system and control features for complete compatibility with the Improved TOW and TOW 2 missile systems. These improvements will enhance the AH-1S COBRA antiarmor capability and keep it an integral element of the ground combined arms team. The AH-1S is a single-engine, two-seat attack helicopter designed to employ the TOW missile, 20mm projectiles, and 2.75-inch rockets. Currently its capabilities are limited primarily to daytime operations. The AH-1S will complement the Army's primary attack helicopter, the AH-64, to be fielded in the mid-1980s.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: Work on the FLIR-Augmented COBRA/TOW Sight (FACTS) was deferred in early 1982 pending a review of the total COBRA fleet modernization requirement. 1981 Congressional language (HASC) expressed concern "that the Army has yet to define the details, schedule and costs associated with expanding the operational life of the COBRA system through the year 2000." The Army initiated a "COBRA 2000" review in June 1981. The planned program addresses upgrading the older model AH-1S (MOD, PROD & ECAS) helicopters by adding a night/adverse weather capability and aircraft performance improvements. The Army has scheduled a decision review in March 1983.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64216A

Title: Aircraft Propulsion Systems

DOD Mission Area: #218 — Land Warfare Associated Air Mobility

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	- 0 -	- 0 -	- 0 -	Continuing	Not Applicable
DC72	Modern Technology Engine (MTE)	- 0 -	- 0 -	- 0 -	- 0 -	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: This program element provides advances in the area of flight safety, reliability, maintainability, durability, survivability, and fuel efficiency through engineering development support for essential improvements and development of aircraft propulsion systems, both engines and drive trains, and associated components and accessories. This program element is essential because it directly addresses the critical need for final development and qualification of propulsion systems and subsystems critical to future multi-Service operational effectiveness and particularly the combat mission capability of Army aviation. The primary project was development of a common Joint Service 5000 to 6000-horsepower-class modern technology engine which will result in improvements in specific power and reduced fuel consumption by 20-25 percent in the Army CH-47 helicopter; a potential increase of 40-percent mission radius for the Navy P-3 aircraft; and a multi-use highly fuel-efficient gas turbine, which is a vital part of the Joint Services Advanced Vertical Lift Aircraft (JVX) for the 1990s and beyond.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: The FY 1983 funds were decreased as a result of a Congressional reduction without prejudice due to budgetary constraints. The FY 1984 and FY 1985 funds were transferred to Program Element #63256A, JVX, Joint Services Vertical Lift Aircraft; Project #D209, Modern Technology Engine (JVX). This program element is deferred until FY 1986 at which time it will be dedicated to providing engineering development support and flight qualification for a 1000 horsepower class advanced technology engine (ATE) critical to fielding of the LHX family of scout/attack and utility/observation rotorcraft planned to replace the Army's rapidly aging fleet of UH-1, OH-58, OH-6 and AH-1 helicopters in the mid-to-late 1990s.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64217A — Title: Synthetic Flight Training Systems

DOD Mission Area: #215 — Land Warfare Support — Budget Activity: #4 Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5263	30663	12946	14844	Continuing	Not Applicable
D275	Synthetic Flight Training Systems	5263	30663	12946	14844	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program supports development of high-fidelity operational flight, weapon, and combat mission helicopter simulators to support initial entry rotary-wing training and combat operational training. This simulator development provides a realistic and cost effective training by replicating the combat environment for tactical flight, to include nap-of-the-earth (NOE), weapons engagement, and enemy interaction. The simulators are used to complement the training accomplished in actual aircraft during formal courses of instruction and for maintenance of combat readiness by rated aviators. Each hour flown in a simulator offsets an hour which would have been flown in an aircraft. An hour in an AH-64 aircraft will cost approximately $3000, while the simulator will cost less than $600 per hour. Each simulator will be used 3645 hours per year, and therefore, each simulator reduces annual operations and support cost by $8,748,000 (3000-600=2400x3645), while concurrently providing a better trained pilot. The reduction in operations and support cost is included in the Army's flying hour program request.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	5263	30663	12946	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	3063	30951	21053	Continuing	Not Applicable

The funding increase in fiscal year 1982 was a result of the Army accelerating the development of the AH-64 Combat Mission Simulator. The funding decrease of $88 thousand in FY 1983 is a result of pro rata application of general Congressional reduction to the RDTE,A appropriation. The reduction in FY 1984 of $7633 thousand was the cancellation of development of the Army Helicopter Improvement Program (AHIP) simulator. The remaining FY 1984 reduction of $474 thousand resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

Program Element: **#64217A**

Title: **Synthetic Flight Training Systems**

DOD Mission Area: **#215 — Land Warfare Support**

Budget Activity: **#4 Tactical Programs**

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Army						
Funds (current requirements)	35900	57400	142000	TBD	Continuing	Not Applicable
Quantities (current requirements)	1(AH-1FS)	3(AH-1FS) 1(CH-47FS)	3(UH-60FS) 1(AH-1FS)	2(UH-60FS) 2(AH-1FS) 2(AH-64FS)	Continuing	Not Applicable
Military Construction, Army (MCA)						
Funds (current requirements)	- 0 -	- 0 -	3100	- 0 -	Continuing	Not Applicable

The MCA funding decrease of $400 thousand in FY 1984 is a result of validation of construction cost. Flight Simulator Facility will be constructed at Fort Rucker, AL.

E. (U) RELATED ACTIVITIES: Program Elements #63216A (Synthetic Flight Simulators) and #62727A (Nonsystem Training Device Technology). These activities are engaged in flight simulation component research and development. Close coordination with the Air Force and Navy is maintained by the Army through the collocation of the Army's Project Manager for Training Devices with The Navy Training Equipment Center and an Air Force liaison office. Many joint projects are effected between the Services to prevent unnecessary duplication in the flight simulation arena.

F. (U) WORK PERFORMED BY: Link Division, The Singer Co., Binghamton, NY, for development of the AH-1, CH-47, UH-60, and the AH-64 Combat Mission Simulator. Responsible developing agency is the US Army Project Manager for Training Devices collocated with the US Naval Training Equipment Center, Orlando, FL.

Program Element: #64217A Title: Synthetic Flight Training Systems

DOD Mission Area: #215 — Land Warfare Support Budget Activity: #4 Tactical Programs

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D275 — Synthetic Flight Training Systems (AH-64 Combat Mission Simulator)**

a. **(U) Project Description:** This project supports development of a family of high-fidelity flight, weapon, and mission helicopter simulators to support initial entry helicopter pilot training, transition training, and combat operational training. A major thrust is the development of simulation of the combat environment for tactical flight, including nap-of-the-earth (NOE), weapons engagement, and enemy interaction, to provide realistic and cost effective training in a totally safe environment. The simulators complement the training accomplished in actual helicopters during formal courses of instruction and for maintenance of combat readiness by rated aviators. Each simulator is a replica of the helicopter cockpit, mounted on a motion system, with an instructor's station to control the training scenario, the operating environment, and the measurement of the pilot's performance. Each simulator has a visual system to provide the aircrew with a view of the terrain outside the helicopter. The FY 1982 funding initiated the Engineering Development of the AH-64 Combat Mission Simulator. This training device will be capable of simulating the full combat mission to include hostile enemy interaction. All AH-64A flight and weapons systems required for aircrew training, to include the gunner's Target Acquisition Designation Sensor (TADS) and the Pilot's Night Vision Sight (PNVS), will be incorporated in the simulator. If simulators were not available, the Army would fly the aircraft those hours that were spent in the simulator and, therefore, incur a considerably greater training expense.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Initiated full-scale engineering development of the combat mission simulator for the AH-64 Attack Helicopter. Began integrated logistic system management, cost and schedule performance management, contract management and vendor liaison and contract work breakdown schedule management. Procure aircraft data and Government-furnished equipment.

(2) **(U) FY 1983 Program:** Continue the development of the combat mission simulator for the Attack Helicopter. Work breakdown structure includes: hardware and software design and development, hardware and software integration, system engineering and technical control, technical contract data, logistic support and procurement, and system support and assembly.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Continue development of AH-64 combat mission simulator. Complete hardware and software design and development, hardware and software integration, system engineering, data base model, computer-generated imagery installation, all in-plant installation and inspection, and in-plant system testing.

Program Element: **#64217A** Title: **Synthetic Flight Training Systems**

DOD Mission Area: **#215 — Land Warfare Support** Budget Activity: **#4 Tactical Programs**

(4) **(U) Program to Completion:** The development effort for the AH-64 combat mission simulator will continue into FY 1985. Work breakdown includes: on site assembly, full system testing, logistic system integration and Army acceptance with ready-for-pilot-training date of July 1985. This is a continuing program.

c. **(U) Major Milestones:** Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64216A

Title: Airdrop Equipment Development

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2763	2728	3426	4226	Continuing	Not Applicable
D279	Airdrop Equipment Development	2763	2728	3426	4226	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program supports engineering development and type classification of airdrop components and systems used by all uniformed services for airborne assault, special operations, and airdrop resupply of both conventional and airborne forces. The development of personnel and cargo parachutes, airdrop containers, and associated support equipment is included in this program. The program together with related program elements (62210A and 63218A) addresses the following critical deficiencies: insufficient survivability of air delivery systems, inability to insert fighting-ready airdrop forces and materiel accurately and coherently, and inability to airdrop large fire and combat support systems. The airdrop projects are included in the Army (US Army Training and Doctrine Command (TRADOC)) critical category priority list for support of combat operations. The program directly supports the XVIIIth Airborne Corps and Rapid Deployment Force contingency plans for the deployment of an airborne unit, and thus is vital to national defense. The airdrop of supplies is increasing in importance in view of the increased need for a Rapid Deployment Force and the extended distances characteristic of many contingencies that could involve the vital interests of the US. Both the High Technology Light Division and Air land Battle 2000 concepts rely heavily on the use of airdrop for resupply of units deep within the territory of the enemy. Through data exchange agreements and standardization working groups, the program fulfills essential airdrop mission and technology needs of many allied countries.

C. (U) COMPARISON WITH FY 1993 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1992	FY 1993	FY 1994	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	2763	2728	3426	Continuing	Not Applicable
Funds (as shown in FY 1993 submission)	2918	3136	4144	Continuing	Not Applicable

Program Element: **#64218A** Title: **Airdrop Equipment Development**

DOD Mission Area: **#215 — Land Warfare Support** Budget Activity: **#4 — Tactical Programs**

Reduction of $155 thousand in the FY 1982 funding level is the result of reprograming of funds to higher priority Army requirements and a Congressional disapproval of funds to assist the USAF in the anticipated development of the C-17 aircraft. The funding decrease of $408 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation ($8 thousand) and the proposed reprograming of funds for Compartmented Programs ($400 thousand). The FY 1984 reduction of $718 thousand is a result of reprograming of funds to meet higher priority requirements and a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable. (NOTE: Airdrop items are stock fund procured and managed.)

E. (U) RELATED ACTIVITIES: Program Elements 62210A, Airdrop Technology, and 63218A, Airdrop Equipment and Techniques; Joint Technical Airdrop Group that coordinates Army program elements with other Services' program elements to assure that there is no unnecessary duplication of effort within DOD; Joint Air Movements Board; North Atlantic Treaty Organization (NATO) Air Transport Working Party; Air Standardization Coordinating Committee, Working Party 44; Mutual Weapons Data Exchange Agreements with France, Germany, and Korea; United States/Germany Non-major Items Meetings.

F. (U) WORK PERFORMED BY: Pioneer Parachute Co., Inc., Manchester, CT; Foster-Miller Inc., Waltham, MA; Frost Engineering Development Corp., Englewood, CO; Mills Manufacturing Co., Asheville, NC; Naval Ordnance Station, Indian Head, MD; US Army Yuma Proving Ground, Yuma, AZ, US Army Natick R&D Laboratories, Natick, MA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D279 — Airdrop Equipment Development: The ongoing work under this program is dedicated to the development and fielding of airdrop systems, components, and techniques which will increase the mission capabilities of airdrop operations, reduce operational costs, increase reliability of airdrop materials and survivability of personnel and aircraft, and improve the readiness posture of airborne and airlift forces. The program supports Army, Marine Corps, Air Force, Navy, and Allied Forces (as requested). The major efforts through Fiscal Year 1984 are focused on: providing a capability to airdrop heavy, outsize combat materiel up to 60,000 pounds; fielding a single platform usable for both the Low Altitude Parachute Extraction System and regular low-velocity airdrops; extending the capability to airdrop personnel at higher speeds/lower altitudes (down to 300 feet) and at large offsets from target areas with precision; new methods and equipment for enhancing the link-up of men and material after airdrop; providing a capability to airdrop related combat materiel on linked platforms; upgrading the capability to deliver critically needed supplies from high-performance aircraft; and providing airdrop/air transport engineering support to Army materiel developers and to the Air Force airdrop/air transport development programs. FY 1982 accomplishments: Type classified the CTU-2A airdrop container which will permit delivery of up to 500 pounds of supplies per container from high-speed tactical aircraft flying at very low altitudes. Successfully completed the Level II testing of the new universal airdrop platform (Type V) and the 500 pound capacity High-Altitude Airdrop Resupply System. Initiated Engineering Development of the Staged Personnel Parachute System with Accompanying Bundles. Conducted engineering tests of the extraction subsystem

Program Element: **#64218A** Title: **Airdrop Equipment Development**

DOD Mission Area: **#215 — Land Warfare Support** Budget Activity: **#4 — Tactical Programs**

for the 60,000 pound capacity airdrop system and began the design of the recovery subsystem. Reoriented development of the Free-Fall Maneuverable Reserve Parachute to meet needs of Revision No. 1 of the Letter Requirement. FY 1983 program: Type classify as standard the Type V Airdrop Platform and the 500 pound capacity High Altitude Airdrop Resupply System. Continue development of the 60,000 pound capacity Airdrop Systems, the Staged Personnel Parachute System with Accompanying Bundles, and the Military Free-Fall Parachute Systems (Renamed from Free-Fall Maneuverable Reserve Parachute, per revision no. 2 of the Letter Requirement). Initiate development of the 300 foot altitude Tactical Assault Personnel Parachute. FY 1984 program: As part of the 60,000 pound capacity Airdrop Systems development, type classify as standard an interim 42,000 pound capacity Low Altitude Parachute Extraction System (LAPES) to provide the airborne units with a near term heavy capability. Type classify as standard the new Military Free-Fall Parachute Systems that will provide an up-to-date offset parachuting capability for Special Forces. Continue design and testing of the remaining components of the 60,000 pound capacity Airdrop Systems. Conduct the Level II testing of the Tactical Assault Personnel Parachute and the Staged Personnel Parachute with Accompanying Bundles. Initiate the Engineering Development of the Airdrop Controlled Exit System and the Drop Zone Assembly Aids for use in visual meteorological conditions. Initiate the development of an advanced Ram Air Parachute System for Special Forces personnel. Participate in design reviews, test planning, and airdrop engineering evaluations of developmental Air Force airdrop aircraft. This is a continuing program.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64220A**

Title: **Army Helicopter Improvement Program**

DOD Mission Area: **#217 — Land Warfare Surveillance and Reconnaissance**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	38497	73811	53662	24297	- 0 -	223365
D516	Army Helicopter Improvement Program (AHIP)	38497	73811	53662	24297	- 0 -	223365

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: In fighting the air-land battle, commanders may often need to concentrate the bulk of their combat power at critical places and times, taking risks on their flanks and operating with small reserves. In this environment, it is essential that commanders have a highly mobile, survivable, flexible, and responsive means to find the enemy, keep the enemy under surveillance, perform reconnaissance along flanks and lightly defended areas, acquire and designate critical targets, and provide command and control of attack helicopter teams and artillery fires. These missions must be accomplished in day, night, and reduced-visibility conditions. The Army Helicopter Improvement Program (AHIP) will modify OH-58A aircraft to perform these missions and operate in air cavalry, attack helicopter, and field artillery units. In the Air Cavalry role, the AHIP scout will be used to find the enemy and perform surveillance missions. In the antiarmor role, the AHIP and attack helicopters will operate in close harmony as hunter/killer teams. In support of field artillery, the AHIP will provide conventional artillery spotting and precision laser designation for the COPPERHEAD. In all roles, the AHIP will provide a day/night/limited-visibility command and control capability and target acquisition and laser designation at standoff ranges for HELLFIRE and other Army and Air Force laser-guided munitions. Target acquisition sensors and the laser designator will be incorporated in a Mast-Mounted Sight (MMS). The MMS will enhance survivability by allowing surveillance, target acquisition, and target designation with only the MMS exposed. The AHIP scout will also include the integration of an improved Nap-of-the-Earth (NOE) communication and navigation system as well as space, weight, power, and structural provisions for later incorporation of an air-to-air Multipurpose Lightweight Missile (MLM) system as a self-defense capability. Aircraft performance will be improved to provide an acceptable hot-day, high-altitude NOE and flight maneuver capability for worldwide deployment. The AHIP scout will be a survivable, mobile, flexible system providing a full range of support to ground commanders. The AHIP scout, designated the OH-58D, is being developed under a fixed price incentive contract that includes ceiling priced options for the first two years of production (60 aircraft).

Program Element: #64220A

Title: Army Helicopter Improvement Program

DOD Mission Area: #217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	38497	73811	53662	24297	223365
Funds (as shown in FY 1983 submission)	38497	75811	55666	24990	228062

The funding decrease of $2.0 million in FY 1983 is a result of Congressional direction in the FY 1983 Appropriations Act. The funding decrease of $2004 thousand in FY 1984 and $693 thousand in FY 1985 resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Army						
Funds (current requirements)	- 0 -	26363	191200	244980	1856783	2321326
Quantities (current requirements)	- 0 -	- 0 -	16	44	518	578

(U) The Defense Appropriations Act for FY 1983 reduced requested long-leadtime item funding by $16.4 million. The $26.7 million contained in the FY 1983 Appropriations Act was further reduced by $337.0 thousand as a result of pro rata application of Congressional reductions for Independent Research and Development. To minimize the impact of the $16.4 million reduction and to preserve the ceiling price options already negotiated for the first two years of production, the Army increased the FY 1984 budget request by $16.4 million. An increase of $17.8 million in total estimated cost was caused by two actions: Application of Office of the Secretary of Defense (OSD) Inflation Guidance of January 1983 resulted in a decrease of $125.8 million for major item production; and a new estimate of initial spares and repair parts requirements by using the Selected Essential Item Stockage for

Program Element: **#64220A** Title: **Army Helicopter Improvement Program**

DOD Mission Area: **#217 — Land Warfare Surveillance and Reconnaissance** Budget Activity: **#4 — Tactical Programs**

Availability Method (SESAME) caused an increase of $143.6 million which includes a $49.2 million inflation increase. Funding for spares included in the FY 1983 President's Budget and Congressional Descriptive Summary was based on support of a "generic" aircraft. The current spares requirement is based on the actual configuration of the OH-58D, latest spares pricing estimates, and application of January 1983 OSD inflation guidance.

E. (U) RELATED ACTIVITIES: Previous aerial scout program concept and program formulation efforts were conducted under Program Element #63205A (Aerial Scout) and #64203A (Advanced Scout). A portion of Program Element #64203A (Advanced Scout) FY 1980 funding was used to support initial phases of the AHIP Full-Scale Development (FSD). Program Element #63205A and #64203A have been eliminated. Weapon systems being developed under Program Elements #64621A and #64310A (Heliborne Missile - HELLFIRE) and Program Element #64621A (COPPERHEAD) may use the terminal homing guidance provided by the Mast-Mounted Sight (MMS) laser designator on the AHIP. There is no unnecessary duplication of effort within the Army or the Department of Defense.

F. (U) WORK PERFORMED BY: A fixed price incentive contract for engineering development of the airframe and mast-mounted sight was awarded to Bell Helicopter Textron, Fort Worth, TX, on 21 September 1981. Subcontractors to be utilized by Bell Helicopter Textron include McDonnell Douglas Astronautics Company, Huntington Beach, CA, in association with Northrop Corporation, Anaheim, CA, for the Mast-Mounted Sight; Sperry Flight Systems, Phoenix, AZ, for controls displays; Detroit Diesel Allison, Indianapolis, IN, for engines; and Litton Systems, Van Nuys, CA, for attitude and heading reference subsystems. The Advanced Scout Helicopter Project Management Office, St. Louis, MO, is the responsible developing organization.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D618 — Army Helicopter Improvement Program (AHIP).**

a. **(U) Project Description:** This project continues full-scale development of an improved scout helicopter capable of accomplishing the Army's scout missions under day, night, and adverse weather conditions. The development of the AHIP scout encompasses a major modification of the existing OH-58A helicopter. Performance and agility improvements will be achieved through the installation of a 650 shaft horsepower turbine engine, redesign of the main transmission and tail rotor drive train, and the installation of a composite, four-bladed main rotor system and composite tail rotor. These improved components are either commercially available or modifications to existing components. The addition of a Stability and Control Augmentation System (SCAS) and a fully integrated cockpit will improve controllability and reduce pilot workload. In addition to improved communications and communications security equipment, the AHIP scout will have a doppler navigation and automatic target handoff capability. Significant improvements in day, night, and adverse weather target acquisition designation will be achieved through the incorporation of television and

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common module Thermal Imaging System (TIS) sensors and a laser rangefinder/designator into the MMS. The MMS will also improve survivability by reducing the scout's detectability and increasing its capability for long range target detection and acquisition. In addition to the design, fabrication, integration, and testing of five prototype aircraft and seven prototype MMSs, this project will accomplish the necessary training, logistics support analysis, and producibility planning required to initiate production of the AHIP scout.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Full-Scale Development (FSD) of the AHIP scout began 1 November 1981 following successful negotiations of FY 1984 and FY 1985 production option ceiling prices with Bell Helicopter Textron (BHT). The AHIP scout Baseline Cost Estimate (BCE) which was completed 20 November 1981 included cost estimates for research and development, investment, and operation and support. The AHIP Army Systems Acquisition Review Council (ASARC) was held on 8 March 1982, and the AHIP Go-Ahead Decision Review by the Defense Systems Acquisition Review Council (DSARC) principals was conducted 14 April 1982. The DSARC principals approved the AHIP acquisition strategy and continuation of FSD. Induction of five OH-58A aircraft to BHT for modification to the AHIP scout configuration was completed ahead of contract schedule on 1 September 1982. The design phase of the AHIP scout was essentially completed in FY 1982. Limited AHIP engineering support testing on "brassboard" hardware was conducted to demonstrate the engineering feasibility of the selected design concepts. The Detroit Diesel Allison T703-AD-700 engine successfully completed the 150-hour Federal Aviation Agency (FAA) certification test. The primary contractor test effort was directed towards preparing contractor test plans focused on those relating to fatigue testing of dynamic rotor and drive train components.

(2) **(U) FY 1983 Program:** Continuation of Full-Scale Development (FSD); to include conduct of the Critical Design Review (November 1982), system engineering management, completion of OH-58A aircraft preparation for modification, fabrication of prototype tooling, integration and final assembly of prototype aircraft, systems integration tests, static test, whirl tests, initial flight testing and Producibility Engineering and Planning (PEP). Particular effort will be focused on qualification of major components as a prerequisite to release of long-leadtime items for initial production requirements.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Continuation of Full-Scale Development (FSD) to include system engineering management, systems integration tests, logistics, training, provisional delivery of prototypes, Preliminary Airworthiness Evaluation (PAE), Development/Operational Test II (DT/OT II) and PEP. FY 1984 producibility engineering effort, to include Initial Production Readiness Review, will be conducted to ensure a smooth transition from full-scale development to production of the AHIP scout. Also included in FY 1984 are the initiation of provisioning/cataloging requirements, completion of the technical manual validation program, provision of a system support package to the Army test site, completion of contractor training courses for operator and maintenance of AHIP aircraft and support equipment, and beginning of the Army physical teardown of the AHIP scout for maintenance demonstration. During FY 1984, the AHIP will complete all component-level testing

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consisting primarily of the remaining fatigue and endurance testing of dynamic and rotor components such as the main and tail rotor transmissions, main rotor blade, tail rotor blade, swashplate, controls, and actuators. Extensive flight envelope expansion and "shakedown" and demonstration of primary AHIP subsystems will be conducted after the 1 August 1983 AHIP first flight. The AHIP contractor mission equipment surveys and demonstrations will start 1 January 1984 and be completed prior to the AHIP Development Test (DT II), which will be conducted during July and August 1984. The Preliminary Airworthiness Evaluation (PAE) will be conducted at the contractor's facility by the Army Engineering Flight Activity (AEFA) during May 1984 and will qualitatively evaluate the handling and airworthiness characteristics prior to OT II. AEFA will conduct the formal Airworthiness and Flight Characteristics (A&FC) evaluation at Edwards Air Force Base, California, from July 1984 thru December 1984. The AHIP OT II, to be conducted by Operational Test and Evaluation Agency (OTEA), will begin in September 1984 at Ft. Hunter-Liggett, California.

(4) **(U) Program to Completion:** Completion of engineering development in FY 1985 includes system engineering management, continuance of OT II, Skill Performance Aids (SPA) verification, final delivery of prototypes to the Army, and completion of PEP effort. Also included is the Army's "hands on" verification of operator and maintenance manuals, acquisition of basic technical manuals for initial deployment and depot-level maintenance support for the continuation of operational testing. The AEFA Airworthiness and Flight Characteristics (A&FC) evaluation at Edwards Air Force Base, CA and the physical teardown evaluation/manual verifications conducted by Test and Evaluation Command (TECOM) at Yuma Proving Ground, will be completed. Approximate completion date: March 1985.

c. **(U) Major Milestones:**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Concept Formulation Package*	Oct 1979	Oct 1979
Special Army Systems Acquisition Review Council (ASARC)*	Nov 1979	Nov 1979
Office of the Secretary of Defense Program Review*	Dec 1979	Dec 1979
ASARC Management Review*	Jul 1980	Jul 1980
Required Operational Capability (ROC)	Jan 1981	Jan 1981
Request for Proposal (RFP) Release for Army Helicopter Improvement Program (AHIP)	Jan 1981	Jan 1981

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Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
AHIP Source Selection Evaluation Board (SSEB)	Apr-Aug 1981	Apr-Aug 1981
Engineering Development Contract Award	Sep 1981	Sep 1981
Preliminary Design Review	Mar 1982	Mar 1982
ASARC Go-Ahead Review	Mar 1982	Not Shown
DSARC Program Go-Ahead Review	Apr 1982	Not Shown
Critical Design Review	Nov 1982	Nov 1982
In-Process Review**	May 1983	Not Shown
Long-Leadtime Item Release	Jun 1983	Jun 1983
Initial Flight Demonstration	Oct 1983	Oct 1983
In-Process Review**	Feb 1984	Feb 1984
Long-Lead Tooling and Fabrication Release	Feb 1984	Feb 1984
Developmental Testing/Operational Testing	Jul 1984 - Jan 1985	Jul 1984 - Jan 1985
In-Process Review**	Aug-Sep 1984	Not Shown
First Production Option Award	Aug-Sep 1984	Not Shown
Milestone III Decision	Apr 1985	Apr 1985
Production Award	Jun 1985	Jun 1985
Production Delivery Begins	Oct 1985	Oct 1985
Initial Operational Capability (IOC)	Jun 1986	Jun 1986

* Performed under Project #D881, PE #64309A

** Department of the Army In-Process Reviews will be conducted prior to each LLTI funding release and first production option per ASARC decision, 8 March 1982.

Program Element: **#64220A** Title: **Army Helicopter Improvement Program**

DOD Mission Area: **#217 — Land Warfare Surveillance and Reconnaissance** Budget Activity: **#4 — Tactical Programs**

I. (U) TEST AND EVALUATION DATA: The Army Helicopter Improvement Program (AHIP) is managed by the Advanced Scout Helicopter Project Manager's Office (ASH PMO), US Army Aviation Research and Development Command, St. Louis, Missouri. AHIP has essentially completed the design phase with the Critical Design Review (CDR) for the entire system having been held in November 1982. To date, with the exception of the T703-AD-700 engine, only limited AHIP engineering support testing on "brassboard" hardware has been conducted to demonstrate the engineering feasibility of the selected design concepts. The Detroit Diesel Allison T703-AD-700 engine has successfully completed the 150-hour Federal Aviation Agency (FAA) certification test. The primary contractor test effort has been directed towards preparing contractor development test plans, primarily those relating to fatigue testing of dynamic rotor and drive train components. In early 1983, extensive contractor development testing will begin, with the AHIP first flight scheduled for 1 August 1983. After the first flight, flight envelope expansion and extension "shakedown" and demonstration of primary AHIP subsystems will be conducted. The AHIP mission equipment surveys and demonstrations will start 1 January 1984 and be completed prior to AHIP Development Test II (DT II) which will be conducted during July and August 1984. The AHIP Test and Evaluation Master Plan (TEMP) which describes the overall AHIP Test Program, the test issues to be evaluated, and the testing to be conducted during development and operational testing, was approved 26 April 1982 after review by Office of the Secretary of Defense (OSD).

1. **(U) Development Test and Evaluation:** Development test and evaluation will be conducted by the contractor, Bell Helicopter Textron, Ft. Worth, TX; the Mast-Mounted Sight (MMS) subcontractor, McDonnell Douglas Astronautics Company, Huntington Beach, CA; US Army Test and Evaluation Command (TECOM), Ft. Rucker, AL, and Yuma Proving Ground, AZ; US Army Missile Command (MICOM), Huntsville, AL; US Army Night Vision and Electro-Optics Laboratory (NVEOL), Ft. Belvoir, VA; and US Army Aviation Engineering Flight Activity (AEFA), Edwards Air Force Base, CA. Contractor and Government development testing will utilize five prototype Army Helicopter Improvement Program (AHIP) scout helicopters and seven operational Mast-Mounted Sights (MMS). The seventh MMS was recently procured at the direction of OSD to help alleviate a MMS test hardware shortage and will be dedicated to reliability growth improvement and failure detection equipment verification testing. Contractor and subcontractor development testing is scheduled for completion by July 1984. Contractors will perform functional tests at the component and system levels in accordance with a Government approved Airworthiness Qualification Specification (AQS) and System Qualification Specification (SQS) to demonstrate compliance with specification performance requirements and qualification requirements. Contractors will perform environmental compliance and qualification testing at the component and system levels. A Preliminary Airworthiness Evaluation (PAE) will also be conducted by AEFA during the contractor's development flight test program to develop initial handling qualities data and information for issuance of an airworthiness release and to establish baseline information for follow-on Government flight testing. Government laboratory developmental testing (MICOM and NVEOL) of one MMS is scheduled for November 1983 to March 1984. The Government laboratories will accomplish performance tests on the MMS and selected critical MMS components to independently verify that the MMS meets specification requirements; provide data to the contractors; and to evaluate the performance of the MMS in conjunction with weapon systems such as HELLFIRE and COPPERHEAD. Government (TECOM) Development Test II (DT II) on three AHIP prototype aircraft, which will be the same configuration as the production aircraft, is scheduled for July thru August 1984. Prior to starting DT II, the performance of all AHIP scout subsystems will be tested and demonstrated. TECOM will evaluate helicopter operating performance, safety, human

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factors, maintenance, ground handling, reliability, availability, and maintainability (RAM), air transportability, special mission kits and equipment and environmental and associated training packages. This test will consist of approximately 300 flying hours. Additional Government development testing on one AHIP prototype is scheduled for July 1984 thru December 1984. This testing will be conducted by the AEFA at Edwards AFB, CA and will consist of an extensive Airworthiness and Flight Characteristics (A&FC) evaluation. Government Skill Performance Aids (SPA) verification will utilize one AHIP prototype from July 1984 thru January 1985. Development test emphasis will be placed upon crew performance, the performance of the MMS and avionics subsystems, the interface between the subsystems and the aircraft, the interface between the AHIP and other airborne and/or ground combat systems, and the effect of on-board systems on the aerodynamic performance of the aircraft. Testing of the AHIP will be accomplished in a series of subtests, surveys, demonstrations, and analyses to address the test issues and system performance requirements. To facilitate the coordination, interface, and integration of the AHIP developmental and operational test requirements, a Test Integration Working Group (TIWG) has been established. The AHIP TIWG will expedite the Coordinated Test Program (CTP) and the Test and Evaluation Master Plan (TEMP) revision and execution process. The AHIP TIWG insures efficient and effective use of prototypes, eliminates testing redundancy by the integration of test requirements to the maximum extent, and insures that planning milestones are established and completed in a timely manner so that the AHIP test schedule will not be delayed.

2. (U) **Operational Test and Evaluation:** Operational Test II (OT II) will be independently conducted by the US Army Operational Test and Evaluation Agency (OTEA) at Ft. Hunter-Liggett, CA. The test objectives include an assessment of the operational effectiveness of the AHIP scout to include performance, reliability, availability, and maintainability (RAM) characteristics and logistic support of all AHIP scout systems and subsystems. Supportability elements will include ground support equipment, manuals, and training. The OT II will utilize three prototype AHIP aircraft which will be the same configuration as the production aircraft and accumulate approximately 600 flight hours over a 5-month period. OT II testing is scheduled for September 1984 thru January 1985. The OT II test issues with which OTEA will evaluate the AHIP scout helicopter have been identified and approved by US Army Training and Doctrine Command (TRADOC) during September 1982. This early approval will allow OTEA sufficient time to complete planning and prepare for OT II. OTEA has been extensively involved in the AHIP scout test planning and is a key active member at TIWG meetings. This will help achieve a smooth transition from DT II to OT II.

3. (U) **System Characteristics:** The following AHIP operational and technical goals and thresholds, taken from the AHIP Decision Coordinating Paper (DCP) approved by OSD, define the key technical and operational requirements to be demonstrated during AHIP DT/OT II.

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Operational/Technical Characteristics			Objectives	Demonstrated Performance
			GOAL/THRESHOLD	
(a) (U)	OPERATIONAL			
	(1) (U)	Vertical Rate of Climb (feet/minute)		
		At 4000 feet and 95°F	500/HOGE	
		At 2000 feet and 70°F	650/450	
	(2) (U)	Forward Flight Speed (KTAS)	112/100	
	(3) (U)	Endurance (Hours)	2.4/1.9	
(b) (U)	TECHNICAL			
	(1) (U)	MMS Performance		
		Detection Range (km) at 95°F		
		Day		
		Night		
		Recognition Range (km) at 95°F		
		Day		
		Night		

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		Operational/Technical Characteristics	Objectives	Demonstrated Performance
			GOAL/THRESHOLD	
		Designation Range (km) at 95°F		
		Day		
		Night		
		Target Location Accuracy (Meters) 90% Probability		
(2)	(U)	Reliability and Maintainability Characteristics		
		Maintenance Reliability (MTBF in Hrs) At Least	1.40/1.12	
		Maintenance Manhour/Flight Hour No More Than (AVUM + AVIM)	3.0/3.4	
		Mean Time to Repair (Hrs) No More Than (AVUM + AVIM)	2.0/2.5	
(3)	(U)	Sortie Rate (Flight Hours Per Month)		
		Peacetime	20	
		Wartime	112	

NOTE: Abbreviations: HOGE-Hover Out of Ground Effect; °F-Temperature in Degrees Fahrenheit; KTAS-True Airspeed in Knots; km-Kilometers; MTBF-Mean Time Between Failure; Hrs-Hours; AVUM-Aviation Unit Maintenance; AVIM-Aviation Intermediate Maintenance.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64268A**

Title: **Aircraft Component Improvement Program**

DOD Mission Area: **#218 — Land Warfare Associated Air Mobility**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	11833	6978	16363	20087	Continuing	Not Applicable
D106	Aircraft Component Improvement Program	11833	6978	16363	20087	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Army needs the best possible engines for its fleet of helicopters and the ability to keep them operationally available throughout their life cycles. This engineering development support program provides essential improvements in current inventory aircraft engines including improvements in such areas as: flight safety, reliability, maintainability, durability (including improved maintenance techniques and increased overhaul intervals), and the correction of service-revealed deficiencies. This effort is essential to increase the time between overhauls, foster a general reduction in maintenance man-hours and resources required to sustain aircraft engines in tactical service, and ultimately substantially reduce overall life cycle costs. The engine Component Improvement Program (CIP) provides a continuing engineering base for the efficient resolution of Service-Revealed Difficulties (SRD) arising from current field use, special operations such as operation "Bright Star," or other special field exercises for all inventory engines. Component Improvement Programs are extremely cost effective in that problems have been and will continue to be discovered early in the production phase and corrections implemented before large quantities of engines are dispersed throughout the system. The cost avoidance in preventing problems and expensive worldwide retrofit programs on other engines has historically exceeded the cost of previous engine Component Improvement Programs.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	11833	6978	16363	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	11609	10996	17635	Continuing	Not Applicable

Program Element: #64268A | Title: Aircraft Component Improvement Program

DOD Mission Area: #218 — Land Warfare Associated Air Mobility | Budget Activity: #4 — Tactical Programs

The increase in FY 1982 funds is a result of minor reprograming for expanding CIP efforts dedicated to the T700-GE-701 engine. The decrease in FY 1983 funds is a direct result of Congressional nonprejudicial reduction of funding and Army reprograming of funds for the Army Data Distribution System. The difference in funds shown in FY 1984 is attributable to minor program realignment as well as revisions of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This Component Improvement Program (CIP) has been reoriented from Aircraft Procurement Army (APA) to the RDTE account based on an FY 1980 Congressional decision. The Navy and Air Force both manage Component Improvement Programs for their fleet engines. However, only the T700 Series Turbine Engine is used by all three Services with improvement efforts coordinated under this program element. Although all three Services' CIP efforts are closely coordinated, changes to this engine are consolidated with pro rata funding into a single contract for maximum effectiveness. This tri-Service approach prevents duplication of effort by consolidating CIP requirements into one contract and by providing needed engine improvements to all Services. The Army approach to CIP is identical to commercial engine applications and capitalizes upon this experience.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D106 — Component Improvement Program (CIP)**

a. **(U) Project Description:** The objective of the Component Improvement Program (CIP) is to detect and correct field-generated problems on production engines prior to these problems having detrimental effects on in-flight engine operation and logistics support costs. The key to engine CIP is long term testing of production configuration engines in order to predict engine problems which can occur during the engine's entire field life. This testing attempts to duplicate actual field operation through component testing so that problem areas are defined and fixes are generated before failures can occur in the field. Advantages of this approach are that it identifies life-limited parts, forewarns logisticians of spare part requirements, and prevents secondary damage to the engine and aircraft by scheduling removal of a part prior to reaching its service life limit. Other projects undertaken in the CIP are for cost reduction opportunities because of new manufacturing processes or advances in the state-of-the-art in materials and new or revised field requirements such as fuel efficiency, emergency fuels, and new engine operating environments such as in desert operations. Based on life cycle analysis of CIP changes introduced to date, it has been determined that for every CIP dollar invested, twelve dollars in logistics, mission, and maintenance costs have been avoided. For this reason alone, it makes good business sense to fund CIP.

Program Element: #64268A

Title: Aircraft Component Improvement Program

DOD Mission Area: #218 — Land Warfare Associated Air Mobility

Budget Activity: #4 — Tactical Programs

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Currently, the Component Improvement Program (CIP) is based upon efforts on three specific engines. For the T700-GE-700 Engine: Four major fixes, two with flight safety impact, were completed: control changes to eliminate hot starts; inlet particle separator redesign to eliminate in-flight shut-downs. Inspection intervals were expanded and redefined to preclude turbine disc failures. Five programs approximating 15 percent cost reduction were completed (e.g., Brazed midframe, steel anti-ice ducts, swirl frame redesign). Five engine life extension programs were completed (e.g., Turbine shroud support, inlet guide vane cover cracks). Accelerated mission testing for 530 hours, believed equivalent to 2500 hours of field operation, was completed. For the T55-L-712 Engine: An analysis of equipment performance reports was conducted which resulted in improved maintenance and spare part stocks and distribution, validation of maintenance instructions and records, and increased assessment and assistance in solving field problems. Engine service testing, equivalent to 1000 hours of field use, was also conducted for this purpose. Efforts were also initiated on reliability, availability and maintainability (RAM) programs providing an improved segmented nozzle, chip detector, and improved control units. For the T700-GE-701 Engine: An electrical fuel control was redesigned to eliminate divergent output speed oscillations. The start-up nozzle fuel injection system was simplified to reduce cost and increase reliability. Turbine discs were redesigned to eliminate inspection requirements through an approximate 10-percent increase in service life.

(2) **(U) FY 1983 Program:** For the T700-GE-700 Engine: Priority will be given to resolution of field-generated problems such as: qualifying bearing modifications, initiating backup redesign and conducting comparative fatigue testing, reducing compressor erosion, and determining causes of field performance losses. Initiate programs on a limited basis to improve stall margin and prevent flame-outs with hot fuel. Continue conducting durability and cost reduction programs. For the T55-L-712 Engine: Resolve current and future service-revealed difficulties, particularly cooling air leakage. Continue fleet leader factory and flight test programs. Continue reliability, availability, maintainability (RAM) programs initiated in FY 1982. Initiate design of a fuel filter bypass system. For the T700-GE-701 Engine: Improve effectiveness of Compressor Blade Design Deficiencies resulting from Apache aircraft flight test program. As funding permits, accelerated mission testing approximating 50-75 hours will also be initiated. Conduct durability/life extension and cost reduction programs with testing of redesigned turbine rotor and oil cooler as necessary.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** T-700-GE-700 and T-700-GE-701 Engines: The T700 engine is qualified and in production for the UH-60A BLACK HAWK helicopter, and a derivative, the T700-GE-701, is included in the Army AH-64 Advanced Attack Helicopter (Apache) program. The engine has been extremely successful, and the service-revealed difficulties encountered have been quickly resolved. As a result of the ongoing T700 Component Improvement Program (CIP), significant improvements have been made in reliability, maintainability, and in an estimated $130 million cost-avoidance in both acquisition and life cycle costs. The requested funds in FY 1984 will permit continuing this program of engineering support and test of critical components and engine accessories during the early production phases to maintain this continued success. It will also provide solutions to any potential problems encountered in the newly developed (10-percent growth) T701 engine.

Program Element: #64268A

Title: Aircraft Component Improvement Program

DOD Mission Area: #218 — Land Warfare Associated Air Mobility

Budget Activity: #4 — Tactical Programs

Continuing improvements in both engines will be sought in durability, life extension, and cost reduction projects, specifically in the areas of bearings, seals, fuel control, combustor module, and inlet particle separator. Specific tasks for the T700 will include: complete qualification of new redesigned bearing for increased service life; conducting 1,000 hours of accelerated mission testing; design and testing of components to withstand sand and foreign object ingestion; completing designs, procuring hardware, and initiating tests on components for stall margin improvements; defining requirements and initiating designs for a fuel pump to prevent flame-outs; and introducing design changes for reducing field engine performance loss. For the T701, specific tasks will include: complete qualification of improvements to prevent compressor blade failures; conducting 500 hours of accelerated mission testing; and initiating a program to improve central system fuel control transient response. T55-L-712 Engine: This T55 engine version used in the CH-47D (Modernization Aircraft) and in a limited number of CH-47C models has been qualified, and a limited number of engines are being evaluated in a field environment. Although the service-revealed difficulties to date have been small in program impact, the potential for continued service-related problems remains relatively high during this early period of modified engine fielding. The funds requested in FY 1984 will permit continuing support to solving these service-revealed deficiencies as well as continuing service life and endurance testing to resolve any reliability, maintainability, and manufacturing problems that appear during the fabrication of further engine modification kits. Specific tasks for the T-55 will include: introducing design changes to increase by approximately 10 percent, speed range on fuel control; design and testing of changes to prevent power and fuel consumption degradation and maintain engine performance; conducting 500 hours of accelerated mission testing; and completion of assurance and qualification tests on fuel filter improvements to include complete redesign of air bleed system. Additionally in FY 1984, efforts will be initiated to provide a Component Improvement Program for improving T-53 fuel efficiency by 15-25 percent and both T-53 and T-62 inlet sand erosion programs associated with missions in desert environments such as those discovered in operation "Bright Star." An estimated $4 million cost-avoidance is anticipated as a result of this planned FY 1984 effort.

(4) (U) **Program to Completion:** This is a continuing program.

c. (U) **Major Milestones:** Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64307A**

Title: **Patriot (SAM-D)**

DOD Mission Area: **#214 — Ground-Based Antiair and Tactical Missile Defense**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	55812	46943	84550	69564	To Be Determined	To Be Determined
D212	Patriot (SAM-D)	32885	15828	57377	50081	To Be Determined	To Be Determined
D213	Patriot (ECCM Enhancement)	21871	27399	20513	15443	To Be Determined	To Be Determined
D291	Patriot (NATO)	1056	3716	6660	4040	To Be Determined	To Be Determined

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Air defense for the field Army requires high- and medium-altitude air defense capable of reacting to the massive air raids expected in a conflict. In the field Army Patriot defenses will be complemented by short-range, low-altitude air defense weapons and will be integrated with the US Air Force in the overall air defense of the theater of operations. Patriot is an advanced surface-to-air guided missile system with a high single-shot kill probability capable of operation in an Electronic Countermeasures (ECM) environment, and able to conduct multiple simultaneous engagements against the high-performance air-breathing targets likely to be encountered by deployed United States forces during the 1980s and beyond. To cope with the projected threat, Patriot will utilize a trainable, multifunction, electronically scanning phased array radar. A digital computer will be used to automatically control the system functions and provide the operator, through various displays, the ability to control and monitor operations. The guidance system combines command guidance and homing guidance, track-via-missile (TVM) systems. Patriot (Project Number D291) is being considered by European nations as their future surface-to-air missile system. Six European NATO nations have signed a Memorandum of Understanding with the US which established a NATO Patriot Steering Committee (PSC) and a full-time management study group for the period October 1978-April 1983 to study the acquisition of Patriot by these nations. Patriot Electronic Counter-Countermeasures (ECCM) Enhancement (Project Number D213) has been initiated upon recommendations of the Defense Science Board to cope with the postulated advanced threat.

Program Element: #64307A Title: Patriot (SAM-D)

DOD Mission Area: #214 — Ground-Based Antiair and Tactical Missile Defense Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	55812	46943	84550	To Be Determined	To Be Determined
Funds (as shown in FY 1983 submission)	57812	47076	86076	Not Shown	Not Shown

NOTE: Differences in FY 1982, and FY 1984 are primarily due to inflation adjustments and some internal restructuring between projects. FY 1983 decrease is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Missile Procurement, Army						
Funds (current requirement)	668000	770000	992000	1175700	4052900	8564000
Quantities (current requirement)						
Fire Control Sections	9	12	15 [1]	17 [1]	40	103
Missiles	176	287	525	815	4167	6217

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	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army						
Funds (current requirement) [2]	18170	48660	16830	88000	80670	256130

[1] Quantities reduced in FY 1984 and FY 1985 due to program adjustments resulting from an updated baseline cost estimate.
[2] NATO Infrastructure Funds will also be used for construction of operating facilities in USAREUR. MCA Funds slipped from FY 1984 into FY 1985 due to delay in start of planned construction of site for third battalion in USAREUR.

E. (U) RELATED ACTIVITIES: System commonality with the Navy AEGIS has been studied, and although separate developments are required, continuous coordination insures the use of common components whenever feasible. The Patriot system, through the battalion, will be interoperable with other Army Group/Brigade-level command and control systems through the Army Air Defense Command and Control System (AN/TSQ-73). It will also be interoperable with the Air Force or Marine Corps systems when the Group/Brigade-level AN/TSQ-73 is not available.

F. (U) WORK PERFORMED BY: The Raytheon Company at Bedford, MA, is prime contractor with Martin Marietta Corporation of Orlando, FL, as missile subcontractor. Thiokol Chemical Corporation of Huntsville, AL, is a subcontractor for the rocket motor. Teledyne Brown, Huntsville, AL, is the Software Verification and Validation contractor; Science Applications Incorporated, Huntsville, AL, has developed a Tactical Operation Simulator (TOS); Sanders Associates, Nashua, NH, has developed an Operator/Tactics Trainer (OTT). Government agency in-house work is managed by the Patriot Project Management Office, Huntsville, AL.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D291 — Patriot NATO: Six European NATO nations have signed a Memorandum of Understanding with the US which established a NATO Patriot Steering Committee and a full-time management group to determine how the participating NATO nations would acquire Patriot. Patriot (NATO) Project D291 provides for the US portion of research and development activity associated with these ongoing studies. Tasks focus on standardization and interoperability actions necessary to insure that US systems continue to maintain interoperability with allied systems and will evolve to meet NATO Integrated Air Defense requirements. Ongoing and planned efforts include: communications interoperability, Identification Friend or Foe compatibility analysis, NATO Patriot and Hawk Interoperability, common military equipment interface, and common logistics support studies and planning. Bilateral discussions with Germany, the Netherlands, and Greece were initiated, in FY 1983 and

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requests for price and availability for a specific number of systems were received from the Netherlands and Greece. A Japanese study to determine Patriot adequacy to replace their Nike-Hercules and Basic Hawk was initiated in FY 1982.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D212 — Patriot (SAM-D)**

a. **(U) Project Description:** Funds are required to develop program test sets (PTS) for Patriot Battery Replaceable Units (BRUs) selected for repair at a Government-operated depot. PTSs are required to adapt BRUs to the selected Automatic Test Equipment (ATE) and include the software and procedures to test and repair the BRUs. The ATE will be a standard item of equipment (such as EQUATE AN/USM-410) provided it meets the technical requirements of the Patriot System BRUs. This RDTE request also includes publication of the Patriot System Department of the Army Technical Manuals (DATMs) to support the fielding of the Patriot System. Funding allows continued Engineering Development effort for the Antiradiation Missile (ARM) Decoy for the Patriot system, continues Patriot Diagnostic Software Improvements, and allows continuation of Patriot Radar and Software Enhancements.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Completed RAM demonstration portion of Unit 3 test. Established diagnostics improvement program; initiated first battalion individual training. First production sets were delivered. The first tactical half-battalion was activated at Ft. Bliss, TX, as a training unit. Testing of maintenance diagnostic software continued, and development of maintenance support test equipment began.

(2) **(U) FY 1983 Program:** Component and System Design Confirmation Tests, which are Patriot project office and contractor tests on production hardware will be completed. These tests consist of missile firings, search/track tests, missile handling and reload, road march (mobility), and communications tests. Complete Unit 4 Tests, Follow-on Evaluation (FOE), deliver deployment software build, establish Army training base, receive conditional materiel release approval and begin provisioning of first half-battalion for Europe. Development and testing of Patriot integrated logistic support equipment and improvement of maintenance diagnostic software will continue. Development of an Antiradiation Missile (ARM) decoy will begin. Equipment publications and manuals will be refined.

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(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: Complete training for first half-battalion with deployment in Europe planned for ; complete system environmental qualifications with production hardware, continue post-deployment software program, continue system tests with ECCM enhancement improvements. Diagnostics improvement program continues. Continue system Electronic Counter-Countermeasures enhancements for incorporation into planned production schedules. Initiate development of several major product improvements which will provide the system with added capabilities to counter the and also will provide improved reliability and maintainability.

(4) (U) Program to Completion: The US will assist in the development of cooperative programs with NATO and other US allies. Production contracts will be executed until the currently programed number of fire units are completed. Continue the development of several major product improvements. These improvements will provide the system with added capabilities to

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Completion of DT/OT Testing	Aug 1980	Aug 1980
Limited Production Decision DSARC III	Aug 1980	Sep 1980
Completion of Prototype System* Confirmation Test**	N/A	N/A
Delivery of 1st Production Fire Unit	Jun 1982	Apr 1982
First Battalion (FORSCOM) Activation	Apr 1983	Jan 1983
Complete Production Confirmation Test***	Jan 1983	Dec 1982
First Battalion (USAREUR) IOC		

* No production prototypes are planned.
** Completion of Unit 1, Unit 2, and Unit 3 Testing using ED sets (Oct 1981); Unit 4 Testing using production sets (Aug 1983).
*** The Production Confirmation Test is equivalent to Patriot's Component Design Confirmation/System Design Confirmation (CDC/SDC).

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NOTE: Milestones for delivery of first production units and start of unit training of first battalions have been slipped due to production start-up delays.

2. (U) Project: D213 — Patriot ECCM Enhancement

a. (U) Project Description: Patriot's engineering development has been keyed to an Electronic Countermeasure (ECM) threat postulated of the threat. . Improvements from this program will allow Patriot to Both hardware and software enhancements will be made to achieve the improved performance. Hardware improvements are: Software improvements include:

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: The program was initiated in 1981. Conceptual design, initial definition of performance trade-offs, and initial design efforts began on those items having a significant improvement in performance against the The study tasks were initiated with the following tasks selected for the development phase during the FY 1982 timeframe: Purchase of six missiles for use in testing of system enhancements was initiated, and integrated logistics support was provided for the tasks.

(2) (U) FY 1983 Program: Continue design, testing, and qualifying the hardware and software changes from Patriot systems enhanced capabilities in the following areas: for the engagement control station, software improvements to addressInitiate development of Integrated logistics support will be continued.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: Hardware incorporation into the production program of New software that includes engagement of will be initiated for issue to deployed assets. The development and test of improved will be completed. Multibeam antenna development will be initiated; responsive threat analysis and integrated logistics support will be continued.

(4) (U) Program to Completion: Continue the development of . Integrated logistics support will be continued. The project will continue in order to develop in response to Patriot fielding.

c. (U) Major Milestones: Not applicable to this project.

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DOD Mission Area: **#214 — Ground-Based Antiair and Tactical Missile Defense** Budget Activity: **#4 — Tactical Programs**

I. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. **(U)** The Patriot System (known as Surface-to-Air Missile Development (SAM-D) until 1976) was conceived in the early 1960s. Conceptual designs were evaluated from two contractors with Raytheon selected to continue with concept definition. The multifunction phased array radar concept was investigated until 1967 when a Milestone I decision was made to enter Advanced Development (AD). The AD contract was awarded to Raytheon Company in May 1967. AD defined a low-risk engineering development (ED) program by demonstrating: the performance of the multifunction aspects of Patriot; the use of software to control the system; and the track-via-missile (TVM) concept. Prototype equipment functionally identical to that required in the tactical system was built. This demonstration model was used to accomplish analyses and tests. As a result of the successful AD program, on 31 March 1972, the Deputy Secretary of Defense approved entry into engineering development, and a contract was awarded to Raytheon.

b. **(U)** Five individual fire units were built during Engineering Development. Fire unit 1 was constructed in a nonmobile configuration as the radar antenna and the launcher were installed in fixed positions at White Sands Missile Range (WSMR), NM. Communications and coordination data were exchanged by cables between the equipment elements. Fire Unit 2 was the first mobile fire unit. The radar and launcher were rotatable on their separate trailers, and the control station equipment was in a van much like the final tactical design will be, but communications and coordination data were still by wire between elements. Engineering development Fire Units 3, 4, and 5 were essentially in a production tactical configuration. Communication by radio data link was used for the tests with these units. Besides their severe individual tests, Fire Units 3, 4, and 5 were included in tests of the battalion command and coordination capability. By exchanging data and receiving tactical directions from the battalion unit by tactical digital radio signals, these tests exercised multiple fire unit tactical requirements. These tests of production-like equipment provided input for a production decision.

c. **(U)** The engineering development (ED) test program was organized into contractor and Government testing called Engineering Design Tests (EDT) and Prototype Qualification Tests (PQT). The objective of the testing was to allow maximum use of contractor data and avoid duplicative testing when possible. The contractor testing was divided into three phases: the first phase was the initial proof-of-principle and EDT firings; the second was between February 1976-November 1977; and the third continued until February 1980. The contractor fired 50 missiles during these phases. The Government program was originally configured to fire 70 missiles. Thirty firings were reduced by the elimination of DT/OT III, and fifteen were reduced in 1977 because data from other missions would suffice, leaving 25 for DT/OT. The reduction was offset partially by adding simulation capabilities to provide a more comprehensive system evaluation. These 25 firings were reduced subsequently to 18 when a jammer could not be developed to stress the system. Sixty-eight missiles were fired in ED by the contractor and the Government. A summary of these firings is shown at

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subparagraph h below. Additionally, seven missiles were fired in an OSD-directed confirmation program, as shown in paragraph 4h. Six more missiles are planned to be fired in an electronics countermeasure growth program.

(1) (U) The ED program progressed to build prototype equipment to be used in tests and firings. Ten Control Test Vehicles (CTV) were fired to prove missile aerodynamics and control. The ED program was reoriented in January 1974 to demonstrate the Track-Via-Missile (TVM) guidance concept through the Proof-of-Principle (POP) firing program. Phase I system demonstration firings comprised of fourteen missiles was initiated by the contractor in February 1975 and continued through February 1976. As a prerequisite to the live firings, Captive Carry Flight Tests were conducted. These captive tests used a missile without rocket motor mounted on an aircraft to simulate the free space guidance conditions of a missile intercepting a target. The firing phase demonstrated the Track-Via-Missile guidance, the guidance modes, and fuzing functions. Due to the success of the missile firings, the DOD objectives of the Proof-of-Principal demonstration were met with the first six Patriot guided missile flights against target aircraft. The target conditions included Five additional engineering evaluation firings were performed against targets of An additional three missiles were fired as CTVs to complete the matrix of missile aerodynamic data. Thirteen of the missile flights were successful using an ED demonstration model system. No major deficiencies were discovered during this phase, and at the conclusion of Proof-of-Principle firings, full Engineering Development status was restored.

(2) (U) During Phase II tests, February 1976 to November 1977, the contractor demonstrated system performance and fired nine missiles using fire unit 1 against various electronic countermeasures. An extensive search/track test program was conducted to exercise the system against various electronic countermeasures (ECM) and target scenarios. These tests included In addition, the data from these tests were used to evaluate: system diagnostic capabilities; built-in test equipment (BITE); reliability, availability, and maintainability (RAM); system status monitor; system displays and controls. All missile firings were successfully conducted against targets of various intercept geometries in the presence of Multiple simultaneous engagements were performed to demonstrate the capability to control multiple missiles in terminal guidance while simultaneously conducting surveillance functions. As in Phase I, the Phase II firing tests revealed no major deficiencies; minor adjustments to equipment were made as required. During this phase, an Army decision, concurred in by OSD, was made to accelerate the program by moving the full-production decision from March 1983 to April 1980. This decision eliminated DT/OT III and thirty firings, and replaced it with a Production Confirmatory Test and a follow-on evaluation. The overall success of the first 23 firings and the need for placing the system into the field led to this decision.

(3) (U) Phase III contractor tests were completed in February 1980. They consisted of 28 missile flights in electronic countermeasures (ECM) environments in addition to system environmental and multiple fire unit search/track tests. The Government has monitored and participated in the PQT by the contractor (PQT-C) to satisfy as many PQT-G requirements as practicable. Military personnel were incorporated into the program to assess critical man-machine interfaces. Development Test and Operational Test evaluators shared test data for use during their independent evaluations. These tests were completed in August 1980.

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d. **(U)** The OT/DT events utilized prototype FUs 3, 4, and 5 for the conduct of both tests. FU 3 was used only for specific tests during OT. The Communications Relay Group (CRG) (which provides for relaying data from Fire Units to the battalion-level system) utilized for these tests was furnished by the Army Communications Research and Development Command (CORADCOM) and is electronically equivalent to the required system. The production CRG is functionally equivalent to the CORADCOM configuration but is being manufactured by the prime contractor. The Antenna Mast Set (AMS) used during OT/DT (which raises the antenna to transmit the data between FUs and the battalion system) was an Army Standard item but did not meet Patriot emplacement time requirements. A Patriot AMS has been designed and started testing in FY 1982. The electronic equivalents of the CRG and AMS were available for testing by the Government.

e. **(U)** Reliability and maintainability data have been collected on Patriot firing units since early in Engineering Development (ED) beginning with factory integration testing and continuing with systems testing at White Sands Missile Range, NM. As a result of this process, reliability and maintainability problems were identified early, and corrective actions were incorporated in the later ED firing units.

f. **(U)** Environmental qualification tests were conducted as a coordinated Government-contractor test program to determine the effects of natural and induced environments. Climatic testing has been conducted at Eglin AFB, FL, and at the contractor plant facilities and WSMR. Mobility, transportability tests on the launcher and missile were conducted at Aberdeen Proving Ground, MD, during the second and third quarter FY 1980. Compromising emanations testing was conducted at WSMR.

g. **(U)** The development contractor for the Patriot system is Raytheon Company, Bedford, MA, with Martin Marietta of Orlando, FL, as the primary subcontractor for the missile. MG Jerry M. Bunyard is the Patriot Project Manager. The development testing was conducted by the US Army Test and Evaluation Command (TECOM), and the operational test was conducted by the US Army Operational Test and Evaluation Agency (OTEA). AMSAA performed an independent evaluation of OT/DT test data.

h. **(U) Patriot Flight Test Results.** (Excludes verification program which is shown at paragraph 4h.) From 27 February 1975 through 21 July 1980, 68 missiles were fired in the Patriot ED test program. Mission results and reliability scoring totals for these flight tests are as follows:

MISSION RESULTS **RELIABILITY SCORING**

Mission results are based on criteria of the project manager for contractor firings, AMSAA for DT firings, and OTEA for OT firings. Reliability scoring is based on test community scoring criteria.

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2. (U) Operational Test and Evaluation:

a. (U) The US Army Operational Test and Evaluation Agency (OTEA) completed Operational Test II (OT II) in March 1980 and will conduct a Follow-on Evaluation (FOE) prior to deployment. Nine of eighteen Government test missiles were fired under the control of OTEA. An independent evaluation report was provided by OTEA. OT II was conducted at White Sands Missile Range and Ft Bliss, TX, on engineering development prototype equipment manned by soldiers from an active duty battalion. These soldiers were selected by the US Army Training and Doctrine Command (TRADOC), received individual training from the project management office, and underwent collective training by TRADOC.

b. (U) The Patriot OT II was a ten-month, two-phase test with a Patriot Battalion minus (consisting of two firing units, a Information Coordination Central (ICC), and associated Government equipment), which conducted field exercises, tactical evaluations, nonfiring exercises, and live firings. Phase I began in January 1979 and covered approximately eight months. It included the new equipment training for operator and maintenance personnel and unit collective training. Phase II was delayed from 31 August to 19 November 79 by software integration problems. Subtest 1 was a Tactical Effectiveness Evaluation (TEE) conducted under scenarios realistically depicting the threat environment to assess operator/machine capabilities. During Subtest 2, the Patriot units deployed and conducted movements under realistic operational field conditions. During Subtest 3 conducted 8-14 January, the Patriot units simulated engagements of manned targets during ten repetitions with approximately 46 aircraft each during nonfire search/track exercises. Subtest 4 was a series of four live fire exercises with one or two fire units launching nine missiles in four separate firings during multiple simultaneous engagements. The Patriot CCS was interfaced with an Air Defense Group Command and Control System, the AN/TSQ-73, when the battalion operated in the centralized or decentralized methods of control for both live fire and nonfire exercises.

c. (U) OT II soldier training was an eight-month phase that primarily addressed the New Equipment Training (NET) and collective training required to qualify personnel to operate Patriot system elements. The US Army Training and Doctrine Command (TRADOC) designated the number of personnel and positions required to operate the Patriot Battalion slice tested in OT II, and these personnel attended NET provided by the Patriot Project Manager. The instruction in NET included launcher and fire control operations, crew actions, initialization, operator functions, and organizational maintenance procedures. Training on the operation and maintenance of Government-furnished equipment (GFE) incorporated into Patriot was also included. TRADOC provided approximately one month of collective training in addition to NET. Evaluations of the scope and quality of training, as well as test performance data and debriefings administered throughout the test, were used to obtain information on the adequacy of training. OTEA monitored the training phase.

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d. (U) The equipment utilized for OT II was preproduction prototype configuration Fire Units 4 and 5 except for the CRG and AMG. These latter items will be fully evaluated during the confirmation test and follow-on evaluation. The entire Patriot system will be evaluated in the FOE which will be conducted in two parts. The first part will be conducted during the collective Unit Training of the 1st FORSCOM Battalion. The second will consist of maneuver, search/track, and missile firings and will be conducted by OTEA.

3. (U) **System Characteristics:** The essential system requirements at the confidential level are provided below.

Operational/Technical Characteristics	**Objectives**	**Demonstrated**
Range (km) — Max		
Min		
Altitude (km) — Max		
— Min		
Target — Max Velocity (m/s)		
Target Maneuver (g)		
in formation		
Availability — Inherent		
Fire Unit — MTBF (hrs)		
Reaction Time (Auto) (Sec)		
PSSK		
Reload Time (Min)		
Missile Reliability R (LF)		
Maintainability MTTR (Hrs)		Not Demonstrated

4. (U) **Patriot Confirmation Program:**

a. (U) An extended test phase was conducted in which preproduction prototype configuration fire units were modified and tested to performance values to ensure that deficient areas found in DT/OT II had been corrected.

b. (U) Four units of evaluation designed to verify corrections of shortfalls are being conducted. Units 1 and 2 were development evaluations conducted by the contractor and Project Manager. Units 3 and 4 are formal tests of the Patriot system under the test direction and control of TECOM and OTEA respectively. The first three units of tests have been completed. Independent Evaluation Reports (IER) have been rendered for the first two

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tests, and AMSAA has provided an IER for Unit 3. OTEA and AMSAA will provide IERs for Unit 4 testing. At the completion of each of these four units, progress reports are being provided to USDRE (DDTE) for his use in evaluating development progress and in reporting his evaluation to the DSARC principals. Each series of tests is evaluated against predetermined criteria.

c. (U) The confirmation test program is being conducted in accordance with a revised Test and Evaluation Master Plan (TEMP). The TEMP is structured along the lines of the tests and reviews of DDTE Memo, subject: Test and Evaluation Assessment of PATRIOT (U) (S), dated 15 August 1980.

d. (U) Test Unit One consisted of software design and test reviews by an independent panel, completion of the diagnostic software programs to include testing in a fire unit, incorporation and testing of ECCM software changes, the retrofit and testing of the missile, and a reliability demonstration on the improved design of the Electric Power Plant. These tests were successfully completed and results reviewed by OSD.

e. (U) Unit Two testing included software checkout and endurance demonstration, a series of search/track missions, retrofit of the fire unit with improved reliability components, three missile flights, and final checkout for the reliability, and maintainability demonstration. This series of tests has also been completed and results reviewed by OSD.

f. (U) Unit Three testing included missile round environmental, transportation and handling, four missile flights, multifunction capability/multiple simultaneous engagement with live and simulated targets, and a reliability and maintainability demonstration. These tests have been successfully completed, and the results have been reviewed by OSD. Fire Unit 5 was subjected to a 1000-hour Reliability Test, . Insufficient maintainability data were generated to assess mean time to repair (MTTR). MTTR will be addressed during Unit 4 tests. The Fire Unit conducted 20 moves during Unit 3 with no effect on reliability. A summary of Unit 2 and 3 missile firings is shown at subparagraph h below.

g. (U) Test Unit Four is a Follow-On Evaluation of Production Systems and will be conducted by the Operational Test and Evaluation Agency. This test will consist of an evaluation of training and an operational test consisting of a field maneuver exercise, search/track missions, and missile firings. Personnel from the First Patriot Battalion, which was activated at Ft Bliss, will operate and maintain the system during FOE. Reliability and maintainability data will be collected and scored by the Army Scoring Committee. AMSAA will provide an independent assessment report. Unit Four will provide test data to determine if previous system shortfalls have been corrected.

h. (U) **Patriot Confirmation Program Flight Test Results:**

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Flt. No.	Date	Engagement Objective	FU	Mission Results[1]	Reliability Scoring [2]
CM-1	11 Jun 1981		4		
CM-3	16 Jun 1981		4		
CM-2	18 Jun 1981		4		
CM-5	27 Jun 1981		4		
CM-7	8 Jul 1981		4		
CM-6	11 Jul 1981		4		
CM-5[3]	10 Aug 1981		4		

[1] Mission results based on criteria of Project Manager for CM-1, 2, and 3, and TECOM for CM-4, 5, 6, and 7.
[2] Reliability scoring based on Test Community scoring criteria.
[3] CM-4 missile used for second CM-5 firing.

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5. (U) Test Schedule Summary:

Test	Dates	Engagement	Equipment Type
Unit 1	Jul 1980-Jan 1981	FUs 3, 4, 5	Production Prototype
Unit 2	Jan-Jun 1981	FUs 3, 4, 5	Production Prototype
Unit 3	Jun-Oct 1981	FUs 4, 5	Production Prototype
Software	May 1982-Dec 1984	4	Production Prototype
Component Design Configuration (CDC)	Oct 1982-Nov 1982	PS 2, 3	Production
System Design Configuration (SDC)	Dec 1982-Feb 1983	PS 2, 3	Production
Unit 4	Feb 1983-Aug 1983	PS 2, 3, 5	Production
Environmental Qualification Test (EQT)	Mar 1983-Apr 1986	PS 6	Production

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64310A

Title: Helborne Missile — HELLFIRE

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	23125	16254	483	509	13416	329062
	QUANTITIES						229
D074	Helborne Missile — HELLFIRE	23125	16254	483	509	13416	329062

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: HELLFIRE is a heliborne antiarmor terminal homing modular missile system which uses semiactive laser terminal homing guidance and a shaped charge warhead to defeat hard targets. HELLFIRE has been designed to accept various other guidance packages. The missile system will be employed from Advanced Attack Helicopters (AH-64) against heavily armored vehicles at longer standoff ranges and with greater lethality than missiles currently in the inventory. HELLFIRE will provide accurate fire on targets acquired and autonomously designated by the attack helicopter or remotely designated by ground observers, other attack helicopters, and aerial scout helicopters. HELLFIRE can be employed in a wide variety of firing modes in day or night operations. It is being developed HELLFIRE will provide greater versatility than missile systems currently in the inventory, and its mission engagement capability will be enhanced by the variety of methods of designation and firing techniques. The system is needed to counter the expanding armor threat. It has been designed to be adaptive, to be highly lethal, to reduce launch aircraft vulnerability

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	23125	16254	483	13925	329062
Funds (as shown in FY 1983 submission)	24225	19327	285	18549	337701

Program Element: #64310A Title: Helibome Missile — HELLFIRE

DOD Mission Area: #212 — Indirect Fire Support Budget Activity: #4 — Tactical Programs

The decrease in FY 1982 ($-1100 thousand) was determined to be unexecutable and was reprogramed within the RDTE,A appropriation. The decrease in FY 1983 ($-3073 thousand) is due to a Congressional program cut. The increase ($+198 thousand) in FY 1984 and the additional to completion decrease ($-4624 thousand) are due to a revised estimate for development and testing of the missile test program sets for the USM-410 Equate Automatic test equipment to support unit and depot maintenance and inflation adjustments.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Missile Procurement, Army						
Funds (current requirements)	119700	247400	240700	238000	1006500	187600
Quantities (current requirements)	680	3971	5351	6026	25754	42332
Aircraft Procurement, Army (Launchers)						
Funds (current requirements)	- 0 -	17200	- 0 -	- 0 -	- 0 -	17200
Quantities (current requirements)	- 0 -	338	- 0 -	- 0 -	- 0 -	338

Program Element: #64310A — Title: Helborne Missile — HELLFIRE

DOD Mission Area: #212 — Indirect Fire Support — Budget Activity: #4 — Tactical Programs

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army Funds (current requirements)	- 0 -	1250	3110	2800	- 0 -	7160

The FY 1982 increase in Missile Procurement, Army (MIPA) funds (+$3.6 Million) represents a $5 million reprograming to offset the adverse effects of a FY 1982 Congressional cut of $15 million and a reduction in inflation of $1.4 million. The reduction in FY 1983 MIPA funds (-$2.9 million) reflects HELLFIRE's share of a Congressional, Independent Research and Development cut for Army programs. The reduction in FY 1984 MIPA funds (-$11.2 Million) reflects a missile quantity adjustment (867) to enhance the second source acquisition strategy and (-$6.1 million) inflation adjustment. The increase in total MIPA funds reflects an additional buy of 6576 missiles in FY 1989 (+$306 million) to more adequately meet the Army's HELLFIRE requirements and (-$65.8 million) inflation adjustments. Aircraft Procurement, Army, funds for launchers were transferred to the AH-64 procurement line for all years after FY 1983. The Military Construction, Army funds will build storage facilities in Europe for the HELLFIRE missile.

E. (U) RELATED ACTIVITIES: The HELLFIRE missile system is related to Air Force, Navy, and other Army systems which utilize similar technology. Technology coordination groups preclude duplication of effort. The exploratory prototype program was conducted under Program Element (PE) #62303A (Missile Technology), and the Advanced Development effort was conducted under PE #63310A (Helborne Missile — HELLFIRE). The Advanced Attack Helicopter is funded under PE #64207A. There is no duplication of effort between HELLFIRE and other Army or DOD systems within similar size, weight, range, and mission requirement classification.

F. (U) WORK PERFORMED BY: Contractors are Rockwell International Corporation, Duluth, GA, for missile development and production, and Martin Marietta Corporation, Orlando, FL, for laser seeker development and production. The Army program manager (PM) is PM HELLFIRE at Redstone Arsenal, AL. By FY 1984 a dual-source all-up-round producer program, initiated by the PM, will result in both contractors becoming producers of the complete round, missile and laser seeker, through a mutual technology transfer.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D074 — Helborne Missile — Hellfire: The AAH/HELLFIRE Army Systems Acquisition Review Council III was completed in FY 1982. HELLFIRE production decision was decoupled from the AAH program, and the requirement for a Defense Systems Acquisition Review Council was waived. HELLFIRE was type classified standard by the Army, and production approval was granted. A development contract was awarded for development of a minimum smoke motor, low-trajectory autopilot improvement, and development of launcher test program sets for the USM-410 automatic test equipment. Production contracts were awarded in February and March 1982. Development and

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testing of the anti-icing shielded dome for the laser seeker and sealable container will be completed in FY 1983. Some of the hardware in environmental storage will be subjected to teardown inspection and testing. First article testing of initial production hardware will start in FY 1983. In FY 1984, performance and qualification testing of the minimum smoke motor and low-trajectory autopilot improvement will be completed. First article tests and production validation flight tests of initial production hardware will be completed. Missiles that have completed environmental reliability storage will be flight tested.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

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I. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. (U) Summary of test phases and objectives.

(1) (U) Evaluation of the HELLFIRE system concept started in 1969, and the Terminal Homing Accuracy Demonstration (THAD) Program was started in 1970. A modified HORNET missile (7") with a modified Falcon motor was used as the testbed missile to demonstrate feasibility. Technical feasibility of laser homing missiles was demonstrated during the THAD Program (May 1971 through January 1972). This exploratory prototype program demonstrated a circular error probability (CEP) of based on 14 missile firings. Missile flight tests of the wide-field-of-view laser seeker and the Army laser seeker were conducted at the US Army Missile Command (MICOM), using the testbed 7" missile, from November 1971 through January 1974. Combined results from these tests and the THAD tests were used to support Development Test I (DT I). Further technical tests were conducted at a MICOM test range from 24 April 1974 through 26 June 1975 to demonstrate the feasibility of the ripple, rapid, night, airborne, indirect, and ground indirect modes of operation for the HELLFIRE. Countermeasure susceptibility testing was conducted at White Sands Missile Range, New Mexico, during the second and third quarter FY74 and the second and third quarter FY75 to qualitatively and quantitatively assess the capability of the Army laser seeker (plus counter-countermeasures options) to successfully complete their missions in a hostile environment. Feasibility testing of 6-inch-diameter tandem liner warheads for the HELLFIRE missile was conducted by Firestone Tire and Rubber Company during FY75. Two tandem liner configurations, , were tested. The Department of the Army requested that the HELLFIRE project manager investigate improving the performance of the warhead by scaling up the six-inch-diameter design to seven-inch and eight-inch diameters. The seven-inch configuration was selected to be continued into Engineering Development (ED).

(2) (U) Engineering Development (ED) testing consisted of a series of Engineering Design Tests (EDT-C) and Prototype Qualification Tests (PQT-C) conducted by the contractor and EDT-G and PQT-G conducted by the Government to provide data necessary for determining the HELLFIRE Modular Missile System's (HMMS) readiness to progress to production. Reliability, availability, and maintainability (RAM) have been evaluated throughout development and will continue. Development tests were conducted so that important system characteristics would be tested and deficiencies corrected prior to the Army Systems Acquisition Review Council (ASARC III). Six modified AH-1G helicopters, four basic and two equipped with the Airborne Target Acquisition and Fire Control System (ATAFCS), were utilized as testbed aircraft to qualify the HELLFIRE Modular Missile System (HMMS). HELLFIRE missiles were also launched from the AH-64 as part of the Advanced Attack Helicopter (AAH) developmental testing. Contractor component/subsystem tests were initiated in January 1978. Samples of critical components were independently tested and evaluated by the Government. Unguided missile (ballistic) flights were conducted early in the development program to provide data for missile airframe/propulsion and launcher design as it relates to missile launch parameters and helicopter safety. Preprogramed missile flight tests were conducted to provide missile integration. System Qualification Tests were conducted to determine if system end items met their performance requirements while operating

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under or following exposure, as appropriate to natural combinations of environments specified for the system. Environmental/Storage Tests started in August 1982 to verify that the HMMS performance will not be degraded by long-term arctic or tropic storage. (DT: Summary Report C8101404/034C, Rockwell International Corp., Oct 81) (OT: IER-OT-062, May 81)

(3) (U) In accordance with Department of the Army direction, the Army Missile Laboratory has conducted a program to evaluate and characterize AH-64/HELLFIRE performance in battlefield obscuration environments. The effort to gather field test data for development of a simulation model development to predict the performance of the target acquisition and designator system for the AAH, the HELLFIRE seeker, and the Ground Laser Locator Designator (GLLD) was completed during FY 1980. These data, time-correlated to carefully measured obscuration environments, were the primary input to the Battlefield Environment Laser Designator Weapon System Simulation (BELDWSS). During the last quarter of FY 1980, trial runs with BELDWSS to predict system performance were initiated. During the second quarter of FY 1981, the simulation predictions were validated by system tests including eight HELLFIRE flight tests in obscurants. In the latter part of FY 1981 the validated BELDWSS simulation was used to characterize system performance across the entire spectrum of obscurant conditions, to provide data for the AAH/HELLFIRE ASARC/DSARC evaluations. There are no Defense Systems Acquisition Review Council-directed tests or demonstrations. (BELDWSS Phase IV ITN-RG-81-3, Vols 1-8, AML, MICOM, June 1981.)

b. (U) Summary of Guided Launches. One hundred twenty-four guided missiles have been launched in the current developmental testing programs for both HELLFIRE and the AH-64. Test results, parameters, and a summary of accuracy successes during developmental guided launches are as follows:

(1) (U) **Parameters:** Summary of all guided missiles flown (124 ED, 45 OT, 8 BELDWESS, 4 interoperability) including 141 officially scored accuracy successes. Groups add to more than 181 total because many flights had several parameters involved. Direct fire parameters with a were: lock-on before launch (LOBL), 127; lock-on after launch (LOAL), 16; offset 15 degrees to 18 degrees, 4. Indirect fire parameters with a were: Low trajectories, 18; high trajectories, 18; remote designation, GLLD, 27; remote designation, aircraft, 7; autonomous designation, aircraft, 2.

(2) (U) **Other parameters were:** Moving target, 51; day, 157; night, 24; designation by GLLD, 83; designation by TADS, 56; rapid fire, 24; ripple fire, 14.

(3) (U) **Malfunctions:** Of the 40 accuracy failures during developmental testing, 23 were considered no-test because they were not missile related; e.g., crew error, designator malfunction. The remaining 17 malfunctions were investigated, and successful corrections were implemented; e.g. roll gyro tumbled—autopilot was modified; missile impacted short in smoke—seeker was modified to last pulse logic; missile turned from spot—angle gate added.

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c. (U) Description of equipment being tested. The HELLFIRE missile system is a high-explosive antitank (HEAT) missile with a laser seeker, fire control system, launcher, and container. The HELLFIRE launcher carries four missiles and is compatible with the armament stations of both the AH-64 (APACHE) and AH-1 (COBRA). A gas storage system has been designed and can be installed on the launcher for cooling infrared detectors in follow-on seekers. There will be no significant differences between the prototype and the production configurations. Changes for lower cost have been tested in Block V seeker flights.

d. (U) All subsystems and support equipment have been available during required test periods.

e. (U) Developing/Testing Organizations.

(1) (U) Development Contractors: Missile/Launcher — Rockwell International Corporation, Missile Systems Division, 4300 East Fifth Avenue, Columbus, OH 43216; Seeker — Martin Marietta Corporation, Orlando Aerospace, P.O. Box 5837, Orlando, FL 32855. Service Program Manager: Project Manager, HELLFIRE/GLD, US Army Missile Command, Redstone Arsenal, AL 35809. Independent Evaluator: Commander, US Army Materiel Systems Analysis Activity (AMSAA), Aberdeen Proving Ground, MD 21005. Development Test Agency (Environmental Storage and Safety): Commander, US Army Test and Evaluation Command (TECOM), Aberdeen Proving Ground, MD 21055. Independent Operational Test Agency: Commander, US Army Operational Test and Evaluation Agency (OTEA), 5600 Columbia Pike, Falls Church, VA 22041.

f. (U) Major Test Facilities.

(1) (U) US Army Missile Command, Redstone Arsenal, AL — Contractor and Government personnel conducted the missile flight, captive flight, component qualification, system qualification, and electromagnetic radiation tests.

(2) (U) Eglin AFB, Florida — Contractor and Government personnel conducted missile flight tests.

(3) (U) Yuma Proving Ground, Arizona — Contractor and Government personnel conducted AH-64/HELLFIRE integration tests to include missile flight tests.

(4) (U) Hunter Liggett Military Reservation, California — Government personnel conducted and participated in the operational testing.

g. (U) Overall test program schedule.

(1) (U) Missile flight tests, Oct 1978 — Mar 1982.

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(2) (U) Component Qualification Tests, Dec 1978 — Jan 1981.

(3) (U) System Qualification Tests, Jan 1980 — Mar 1982.

(4) (U) Environmental Storage Tests (PQT-G), Aug 1982 — Aug 1984.

h. (U) Tabulation of developmental firings in HELLFIRE and Advanced Attack Helicopter programs.

	Type Missile	No. Flights Planned	Completed	Successful
(1) Exploratory Development	Modified Hornet	56	56	41
(2) Terminal Homing Accuracy Demonstration (THAD)	Modified Hornet	15	15	15
(3) HELLFIRE Engineering Development				
Ballistic Rounds		3	3	3
Programed Rounds		4	4	4
Guided Missiles	ED	78	78	61
Advanced Attack Helicopter	ED			
Ballistic Rounds		16	16	16
Guided Missiles	ED	46	46	46

i. (U) The HELLFIRE Modular Missile System has not been previously tested by another DOD component.

j. (U) HELLFIRE Modular Missile System reliability, availability, and maintainability — durability (RAM-D) performance requirements were verified by test, demonstration, and analysis prior to full-scale production using valid data from the guided flight test and system qualification test programs. In accordance with AR 702-3, all RAM-D requirements contained in the HELLFIRE Materiel Need (MN) were met, as verified by joint HELLFIRE RAM-D scoring and assessment conferences attended by OTEA, TRADOC, AMSAA, and MICOM.

k. (U) The items tested during development were not significantly different from the hardware for operational tests and production.

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1. (U) Tests have been conducted to determine if the missile, launcher, and container meet their performance requirements while operating under or following exposure to natural and induced environments as specified for the system. This portion of the HELLFIRE test program began in the second quarter of FY80 and was completed in the second quarter of FY82 with no major deficiencies found and all shortcomings identified and corrected.

2. (U) Operational Test and Evaluation:

a. (U) Summary of Test Phases and Objectives

(1) (U) Laser-Guided Missile System (LAGUMS) Military Potential Tests were conducted in 1972 and 1973. These tests evaluated the ability of the helicopter gunner to manage the missile system successfully during target engagement and reexamined the tactical employment of LAGUMS-equipped helicopters. The tests also provided information on exposure and detectability of the launch aircraft and target designators. The results of these tests were used in lieu of Operational Test (OT I). Additional operational tests were conducted by the US Army Combat Developments Experimentation Command (CDEC) during August-December 1974. These tests measured the vulnerability of the ground target designator. They also compared the mission effectiveness and operational performance of HELLFIRE versus extended range TOW. (CDEC-Rpt 42-11, Phase 2B, No. 20413-Dec 72) (LAGUMS: No. 034-73-17, Rockwell International-May 73.)

(2) (U) An Operational Test (OT) was conducted May-July 1980 with tactical prototype hardware to validate the operational capability of HELLFIRE using the COBRA helicopter as the testbed vehicle. Data were obtained in an operational environment to assess the operational effectiveness to include command and control, hit performance, human factors, and safety. Information was obtained on the reliability, availability, and maintainability (RAM) of the system during this test. This test was conducted at Hunter Ligget Military Reservation, CA, and was managed by the US Army Operational Test and Evaluation Agency (OTEA). (HELLFIRE OT: FTR OT-062-Vol I-III-Jan 81.)

(3) (U) On 27 May 1981 the Marine Corps Operational Test and Evaluation Agency at Twenty-Nine Palms, CA, conducted an interoperability test using four HELLFIRE missiles on stationary and moving targets. This test was conducted in conjunction with the OT II for the USMC Modular Universal Laser Equipment (MULE). The MULE designated all four targets, and the missiles were launched from the AH-1 surrogate platform.

(4) (U) The Operational Test II (OT II) for the AAH was conducted Jun-Aug 81 with prototype aircraft. It validated the operational capability of HELLFIRE as an integrated weapon system on its primary firing platform. The data collected were used to assess the same factors as listed in paragraph (2) above. The test was conducted at Hunter Liggett Military Reservation, CA, and was managed by the US Army Operational Test and Evaluation Agency. (OT II: FTR OT-046, Apr 82.)

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b. (U) Summary of Test Results.

(1) (U) Testing to satisfy the OT I requirements is described in subparagraph I.2.a.(1) above. The operational test described in subparagraph I.2.a.(2) was not designated as HELLFIRE OT II because it evaluated only the operational capability of the HELLFIRE missile and not the total weapon system as it will be fielded. The weapon system was evaluated during the AAH OT II in June-August 1981.

(2) (U) Thirty-three HELLFIRE missiles were fired from the AH-1 testbed aircraft in the operational test completed 11 July 1980. A combination of direct, indirect, rapid, and ripple firing modes was used in a battlefield environment which included dust and smoke. The Independent Evaluation Report published in May 1981 shows Results of the HELLFIRE operational test live firings are:

(a) (U) System reliability: 33 missiles launched; 3 scored no-test (see Note); 3 scored missile failure; 27 sccred reliable out of 30; reliability = 90%.

(b) (U) Accuracy given a reliable missile.

NOTE: (U) Missiles were scored as no-test due to limitations of the surrogate launch system, the AH-1 (COBRA), and laser false targets.

(3) (U) All four HELLFIRE missiles fired during MULE OT II were direct hits. Two of the firings were from the lightweight launcher.

(4) (U) A total of 12 HELLFIRE missiles were fired during AAH OT II. Results are as follows:

(a) (U) System reliability. 12 missiles launched; 1 scored no-test — cockpit procedures; 11 scored reliable out of 11; reliability = 100%.

(b) (U) Accuracy given a reliable missile.

(5) (U) One additional missile was fired from the AAH by USMC pilots subsequent to OT II. This firing was part of a quick-look by the Marine Corps at the AAH. The missile was a long-range direct fire HEAT round and resulted in a direct hit.

c. (U) Major test facilities — Operational Testing (OT) was conducted at Hunter Liggett Military Reservation. Tests were conducted by Government personnel with participation by contractor personnel.

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d. **(U)** Overall test program schedule — Operational Testing (OT) was conducted May-July 1980, and AAH OT II was conducted June-August 1981. The results of those OTs are discussed in subparagraph I.2.b. above.

e. **(U)** Operational tests have been conducted with the current HELLFIRE prototype missile which will be the same as the production missile.

f. **(U)** A wide variety of possible countermeasures have been studied. Work will continue in conjunction with the Electro-Optical Guided Weapons CM/CCM Joint Test and Evaluation Directorate to evaluate and incorporate CM/CCM as needed.

g. **(U)** A missile reliability point (in flight) estimate of .93 has been demonstrated on Engineering Development firing attempts. The Materiel Need (MN) requirement band is .92-.95. Reliability verification included a test-to-failure program to determine the reliability design margin of critical missile system components and assemblies. The laser seeker program included a reliability mean-time-between-failure demonstration test. All flight test data from development program were scored for reliability. The development program also included a formal maintainability demonstration utilizing trained military personnel. Results verified that such personnel can easily maintain the system at the required maintenance levels in accordance with user concepts.

3. (U) System Characteristics:

Operational/Technical Characteristics	Objectives	Demonstrated Performance
Range		
Direct Fire		
Indirect Fire		
Time of Flight		

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Operational/Technical Characteristics	Objectives	Demonstrated Performance
Probability of Hit (Given Reliability)		
Stationary Targets		
Moving Targets		
Missile Weight, Max	98.5 pounds	99.8 pounds
Missile Reliability (in flight)	.92-.95	.93

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64311A** Title: **PERSHING II**

DOD Mission Area: **#242 — Theater Wide Nuclear Warfare** Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	150580	110984	22841	48	47	672317
	QUANTITIES	20**	8	- 0 -	- 0 -	- 0 -	28
D599	PERSHING II	150580	110984	22841	48	47	672317

* Does not include $18.0M received from AF PE 63317F (Theater Ballistic Missile Program) in FY 1979.

** Includes six ground test missiles.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: PERSHING II is an evolutionary modernization of the currently deployed PERSHING Ia system. PERSHING II will provide vastly improved performance over PERSHING Ia: increased range (1800 kilometers versus 740 kilometers); higher accuracy versus ; use of lower yield warheads, thereby reducing unwanted collateral damage/civilian casualties; increased versatility through the use of the air-burst/surface-burst warhead; superior military effectiveness and survivability; and manpower savings. The PERSHING II development includes an improved maneuverable reentry vehicle which incorporates radar terminal guidance; new propulsion sections to achieve the longer range and ground support equipment changes that provide enhanced system reliability, accuracy, and targeting flexibility; plus reduced operating and support costs. Five missile flight tests were conducted during the Advanced Development phase in FY 1978. Based on the success demonstrated during these tests, the system was approved to enter Engineering Development in FY 1979. Long-lead procurement was initiated in December 1981, and the full production contract was signed in June 1982. The FY 1983 option in the production contract was exercised in October 1982. Deployment to Europe is planned to begin in December 1983. PERSHING II will form the ballistic component of NATO's modernized Intermediate Range Nuclear Forces (INF) as agreed to in 1979 by all members of the NATO Alliance. The rapid fielding of PERSHING II will fulfill the national need to fill the land-based ballistic missile void in the NATO INF. This is particularly critical in view of the unilateral expansion of the Soviet threat to NATO, exemplified by the SS-20 missile and the Backfire bomber. In addition, there appears to be a continuing trend on the part of the Soviet Union and non-Soviet Warsaw Pact (NSWP) countries to harden their military installations, necessitating increased accuracy in weapons to effectively defeat them. This Soviet/NSWP buildup is independent of NATO actions because it preceded the NATO INF modernization decision by several years. In recognition of the critical need for PERSHING II, the President has designated the system a program of highest national priority.

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C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	150580	110984	22841	95	672317*
Funds (as shown in FY 1983 submission)	150580	111301	23598	99	673394*

The funding decrease of $317 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The FY 1984 reduction of $757 thousand resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

*Does not include $18.0 million received from AF PE 63317F (Theater Ballistic Missile Program) in FY 1979.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Missile Procurement, Army:						
Funds (current requirements)	227600	- 0 -	432800	445200		
Quantities (current requirements)	21	- 0 -	95	104		

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	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army						
Funds (current requirements)	- 0 -	819	- 0 -	- 0 -	- 0 -	4719

Change from FY 1983 submission reflects adjustments for inflation and funding for additional initial spares. FY 1983 minor MCA funds are required for additions to an existing maintenance facility to support the fielding of the system. Program cost assumes an adequate FY 1983 supplemental.

E. (U) RELATED ACTIVITIES: Close coordination is maintained with the Air Force on advanced ballistic reentry developments. Prior year efforts in surface-to-surface missile PERSHING (Program Elements (PE) #22162A and #22254A) and Radar Area Correlation (PE #63306A) under the US Army Materiel Development and Readiness Command have been conducted by the same project manager (PM) selected to develop this project. These efforts have been closely coordinated with the US Army Missile Command funded under PE #62303A (Missile Technology). This program is coordinated with all Services by the Office of the Secretary of Defense (OSD). There is no unnecessary duplication of effort within the Army or Department of Defense. The technology employed in PERSHING II terminal guidance is unique to this system. The system is responsive to targeting requirements from the forward edge of the battle area out to the missile's maximum range. This, plus tactical mobility which allows sustained operations without constraining dependence on a main operating base, makes the system unique.

F. (U) WORK PERFORMED BY: US Army Missile Command, Redstone Arsenal, AL; White Sands Missile Range, NM; Martin Marietta, Orlando, FL; Goodyear Aerospace Corporation, Akron, OH; Singer Company (Kearfott Division), Little Falls, NJ; Bendix Corporation (Navigation and Control Division), Teterboro, NJ; and Hercules, Inc., Salt Lake City, UT.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D599 — PERSHING II**

Program Element: #64311A Title: PERSHING II

DOD Mission Area: #242 — Theater Wide Nuclear Warfare Budget Activity: #4 — Tactical Programs

a. (U) Project Description: In order to meet the Supreme Allied Commander, Europe's (SACEUR's) expressed need for an improved, mobile, surface-to-surface missile system, a Special Task Force was formed in January 1973 to validate the need for an improved PERSHING system and to develop a Concept Formulation Package for the system. In October 1973, the Decision Coordinating Paper (DCP) for PERSHING II was presented to and approved by the Army Systems Acquisition Review Council (ASARC) and forwarded to the Defense Systems Acquisition Review Council (DSARC) on 22 January 1974. As a result of a favorable DSARC recommendation, the Deputy Secretary of Defense directed the Army to proceed with the Advanced Development (AD) of PERSHING II. Five missile flight tests were conducted during the AD phase in FY 1978. These flights demonstrated the capability of the new terminal guidance technique to achieve the required system accuracy. All objectives of the AD program were met. The Army, on 18 July 1978, conducted an ASARC II and concluded that PERSHING II was ready for Engineering Development (ED). In the August 1978 Amended Program Decision Memorandum (APDM), the Secretary of Defense directed the Army to proceed to DSARC II as soon as possible with the extended range option of PERSHING II. A DSARC II was conducted 21 December 1978. As a result, the program was authorized to proceed into ED with extended range PERSHING II and two warheads—airburst/surface burst and an earth penetrator. This directed extended range decision represents a substantial increase in the range (1800km vs 740km) over the currently fielded PERSHING 1a (P1a). A contract was awarded to the PERSHING prime contractor in February 1979 for engineering development of the PERSHING II program. The FY 1982 APDM canceled funding for the earth penetrator warhead program in FY 1982 and beyond based on budget constraints and priorities. PERSHING II, a product improvement of the currently fielded PERSHING system, uses a new propulsion system to accommodate the greater range and modified ground support equipment that eliminates and/or consolidates hardware to reduce firing platoon response times by a factor of more than 50 percent, achieves greater flexibility, and reduces operating personnel. PERSHING II incorporates a new reentry vehicle that uses Radar Area Correlation Terminal Guidance to provide accuracy in the range of Circular Error Probable (CEP). This high accuracy represents an order of magnitude improvement over the currently fielded P1a system and provides the capability to effectively use low-yield or specialized warheads. During the Engineering Development phase, the tactical configuration of the reentry vehicle, propulsion stages, and ground support equipment are being developed, fabricated, and tested. This phase will culminate with the firing of 18 missiles during the integrated user/developer flight test program.

(1) (U) FY 1982 Accomplishments: The PERSHING II program started in FY 1975. In February 1980, the President granted PERSHING II a BRICKBAT (DX) status, making it a program of highest national priority. In FY 1981, prototype procurement activities were completed, and fabrication of the prototype ground support equipment was initiated. Fabrication of the reentry vehicle and propulsion section continued, and prototype testing was initiated. During FY 1982, fabrication of the prototype missile and ground support equipment continued. The first of the planned 18 integrated user/development test missile flights was conducted with an abnormal event occurring shortly following lift-off. Extensive failure analysis occurred, and corrective action was taken. Long-lead procurement for the production phase was initiated early in FY 1982. Contract award for full production was made in June 1982.

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(2) (U) **FY 1983 Program:** The Engineering Development phase will culminate in FY 1983 with the completion of the 18 user/developer missile flights. The test hardware will be made on production hard tooling, and this tooling will be used in the production program. The line will remain open and in continuous operation between the Engineering Development prototype units and the production units. The second production buy will occur in FY 1983, and the Initial Operational Capability (IOC) in Europe will occur in December 1983.

(3) (U) **FY 1984 Planned Program and Basis for Budget Year Request:** Engineering development wrap-up and phasedown will occur in FY 1984 with flight test analysis and development on selected activities being completed. The third production buy will occur in FY 1984.

(4) (U) **Program to Completion:** Additional production buys will occur in FY 1985 through FY 1986 to provide PERSHING II hardware for deployment of all PERSHING II battalions and to support the general missile firing programs.

c. (U) **Major Milestones:**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Start Development Test I	Nov 1977	Nov 1977
Complete Development Test I	May 1978	May 1978
Defense Systems Acquisition Review Council II	Dec 1978	Dec 1978
Award Engineering Development Contracts	Feb 1979	Feb 1979
Start Integrated Flight Testing	Jul 1982	Apr 1982
Long-Lead Procurement	Dec 1981	Dec 1981
Defense Systems Acquisition Review	Apr 1983	Jun 1982
Start Full-Scale Production	Jun 1982	Jun 1982
Production (Buy 2)	Oct 1982	Oct 1982
Complete Development/Operational Testing	Aug 1983	May 1983
Initial Operational Capability	Dec 1983	Dec 1983
Production (Buy 3)	Oct 1983	Oct 1983
Production Deliveries Complete	Feb 1988	Dec 1988

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The change in the start of the integrated flight test program resulted from late delivery of hardware from the factory. Completion of the development/ operational testing has been delayed as a result of restructuring the integrated flight test program due to the failure of the first flight missile. DSARC has been delayed in order to have more testing data available before the review.

Program Element: #64311A Title: PERSHING II

DOD Mission Area: #242 — Theater Wide Nuclear Warfare Budget Activity: #4 — Tactical Programs

I. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. (U) During the engineering development phase of the PERSHING II Development Program, extensive testing is being conducted. Development testing will include the following:

(1) (U) Wind tunnel testing — Wind tunnel testing is conducted to verify the aerodynamic characteristics of the missile design. The first phase ended in July 1979, and the second phase ended in October 1981. No design difficulties have been identified as a result of the tests.

(2) (U) Fixed-wing captive tests — In order to simulate the missile reentry environment (with the exception of velocity), the PERSHING II reentry vehicle pod is attached to the wing of an aircraft and dived at targets. These tests are conducted to verify that the correlator can achieve the required accuracy and verify that reference scenes are adequate for correlation. The first captive test phase was completed in April 1980. Test sites for the first phase included the Orlando, Florida area, White Sands Missile Range (WSMR), New Mexico, the Watertown, New York area, and the Huntsville, Alabama area. These tests were highly successful. The second phase started in October 1981 using prototype hardware. This phase will continue into FY 1983 and will include the Pope AFB, North Carolina area in addition to the areas noted above.

(3) (U) Environmental tests — System environmental testing was initiated in April 1982 and will continue through April 1983. These tests will include road shock and vibration, high-low temperature, temperature shock, humidity, wind, rain, and electromagnetic pulse (EMP). The purpose of these tests is to verify that the missile and ground support equipment remains operational throughout various specified environments.

(4) (U) Integrated User/Developer Flight Test — Eighteen missiles will be flown in the integrated user/developer flight test program. These tests started in July 1982 and will be flown against short- and long-range targets. These tests will demonstrate the capability of the system to achieve the required accuracy and range as well as testing the airburst/surface-burst warhead adaption kit in a flight environment. The tests will be a combined user/developer program which will phase the user into control of the test missiles early in the test sequence. The first flight failed shortly following lift-off. Extensive failure analysis has occurred, and corrective action has been tested.

b. (U) During Advanced Development, system test and fixed-wing captive tests were conducted in preparation for five Advanced Development (AD) missile flights. The missile flights were conducted at White Sands Missile Range, NM, using an earth penetrator warhead as the payload. The planned sixth flight was canceled because of the success demonstrated through flight five. All flights were tested at a range of 60 nautical miles, since the combination of inertial and radar correlation guidance techniques is independent of range. While quality problems were experienced, the overall flight test program at White Sands Missile Range was successful.

Program Element: #64311A Title: PERSHING II

DOD Mission Area: #242 — Theater Wide Nuclear Warfare Budget Activity: #4 — Tactical Programs

c. (U) Due to the low density of the PERSHING Weapon System, the engineering development (ED) prototype hardware will be made on production tooling. Therefore, the prototype hardware used in the integrated flight test program, and in ED testing prior to the flight test program, will be the production configuration. The hardware tested during this program includes the missile (reentry vehicle, first and second stage propulsion section) and ground support equipment (erector launcher, Platoon Control Central, reference scene generation facility, system component test station, etc.).

d. (U) All subsystems and support equipment will be available during system tests. Therefore, no makeup testing will be required.

e. (U) The prime contractor for PERSHING II is Martin Marietta Aerospace, Orlando, FL, and as such, is responsible for the development and testing of PERSHING II. The PERSHING program is managed by the PERSHING Project Manager, COL William Fiorentino, of the US Army Missile Command, Redstone Arsenal, AL. The independent test and evaluation agencies for PERSHING II will be the US Army Materiel Systems Analysis Activity (AMSAA) and the US Army Operational Test and Evaluation Agency (OTEA). OTEA will perform both ground and flight tests as described in paragraph 2 below.

f. (U) All testing, with the exception of the OTEA ground test, flight test, wind tunnel test, and fixed wing captive test, will be at the contractor/developer facility. Troops to perform the OTEA ground test and the flight tests will be from the PERSHING Battalion at Ft. Sill, OK. Contractor personnel will conduct the DT portion of these tests with Government participation.

g. (U) All testing from component testing to captive flight tests is conducted in preparation for the 18-missile flight test program. The major tests with planned spans are: Wind Tunnel (Phase I), Jan 1979-Jul 1979; Wind Tunnel (Phase II), Oct 1979-Feb 1981; Captive Test (Phase I), Sep 79-Apr 80; Captive Test (Phase II), Oct 1981-Sep 1982; Environmental Test, Apr 1982-Apr 1983; Integrated Flight Test Program, Jul 1982-Aug 1983; Operational Assessment, Jul 1982-Aug 1982; Operational Ground Test, Mar 1983-May 1983.

h. (U) 18 missile firings are planned at the end of the ED program. In addition, six ground missiles are planned for ground test purposes. Eight erector launchers, four Platoon Control Centrals, four reference scene generation facilities, and four system component test stations are also planned for tests during the ED phase.

i. (U) The currently planned missile firings for the integrated user/developer flight test program scheduled for completion in August 1983 are as follows:

Program Element: #64311A Title: PERSHING II

DOD Mission Area: #242 — Theater Wide Nuclear Warfare Budget Activity: #4 — Tactical Programs

Flight No.	Range	Configuration
1	Max	2 Stage
2	Short	2 Stage
3	Long	2 Stage
4	Max	2 Stage
5-6	Short	1 Stage
7-18*	Long	2 Stage

*During the second flight test a range safety problem was encountered with the second stage of the missile. In order to prevent recurrence of this problem (which would not be detrimental to a tactical missile flight) and avoid a further delay in the flight test program, a flexible schedule for tests 7-18 has been devised. Long range two-stage flights over water will be alternated with single-stage short range flights over land in order to test maximum missile performance parameters and radar area correlation. When a fix for the range safety problem has been accomplished, all remaining flights will be long range two-stage flights over land.

j. (U) PERSHING II has not been tested by other DOD components.

k. (U) No system retest has been conducted or is anticipated.

l. (U) Reliability assessments will be made using the data obtained from all testing conducted during the Engineering Development program. The first assessment started with the Phase I captive test results and assessments will continue throughout the test program, concluding with the 18 missile flights. Maintainability is a parameter that is constantly considered in any design decision on PERSHING II. A maintainability demonstration and evaluation will be conducted in FY 1983 by the contractor and monitored by TECOM/AMSAA. The demonstration/evaluation will use prototype hardware made on production tooling.

m. (U) Units for development test, operational test, and production requirements will be produced on the same "hard" production tooling and will be of the same configuration.

2. (U) Operational Test and Evaluation:

Program Element: #64311A Title: PERSHING II

DOD Mission Area: #242 — Theater Wide Nuclear Warfare Budget Activity: #4 — Tactical Programs

a. (U) OTEA, the independent operational tester and evaluator for PERSHING II, has access for monitoring purposes to all testing conducted during engineering development. OTEA will also conduct an independent operational ground test of PERSHING II. OTEA will have full independence and control over the ground test. In addition, OTEA has conducted a limited operational ground test of the PERSHING II hardware in July/August 1982 to provide an early operational assessment of the system.

b. (U) During Advanced Development, OTEA concluded that Operational Test I (OT I) was not necessary. However, OTEA did participate in the DT I tests by observing with a broad view toward refining operational issues. OTEA has reviewed DT I test data and concurred that the system was ready to enter engineering development. In Engineering Development, OTEA is monitoring testing to identify operational issues.

c. (U) Hardware planned for test by OTEA will be of production configuration using "hard" production tooling.

d. (U) OTEA Ground tests will use facilities at Ft Sill, OK, Orlando, FL, and White Sands Missile Range, NM. Troops from the PERSHING Battalion at Ft Sill will be used in conducting these tests.

e. (U) RAM assessments will be made by OTEA after the production decision based on the integrated flight testing and the operational ground tests.

f. (U) As directed by the Secretary of Defense, the PERSHING II program is currently pursuing a schedule that results in an acceleration of the IOC by 12 months. OTEA participation prior to full production go-ahead was limited to an operational assessment test and extensive monitoring of development activities. OTEA testing is being conducted per the schedules shown above.

h. (U) PERSHING II is an evolutionary improvement to the currently fielded P1a system. Therefore, PERSHING II is not unlike PERSHING 1a, and a great deal of operational information is available.

Program Element: #64311A Title: PERSHING II

DOD Mission Area: #242 — Theater Wide Nuclear Warfare Budget Activity: #4 — Tactical Programs

3. (U) System Characteristics:

Operational/Technical Characteristics	Objectives	Demonstrated Performance
Maintainability (mean time to repair)	0.8 - 1.5 hr	To be determined
Range Requirements	100 - 1800 km	To be determined
Accuracy	CEP	

*Capability demonstrated in captive and missile flight tests during Advanced Development and captive tests during Engineering Development.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64313A** Title: **GRASS BLADE**

DOD Mission Area: **#214 — Ground-Based Antiair and Tactical Missile Defense** Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): *($ In Thousands)*

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	30625	17069	22677	13066	14547	CLASSIFIED
D112	GRASS BLADE	30625	17069	22677	13066	14547	CLASSIFIED

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Program content is SECRET "Limited Distribution — Special Access Required," precluding further description in this summary. Access to GRASS BLADE information is controlled by the Deputy Chief of Staff for Research, Development, and Acquisition, Department of the Army.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	30625	17069	22677	27613	CLASSIFIED
Funds (as shown in FY 1983 submission)	29826	17117	9546	8466	CLASSIFIED

Details on funding increases are available upon request in accordance with paragraph B above.

Program Element: **#64313A** Title: **GRASS BLADE**

DOD Mission Area: **#214 — Ground-Based Antiair and Tactical Missile Defense** Budget Activity: **#4 — Tactical Programs**

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Classified in accordance with paragraph B above.

F. (U) WORK PERFORMED BY: Classified in accordance with paragraph B above.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Classified in accordance with paragraph B above.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64314A

Title: Multiple Launch Rocket System (MLRS)

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	40171	23149	981	3946	- 0 -	331678*
D564	Multiple Launch Rocket System	40171	23149	981	3946	- 0 -	331678
	QUANTITIES: Rocket/SPLL**						504/10

* Total estimated cost in above table is US share only. Addition of Allied share ($40 million) increases total to $371.678 million.
** SPLL — Self-Propelled Launcher Loader.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Multiple Launch Rocket System (MLRS) is a free-flight, area fire, artillery rocket system being developed to offset the existing deficiency in conventional fire support. The primary missions are counterfire and suppression of enemy air defenses. MLRS supplements cannon artillery fires by delivering large volumes of firepower in a short time against critical, time-sensitive targets. The basic warhead carries improved conventional submunitions. Germany, one of five partners in an international development program, is developing a scatterable mine warhead. Growth potential exists to add a Terminal Guidance Warhead (TGW) (to defeat armor) and a binary chemical warhead. Activities leading to a joint United States/United Kingdom/Germany/France concept for a TGW Program definition were initiated in FY 1980 under the terms of the MLRS Memorandum of Understanding (MOU), signed in July 1979. A supplement to the MLRS MOU covering the initial phase, Concept International Program Definition (C/IPD) was negotiated and concluded. It was signed by all four governments representatives in September 1981. (Italy, the fifth MLRS partner, is not participating in TGW development.)

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	40171	23149	981	3946	331678
Funds (as shown in FY 1983 submission)	38172	23215	- 0 -	- 0 -	324733

Program Element: **#64314A** Title: **Multiple Launch Rocket System (MLRS)**

DOD Mission Area: **#212 — Indirect Fire Support** Budget Activity: **#4 — Tactical Programs**

(U) $1999 thousand was added in FY 1982 by US Army Materiel Development and Readiness Command (DARCOM) reprograming to cover costs of a strike at FMC. The funding decrease of $66 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. $981 thousand and $3946 thousand were added in FY 1984 and FY 1985, respectively, to fund residual RDTE requirements expected to result from operational testing, and for continued development of Test Program Sets for the system's automatic test equipment. All other differences are due to inflation adjustments.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Missile Procurement, Army						
Funds (current requirements)	203300	444400	551600	619900	1792800	3795500
Quantities (current requirements)						
Rocket/Launcher	2496/68	23640/72	36000/76	50472/44	246510/29	362832/333
Military Construction, Army						
Funds (current requirements)	16860	26540	7410	3120	15860	69790

(U) Funding profile reflects multiyear contract acquisition strategy including funds for advanced procurement. Profile also includes initial spares. FY 1982 funding is $2.3 million less than in the FY 1983 Congressional Descriptive Summary (CDS) due to disapproval of reprograming to cover inflation ($2.2 million) and reprograming by US Army Missile Command of $.1 million to another of its programs. Engineering support was reduced by $5.0 million in FY 1984. $16.7 million was added in FY 1986 for initial spares. All other differences from the FY 1983 CDS submission are due to adjustments to profiles for advance materials funding and outlay rates under multiyear procurement, and inflation adjustments.

(U) Military Construction, Army funding requirements were not included in the FY 1983 CDS.

Program Element: #64314A

Title: Multiple Launch Rocket System (MLRS)

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

E. (U) RELATED ACTIVITIES:

1. **(U) Terminal Guidance Warhead (TGW):** Development continues under Program Element #63303A (Multiple Launch Rocket System (MLRS) Terminal Guidance Warhead (TGW)), Project #D216 (MLRS Terminally Guided Warhead). The Defense Advanced Research Projects Agency "Assault Breaker" demonstrations provide a technology baseline for both the MLRS TGW and the Joint Tactical Missile System-Army (formerly Corps Support Weapon System) antiarmor warhead. The TGW effort is managed by the MLRS Project Manager, and is being codeveloped by the United States, United Kingdom, Germany, and France under provisions of a Memorandum of Understanding.

2. **(U) Heavy Expanded Mobility Tactical Truck (HEMTT):** Procurement of 480 trucks with Heavy Expanded Mobility Ammunition Trailers (HEMAT) is being accomplished by the Commander, US Army Tank-Automotive Command. This effort was originally included in the MLRS program element. Each of these 10-ton resupply vehicles with trailers is designed to carry eight Launch Pod Containers, each containing six rockets.

3. **(U) Chemical Warhead:** A Letter of Agreement (LOA) between US Army Development and Readiness Command (DARCOM) and US Army Training and Doctrine Command (TRADOC) dated 21 March 1981 initiated the US unilateral development of a chemical warhead for MLRS under Program Element #63615A (Lethal Chemical Munitions Concepts), Project #DE76 (Lethal Chemical Materiel). That warhead is being developed by the Chemical Systems Laboratory (CSL) and will be integrated by the MLRS prime contractor.

4. **(U)** There is no unnecessary duplication of effort on these related activities within the Army nor the Department of Defense.

F. (U) WORK PERFORMED BY: The US Army Missile Command, Redstone Arsenal, AL, has the overall responsibility for development of the MLRS. Vought Corporation of Dallas, TX, was selected as the prime contractor in May 1980. The Army also has contracts with FMC Corporation, San Jose, CA, for development of the self-propelled carrier vehicle. The warhead fuze is developed and produced by KDI Corporation, Cincinnati, OH, under the supervision of the US Army Electronics Research and Development Command at its Harry Diamond Laboratories, Adelphi, MD. The dual-purpose improved conventional munition is provided by the US Army Armaments Research and Development Command, Dover, NJ.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D564 — Multiple Launch Rocket System: Purpose and Need: MLRS is being developed to offset the existing deficiency in conventional fire support. It provides a weapon system capable of attacking targets beyond the range of cannon artillery as well as supplementing the fires of existing artillery weapon systems when targets develop faster than these systems can attack them, such as during surge conditions. FY 1982 Program: Maturation Development Tests (MDT) continued during the year, with completion of the flight test portion of MDT occurring in May 1982. Deliveries of rockets and launchers from the low-rate production line began in May 1982 and August 1982, respectively. Production Qualification Tests (PQT) on production items were initiated and have been successful. Most of the crew training for the Operational Test III (OT III) unit was conducted from July through August 1982 in preparation for the OT III in FY 1983. Development effort for the

Program Element: **#64314A** Title: **Multiple Launch Rocket System (MLRS)**

DOD Mission Area: **#212 — Indirect Fire Support** Budget Activity: **#4 — Tactical Programs**

Chemical Warhead began with award of a Concept Feasibility Demonstration contract in March 1982 to Vought Corporation. FY 1983 Program: Maturation Development Tests, Production Qualification Tests, and the OT III will be completed in preparation for a March 1983 meeting of the Army Systems Acquisition Review Council (ASARC). This will be a Milestone IIIA meeting with objectives of receiving recommendations for Type Classification Standard for MLRS and approval for entering full-scale production. The Initial Operational Capability (IOC) MLRS battery will be fielded in March 1983 at Fort Riley, KS. The first overseas unit is scheduled for deployment during the last quarter of FY 1983. FY 1984 Planned Program: Research, Development, Testing, and Evaluation efforts in FY 1984 will consist of analysis of OT III results to identify any problem areas requiring corrective action, update of the Fire Control System flight algorithm to improve system accuracy, and continued development or update of Test Program Sets for the system's Automatic Test Equipment.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

Program Element: #64314A

Title: Multiple Launch Rocket System (MLRS)

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

I. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. **(U) Test Management.** MLRS testing is being conducted under the Single Integrated Development Test Concept. Results obtained during testing are being evaluated by the Army Materiel Systems Analysis Activity (AMSAA) and the US Army Operational Test and Evaluation Agency (OTEA). The Project Management Office manages both the US and international aspects of the test program through formally chartered Test Integration Working Groups (TIWG). The Project Manager is Colonel August M. Cianciolo. Vought Corporation is the system prime contractor.

b. **(U) Validation Phase.** Testing during this phase was more extensive than that normally required during a traditional Demonstration and Validation Phase due to the accelerated development schedule for MLRS. Also, it served as the basis for source selection between Boeing and Vought. Testing demonstrated that all technical risks were identified and that solutions were achievable. It also established firm reliability, availability, and maintainability (RAM) system requirements which were consistent with meeting performance effectiveness requirements at the lowest possible life-cycle costs. RAM goals and threshold values were established from these results. Validation Phase testing consisted of Engineering Design Tests and Advanced Development Verification Tests.

(1) **(U) Engineering Design Tests (EDT) (December 1977-December 1979).** Testing was performed by the contractor (EDT-C), under close Government monitoring, and by the Government (EDT-G). EDT provided reliability and safety data, determined natural and induced environmental effects, established performance levels, environmentally tested components, provided selected hazard analyses, and identified technical risks and achievable solutions. As problems were encountered, components were improved and retested. EDT-G results were provided to the contractors and the independent evaluators. (Vought Corporation Human Factors Evaluation, Reaction Time Test Report #2-55430/OR-004, 28 March 1980; the Government portion is in the Final Report, MLRS Vought Engineering Design Test Technical Report #RT-80-21, 13 June 1980)

(a) **(U) Flight Testing.** At White Sands Missile Range (WSMR), NM, 115 nonscored EDT-C tests were conducted from December 1977 to December 1979.

(b) **(U) Mobility and Endurance Testing.** The Government conducted these tests (EDT-G) at Aberdeen Proving Ground, MD, from July 1979 to September 1979. No major problems were encountered. (Final Report on GSRS Mobility and Endurance Test, US Army Test and Evaluation Command (TECOM) Project #2-MI-000-GSR-006, APG-MT-5347, 16 January 1980)

Program Element: #64314A

Title: Multiple Launch Rocket System (MLRS)

DOD Mission Area: #212 — Indirect Fire Support

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(2) (U) **Advanced Development Verification Tests (ADVT) (September 1979-February 1980).** These tests were conducted by both the contractors (ADVT-C) and the Government (ADVT-G) to: provide human factors and ground support equipment performance data in a simulated arctic and desert environment; identify system emissions, effluents, and hazards; and conduct system demonstration flights. ADVT data were used by the independent Government evaluators to officially score system performance and reliability. (Vought Corporation Advanced Development Verification Test, Vought MLRS Simulated Arctic/Desert Test Report #2-55420/OR-001, 4 February 1980) ADVT-C ground and flight testing verified that the design approach was capable of evolving into a ruggedized weapon system that could achieve necessary reliability and performance goals during the Maturation Phase. Self-Propelled Launcher Loaders with Launch Pod Containers were exercised while exposed to high and low temperature extremes (+140, -25°F), high humidity, rain, sand and dust, and icing conditions. ADVT-G ground and flight testing provided the final quantitative data points. Complete Launch Pod Containers with rockets were subjected to tropic, arctic, and desert stockpile-to-target environmental life sequences, and the rockets were flight tested to demonstrate performance in extreme weather conditions. Additional rockets were flight tested to determine accuracy and effectiveness at the required minimum, intermediate, and maximum ranges. RAM data were collected during launcher mobility and endurance tests for the independent Government evaluators. (Final Report of Development Test I ADVT-G Vought MLRS TECOM Project #2-MI-000-GSR-002, 31 March 1980)

(a) (U) **Flight Testing.** The contractors fired 36 rockets at White Sands Missile Range (WSMR), NM, during ADVT-C from September 1979 to November 1979. One fin-opening problem occurred; all others were successful. The Government launched 48 rockets at WSMR during ADVT-G from November 1979 to February 1980, experiencing two fin-opening problems and one pod cover problem; all others were successful. (US Army Missile Command Report "MLRS Accuracy Scoring Analysis of Vought Corporation Scored Test Firings," April 1980)

(b) (U) **Environmental Testing.** The contractors completed climatic and human factors testing during July 1979 to November 1979 at Eglin AFB, FL, with no major problems.

(3) (U) **Summary.** Developmental testing was completed on schedule. Single, double, triple, and six-round ripple firings were conducted, including firings with a crew in the launcher cab. Of the 127 rockets Vought fired, 60 were scored; all fuzes and warheads functioned properly. Test results indicated that the Launch Pod Container can perform the three intended roles of transportation, storage, and launch pod. No significant problems occurred during rail transportation testing. No problems were encountered during loading tests of the launcher and Launch Pod Containers into the C141 aircraft. The launcher performed well as a launch platform and experienced no adverse effects from the firing of 177 rockets. A total of 9792 kilometers in road tests and 3996 firing cycles were accumulated on six launchers. Design changes were made, as necessary, during this phase. These tests confirmed that the rocket, Launch Pod Container, and Self-Propelled Launcher Loader were safe for operational testing, and that the MLRS was ready to enter a Maturation Phase and concurrent low-rate production. These conclusions were affirmed at the Defense Systems Acquisition Review Council III (DSARC III) in May 1980, and Vought Corporation was selected as the system prime contractor.

Program Element: #64314A | Title: Multiple Launch Rocket System (MLRS)

DOD Mission Area: #212 — Indirect Fire Support | Budget Activity: #4 — Tactical Programs

c. (U) **Maturation Phase.** Testing in this phase consists of Maturation Development Tests (MDT) and Production Qualification Tests (PQT). MDT testing is being conducted using research and development prototype hardware. PQT testing is being conducted on hardware manufactured on the low-rate production line. Special emphasis is being placed on testing of built-in test equipment (BITE) based on directions from the Secretary of Defense, to include additional testing and demonstration of hardware maintenance features. These tests will be concluded in FY 1983. All components and subsystems which were not fully tested nor qualified during the Validation Phase and which represent the production configuration will also be tested; included are the software and hardware for the Position Determining System (PDS), Platoon Leader's Digital Message Device (PLDMD), Fire Direction System (FDS), and integration with ancillary systems such as the automatic test equipment and the Heavy Expanded Mobility Tactical Truck (HEMTT) and Heavy Expanded Mobility Ammunition Trailer (HEMAT). Testing will be a joint contractor/Government effort to assure the adequacy of the system design as it is matured. The contractor will prepare test plans for Government approval, conduct tests at contractor and Government facilities, accommodate Government test monitors, and use independent or mixed contractor/Government test crews as test conditions warrant.

(1) (U) **Maturation Development Tests (MDT) (August 1980-March 1983).** This test program includes the following tests: component/subsystem/system performance, rocket flight tests (including environmental), hazard/safety, countermeasures, electromagnetic radiation and pulse, nuclear hardness, human factors engineering, maintainability demonstration, transportability, rail impact, component/subsystem qualification, software development, Launch Pod Container humidity, reliability step stress, and system hot and cold.

(a) (U) **Flight Testing.** The contractor conducted six Early MDT tests at White Sands Missile Range (WSMR), NM, from November 1980 to January 1981 to refine the warhead dispersal system to correct the burst pattern at low temperatures. These nonecored tests were successful. One hundred MDT flight tests were completed at WSMR from April 1981 to May 1982. Problems experienced included three with wiring harnesses, three with motor burn-through, three with fuzes, and one with the pod structure; all others were successful. All test objectives were met. Results were used to establish the production configuration.

(b) (U) **Ground Testing.** The following tests have been completed with no major problems: hazards/safety at Redstone Arsenal (RSA), AL, WSMR, and Eglin AFB, FL (October 1981-September 1982); countermeasures at WSMR and Fort Sill, OK (prequalification — January 1981, qualification — March 1982); electromagnetic radiation and pulse at RSA and Harry Diamond Laboratories (prequalification — March-April 1981, qualification — February-June 1982); nuclear hardness at Sandia, NM, and WSMR (prequalification — April-May, September 1981); human factors engineering at WSMR and Eglin AFB (May-July 1981, February-April 1982); maintainability demonstration at Dallas (March-May 1982); transportability at RSA and Dallas (launcher — February 1981, Launch Pod Container — January 1982, marine loading — February 1982); rail impact at RSA (launcher — February 1981, Launch Pod Container — January 1982); software development at Dallas (October 1981-August 1982); Launch Pod Container humidity at RSA (May-September 1981, January 1982); and system hot and cold at Eglin AFB (prequalification — May-July 1981). (Vought MLRS Maturation Phase Test Prequalification Simulated Arctic/Desert Test Report #4-59-100/IR-29, 15 October 1981) The remaining MDT testing is in process and on schedule.

Program Element: #64314A Title: Multiple Launch Rocket System (MLRS)

DOD Mission Area: #212 — Indirect Fire Support Budget Activity: #4 — Tactical Programs

(2) (U) Production Qualification Tests (PQT) (May 1982-March 1983). PQT includes the following: flight tests; mobility and endurance; environmental qualification; nuclear hardness, lightning, electromagnetic pulse; human factors engineering; command, control, and communications; and chemical/biological decontamination.

(a) (U) Flight Testing. These tests are being conducted at WSMR from May 1982 to February 1983 to demonstrate rocket and Launch Pod Container reliability and accuracy versus range. Launch procedures will simulate tactical employment of MLRS. As of 21 January 1983, 102 of 114 tests have been completed. One early fin-opening and two low heights of burst have been experienced; all others were successful. An additional 54 rockets are being flight tested from November 1982 to February 1983 as part of the Joint Development Test/Operational Test (DT/OT). Eighteen of these rockets have been successfully tested as of 21 January 1983.

(b) (U) Mobility and Endurance Tests. This testing is occurring at Aberdeen Proving Ground, MD, from August 1982 to February 1983 on two production model launchers. Reliability, availability, and maintainability (RAM) will be demonstrated in this testing. Each launcher is to be exposed to a goal of 6000 kilometers travel, 1350 simulated firing missions, and 900 load/unload cycles. As of 21 January 1983, totals of 10737 kilometers, 2081 fire missions, and 695 load/unload cycles have been accumulated.

(c) (U) Environmental Qualification. These tests are to demonstrate performance and reliability of the design in simulated and actual operational environments, and to verify that MLRS will perform as expected over the required operational extremes. Ten Launch Pod Containers with 60 rockets have been exposed to vibration, shock, temperature shock, humidity, sand and dust, rain, and salt fog, and then conditioned to high or low temperatures and test fired at WSMR from August 1982 to February 1983. Fifty-four of these rockets (part of the 114 PQT flight test rockets) have been fired as of 21 January 1983. The early fin-opening and one of the low height-of-burst problems identified in paragraph I.1.c.(2)(a) above occurred during this testing. Testing of the launcher is scheduled at WSMR for August 1982 to February 1983, and at Eglin AFB from January to March 1983. These tests will simulate arctic, temperate, desert, and tropic environments to demonstrate acceptable hardware and man-machine performance.

(d) (U) Nuclear Hardness, Lightning, Electromagnetic Pulse. This testing was successfully completed at WSMR and Sandia, NM, from October to November 1982 except for lightning tests, which was completed in December 1982.

(e) (U) Human Factors Engineering. This testing will occur at WSMR and Eglin AFB from January to March 1983.

Program Element: #64314A Title: Multiple Launch Rocket System (MLRS)

DOD Mission Area: #212 — Indirect Fire Support Budget Activity: #4 — Tactical Programs

(f) (U) **Command, Control, and Communications.** This testing was completed at Fort Sill, OK, by user personnel from February to May 1982. It successfully demonstrated the total digital command loop (TACFIRE, Fire Control System, Platoon Leader's Digital Message Device, and the Self-Propelled Launcher Loader) and that the MLRS is a totally integrated system capable of performing as required. The testing verified hardware and software compatibility. (Vought Report #4-71100/2R-47, 9 September 1982)

(g) (U) **Chemical/Biological Decontamination.** This testing is occurring at the Chemical Systems Laboratory in January-February 1983.

(3) (U) **Summary.** Maturation Development Test (MDT) flight testing is completed, including a 12-round ripple flight test on 10 February 1982. The remaining flight tests are proceeding well and will be completed on schedule. The remaining Maturation Phase ground testing is also on schedule, as adjusted for a four-month delay in delivery of production carrier vehicles from FMC Corporation due to a strike in April 1981 at that manufacturer's plant. MLRS hardware has performed very well during prequalification and qualification testing.

2. (U) **Operational Test and Evaluation:**

a. (U) **Validation Phase.** The MLRS Operational Test I (OTI) (January to February 1980) was an integral part of a combined Development Test/Operational Test (DT/OT) and demonstrated the military utility and operational suitability of MLRS. The OT portion of the test lasted six weeks, and the equipment was tested using active duty crews. Two firing sections, each manning an MLRS candidate system, conducted a series of firing and nonfiring operational exercises in a tactical environment. A Fire Direction Center, Maintenance Section, Ammunition Section, and elements of a Direct/General Support maintenance section also participated in the testing. OT focus was directed toward man-machine interfaces and was conducted in three phases. Phase I (three weeks) was devoted to training and pilot testing at Fort Sill, OK. Phase II (two weeks), also conducted at Fort Sill, consisted of nonfiring field exercises in a simulated tactical environment. Phase III (one week) was a combined Development Test/Operational Test live-fire exercise conducted at White Sands Missile Range (WSMR), NM. During that phase, 12 rockets were fired successfully from each of the two candidate systems (24 rockets total). The OT provided data to assess operational effectiveness, reliability, availability, and maintainability (RAM), operational survivability, human factors, safety, training, doctrine, organization, tactics, and the adequacy of the proposed logistics concepts. All data and associated analyses were provided to the Army Systems Acquisition Review Council III (ASARC III) and were used as a basis for a favorable Defense Systems Acquisition Review Council III (DSARC III) decision to enter the Maturation Phase with concurrent low-rate production. Additional operational testing was recommended to assess battery mission performance. This testing will assess performance of production hardware including the Fire Direction System, on-board Position Determining System, Platoon Leader's Digital Message Device, 10-ton resupply vehicle (HEMTT) and trailer (HEMAT), RAM and built-in test equipment (BITE) of production equipment, interoperability, and the operational organizational concepts. OT I test results were evaluated by the Army Materiel Systems Analysis Activity (AMSAA) and the Operational Test and Evaluation Agency (OTEA). OTEA

Program Element: #64314A Title: Multiple Launch Rocket System (MLRS)

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conducted the operational testing. Test results are in OTEA Reports #FTR-OT-402, March 1980, and #IER-OT-402, April 1980, and the AMSAA Independent Evaluation Report #8-80, June 1980. (The AMSAA report covers both DT and OT.)

b. **(U) Maturation Phase.** The focus of OT III is the MLRS battery and its ability to successfully perform its designated mission, survive, and resupply itself in an intense operational environment. In executing its roles of counterfire and interdiction, the battery must be responsive to corps and division commanders. Accordingly, the overriding criterion of mission performance is the ability of the battery to process a high percentage of all fire missions sent to the battery in a timely and effective manner. Interoperation with controlling headquarters and target acquisition means, battery/SPLL fire mission execution responsiveness, and SPLL mission cycle responsiveness are the critical factors for successful mission performance. In turn, individual and collective training proficiency, ammunition resupply procedures, internal command and control procedures, and overall MLRS and individual SPLL, FDS, PLDMD, RSV, and RST RAM affect battery performance. Finally, because battery elements are dispersed, move frequently, depend on FM communications and are unable to defend themselves from ground and air attack, MLRS mission performance will be affected by: operational, communications, and FDC procedures; SPLL and resupply vulnerabilities; and safety. This OT has been designed, therefore, as a demanding test of the entire battery, its personnel, procedures, and equipment.

(1) **(U) Scope.** The Multiple Launch Rocket System (MLRS) Operational Test III (OT III) is a four-phased OT conducted at Ft Sill, OK; Ft Bliss, TX; and White Sands Missile Range (WSMR), NM. The test unit is an MLRS battery with nine firing sections and a battalion operational/fire direction (OPS/FD) section. Each firing section is equipped with one Self-Propelled Launcher Loader (SPLL). The MLRS battery (including the organic battery survey section equipped with Position and Azimuth Determining System (PADS)) is supported by a proportionate slice of battalion headquarters and service elements and direct support level maintenance elements. Assets to support testing were on hand.

(a) **(U)** Phase I (July-October 1982) of the OT was conducted in two parts. The first part consisted of individual training of player personnel at Ft Sill, OK. The second part of Phase I was conducted at Ft Bliss, TX, and consisted of two weeks of unit collective training. Training data will be collected throughout Phases I, II, and III.

(b) **(U)** Phase II (October 1982) was conducted at Ft Bliss and lasted for two weeks. It consisted of two pilot exercises to validate data collection forms and procedures, followed by one week to revise the control and data collection plans, if necessary, prior to commencement of Phase III.

(c) **(U)** Phase III (November-December 1982) was conducted at Ft Bliss over a six-week period. It consisted of two intensive twelve-day field exercises. The first exercise was conducted during 9-20 November 1982 and included 48 rocket flight tests; test execution went well. The second exercise occurred 30 November-11 December 1982, and also went well. Although the two field exercises were approximately equal in duration and were conducted under similar conditions, there was no requirement nor intent to replicate the exercises. During each field exercise, the MLRS

Program Element: #64314A Title: Multiple Launch Rocket System (MLRS)

DOD Mission Area: #212 — Indirect Fire Support Budget Activity: #4 — Tactical Programs

battery conducted tactical fire and maneuver operations to include live and nonlive fire missions and resupply operations. A total of 144 rockets (24 Launch Pod Containers (LP/C)) were fired during Phase III. The number of additional missions required to achieve the operational mode summary/mission profile (OMS/MP) pace and to satisfy the test objectives was conducted as nonlive fire missions. Live fire accuracy data were collected by TECOM personnel on a noninterference basis and shared with the OT evaluator. Up-to-date meteorological data were provided by a currently available meteorological system. An AN/TPQ-37 Radar was used to provide two types of data: first, to assess interoperability by providing simulated target acquisition information to MLRS; and second, to acquire the MLRS SPLL during live firing as part of the vulnerability subtest. The 8"/MLRS battalion TACFIRE set was used during the first exercise to control the MLRS battery. During the second exercise, an MLRS battalion FDS was used to control the MLRS battery.

(d) (U) Phase IV (November 1982-January 1983) is being conducted at WSMR, NM, and consists of DT firings of 54 MLRS rockets (9 LP/Cs) by military crews. These nine LP/Cs will not have been used during the earlier phases of the OT. Accuracy and target effects data are being collected by TECOM personnel and shared with the OT evaluator. As of 21 January 1983, 18 of these firings have been successfully completed.

(e) (U) Reliability, availability, and maintainability data were collected throughout Phases II and III. Maintainability data were gathered for all MLRS-peculiar maintenance actions through the direct support maintenance level.

(2) (U) **Test objectives.**

(a) (U) **Objective 1:** To obtain data to assess: the mission performance of the MLRS battery in an operational environment, to include electronic warfare (EW) and nuclear/biological/chemical (NBC); MLRS interoperability with supporting and cooperative systems; and vulnerability of the MLRS.

(b) (U) **Objective 2:** To obtain data to assess the reliability, availability, and maintainability (RAM), to include BITE, of the MLRS in an operational environment.

(c) (U) **Objective 3:** To obtain data to assess the logistical support concept for the MLRS in the division and corps areas.

(d) (U) **Objective 4:** To provide information to assess the training, safety, and health and human factors for the MLRS.

(e) (U) **Objective 5:** To provide information to assess the adequacy of the proposed MLRS organization, doctrine, and tactics.

Program Element: #64314A

Title: Multiple Launch Rocket System (MLRS)

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

3. (U) System Characteristics:

Operational/Technical Characteristics	Goal	Maturation Thresholds	Validation Thresholds	Demonstrated Performance
System Accuracy[1]				
Maximum Range				
Reaction time				
Prepare to Fire				
Displace				
Total Mission				
Reliability, Availability, Maintainability				
Reliability				
Rocket	.95-.97	.90	.83	.93
SPLL	.88-.92	.83	.71	.84
Availability				
MLRS Operational Availability	TBD	TBD	Not Applicable	[2]
Essential unscheduled maintenance actions per 1000 hours of launcher loader module operation	50	70	Not Applicable	[2]
Performance of Built-In Test Equipment. % of items removed with no evidence of failure	7%	10%	Not Applicable	[2]
Maintainability				
SPLL (MTTR) (hours) Organizational	1.0	1.10	Not Applicable	[2]
Direct/General Support	4.0	4.40	Not Applicable	[2]

NOTES:

[1] Goals and thresholds are established for 2/3 maximum range .

[2] To be provided after assessment of Maturation Phase results.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64321A

Title: Joint Tactical Fusion Program

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	30417	27610			To be Determined (TBD)	TBD
D396	Tactical Simulation (TACSIM)	- 0 -	- 0 -			TBD	TBD
D926	All Source Analysis System	30417	27610			TBD	TBD

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The past decade has witnessed major technical advances and the introduction of increasingly sophisticated intelligence-gathering and weapons system into the strategic and tactical operations of military forces—both friendly and opposing. Commanders at all echelons must have an intelligence system which will provide early detection, identification, correlation, and location of these enemy critical nodes in order to employ our own forces and weapons for effective enemy attrition. The objective of this program is to develop and field an All Source Analysis System (ASAS) which will provide the tactical commander with a highly automated capability at division, corps, and echelons above corps to analyze, correlate, fuse, and report intelligence data from numerous tactical and strategic sensor systems; provide target nominations; and manage and control organic intelligence/electronic warfare assets.

AD-A126 681 DESCRIPTIVE SUMMARIES OF THE RESEARCH DEVELOPMENT TEST & EVALUATION ARMY..(U) DEPUTY CHIEF OF STAFF FOR RESEARCH DEVELOPMENT AND ACQUISITIO.. FEB 83 3/6

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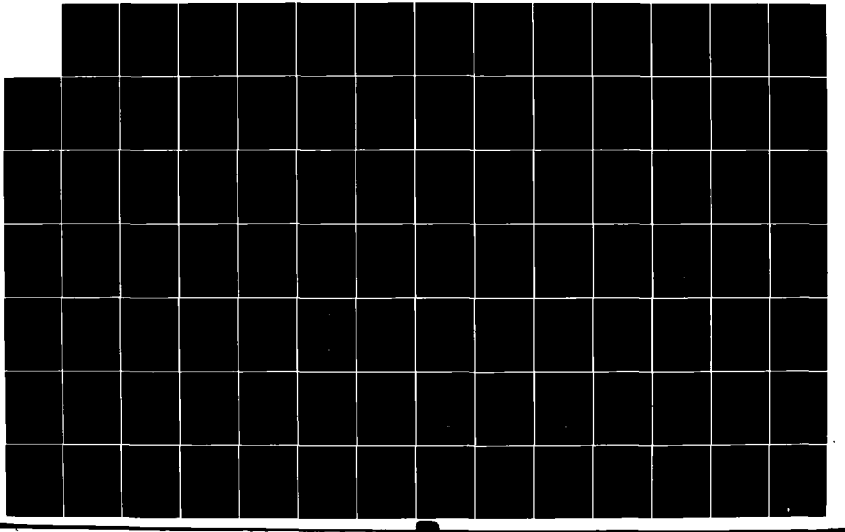

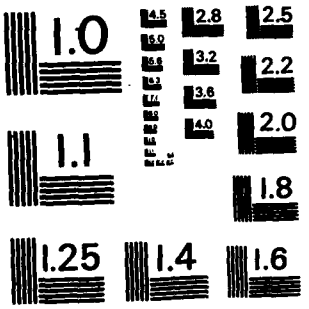

Program Element: #64321A

Title: Joint Tactical Fusion Program

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	30417	27610		To Be Determined (TBD)	TBD
Funds (as shown in FY 1983 submission)	30417	42689		TBD	TBD

In FY 1981 and prior, these funds were included in Program Element (PE) #64745A (Tactical Electronic Support Measures Systems) under project #D926 (Tactical EWI Command and Control Systems). The funding decrease of $15079 thousand in FY 1983 is a result of Congressional direction in the FY 1983 Appropriations Act and pro rata application of general Congressional reductions to the RDTE,A appropriation. In FY 1984, reprograming to support higher priority programs reduced funding.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The following current related Services/agencies' program elements apply: #64321F (Joint Tactical Fusion Program) #63745A (Tactical ESM Systems), Project #D925 (All Source Analysis System), and #35865G (Tactical Cryptologic Program). The Joint Program Office is an integrated entity which requires full Army and Air Force support to execute the acquisition strategy.

F. (U) WORK PERFORMED BY: Current contractors are: Analytics, McLean, VA, and the MITRE Corporation, Bedford, MA. In-house development and contract monitoring are conducted by US Army Materiel Development and Readiness Command (DARCOM), Alexandria, VA, and the Joint Tactical Fusion Program Management Office.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D396 — Tactical Simulation (TACSIM): The All Source Analysis System (ASAS) Required Operational Capability (ROC) documented the need for a tactical simulator capability. TACSIM is considered to be part of the overall effort to answer simulator needs. TACSIM is used to support selected unilateral and joint evaluations under the Joint Chiefs of Staff (JCS) test program and to support the Joint Tactical Fusion Program with a tactical simulator which runs interactively in an operational environment and can support materiel

Program Element: #64321A

Title: Joint Tactical Fusion Program

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

development, force provisioning, and training needs. The objectives of the TACSIM program are to select, organize, and integrate intelligence system models, modeling methodology, and hardware and software to develop a system architecture consistent with the Army Model Improvement Program (AMIP). FY 1982 efforts included supporting several JCS exercises, JTFB testing, completing development of the MARK I TACSIM capability, and beginning work to develop automated scenario generation and incorporation of automated COMINT modeling into the simulation. FY 1983 efforts will support additional JCS exercises, continued development of the MARK II TACSIM and will establish a TACSIM capability at the US Army Materiel Systems Analysis Activity. FY 1984 will continue support of JCS and unilateral exercises, will support ASAS development, and will continue TACSIM developmental efforts leading to a MARK II capability. Mark II has the goal of achieving a fully automated simulation capability, to include automated scenario generation. It also entails the incorporation of additional sensor models into the simulation capability. TACSIM has been funded in the past under Project #D926. In FY 1984 TACSIM is established as a separate project (Project #D396) under PE #64321.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. (U) Project: D926—All Source Analysis System (ASAS)

a. **(U) Project Description:** The employment of highly mobile and technologically advanced weapons systems by opposing tactical military forces requires early detection, identification, and location. To support this requirement, sophisticated intelligence sensor systems which can detect and locate basic elements (such as electronic emitters) are being increasingly employed. There is a critical need to rapidly exploit this time-sensitive, high-volume sensor information and to effectively control and manage organic sensor and electronic warfare assets. The purpose of this program is to develop and field for the Army an All Source Analysis System (ASAS) which will correlate and aggregate the large number of elements (such as detected by various sensor systems; reduce them to force structures ; produce ground-battle situation displays; provide target nomination and intelligence support; and manage and control organic sensor/electronic warfare assets. The Office of the Secretary of Defense submitted to Congress in December 1980 a joint Service/agency-generated Joint Tactical Fusion Development and Acquisition Program Plan which combined the Battlefield Exploitation and Target Acquisition (BETA) project, the Air Force Enemy Situation Correlation Element (ENSCE), formerly ATFD, the Army All Source Analysis System (ASAS)/TCAC-D Programs, and associated simulation projects into a Joint Fusion Program with the Army as the lead Service. The ASAS/ENSCE Programs make maximum use of the investments in BETA, the ASAS Advanced Development Model Signals Intelligence Electronic Warfare Subsystem (ADMSEWS), and Technical Control and Analysis Center (TCAC) projects. The acquisition strategy is based on an evolutionary approach. It takes an existing functional baseline, develops compatible hardware for the tactical environment, and provides for the incremental development of software that reflects user needs and experience. The software architecture proceeds from existing baseline operating and data base management systems to the incremental development of an expanded operating environment that handles the ASAS/ENSCE requirements. For the hardware, development reflects a baseline tactical hardware set appropriately specified in terms of equipment and functions, which accommodates the

Program Element: #64321A

Title: Joint Tactical Fusion Program

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

software being developed and evolves to encompass technical and operational product improvements. This evolutionary approach to development is consistent with DOD Directive 5000.1 and 5000.2 and DOD initiatives to reduce the costs of acquisition programs. The Joint Tactical Fusion Program Management Office (JTFPMO) also monitors and, as directed, participates in and/or implements related intelligence fusion programs to include the Limited Operational Capability Europe (LOCE), the Limited Operational Capability Korea (LOCK) and the Near-Term Intelligence/Electronic Warfare (IEW) Microprocessor Program, Nickname: MICROFIX.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** The Limited Operational Capability Europe (LOCE), a fusion system requested by the European Command (EUCOM) was installed in the European theater. The Joint Tactical Fusion Testbeds underwent user evaluation. Early in the fiscal year, costing of the ASAS Required Operational Capability (ROC) revealed that the system would cost considerably more than originally estimated. An extensive review of the ROC was conducted with the objective of reducing costs by phasing capabilities into ASAS over a period of several years through application of preplanned product improvements into a modest baseline system. A special task force was created at the request of the Under Secretary of the Army to investigate alternative acquisition strategies and to recommend an appropriate strategy. The task force presented its conclusion and recommendations to the Under Secretary in September 1982.

(2) **(U) FY 1983 Program:** JTFPMO support of LOCE will then be primarily configuration management and upgrading of LOCE software. Implementation of the new ASAS acquisition strategy will begin. This includes revising the program management structure, selecting a system integrating contractor, refining system requirements, initiating the software development effort, and completing the preliminary system design. User evaluation of the Joint Tactical Fusion Testbeds will continue. The Army-owned testbed may be reconfigured to provide a limited fusion capability in Korea.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Configuration management of LOCE will continue. Hardware design of the ASAS/ENSCE baseline system will continue, as will the software development effort, with the objective of fielding baseline ASAS systems in and in . Definition of the production version ASAS/ENSCE will be initiated and completed. A request for proposal will be prepared and released for the production system, and the system contractor will be selected. Development of the production system will begin.

(4) **(U) Program to Completion:** Configuration management of LOCE software and evaluation of the Joint Tactical Fusion Testbeds will continue. Development of ASAS/ENSCE will continue with the objective of fielding prototype systems in the European theater and the US in and achieving initial operational capability with an objective system in

Program Element: #64321A

Title: Joint Tactical Fusion Program

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

c. (U) **Major Milestones:** Because the acquisition strategy for ASAS is under revision, the milestones reported in the FY 1993 descriptive summary no longer apply. New milestones have not yet been established. Overall program objectives, however, are: 1) to field prototype systems in in Europe and the continental United States and 2) to achieve an initial operational capability with the objective ASAS in

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64323A

Title: High Technology Light Division (HTLD)

DOD Mission Area: #211 — Direct Fire Combat

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	6058	18215	34210	Not Applicable	Not Applicable
D268	HTLD Airborne Warning and Control System (AWACS) Interface	- 0 -	3858	600	- 0 -	200	4658
D347	HTLD Heavy Mortar Program	- 0 -	2200	3569	5054	28000	38823
D348	HTLD Smart Munition	- 0 -	- 0 -	5789	13606	Continuing	Not Applicable
D349	HTLD Long-Range Electro-Optic Device	- 0 -	- 0 -	538	- 0 -	- 0 -	538
D350	HTLD Deception Devices	- 0 -	- 0 -	7719	15550	- 0 -	23269

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element addresses the need to modernize the Army's most deployable units, the light divisions, whose war-fighting capabilities fail to match those of our potential foes and their client states and whose vulnerabilities will increase in 1985 and beyond. The Army has taken a positive initiative at Ft. Lewis, Washington, to address this shortfall. This initiative took the form of the High Technology Test Bed (HTTB) and the High Technology Light Division (HTLD). The HTTB was formed in July 1980 to provide, through field tests and supporting analysis, an evaluation of candidate operational, organizational, doctrinal, and technological opportunities and concepts. The efforts are focused on enhancing the command, control, and communications; firepower; tactical mobility; survivability; flexibility; and sustainability of the infantry division with a major emphasis on improving its strategic deployability. This capability would allow the US to rapidly deploy a lean, mobile, hard-hitting, sustainable force to troublespots around the world. There is a direct relationship between the HTTB and the HTLD. The vehicle by which the charter of the HTTB is carried out is the HTLD (9th Infantry Division). The HTLD provides the people, equipment, and organization to test and give on-the-ground meaning to the efforts of the HTTB. This is a revolutionary concept that allows for the fastest possible transition from concept to fielding. It allows for the development and use of innovative acquisition procedures to shorten the process currently being used. Collocated are the essential elements necessary to integrate the Air-Land Battle doctrine and tactics with the latest in technology and equipment. This program element develops materiel whose requirements have been validated in the testbed for use in the light division. An interface with AWACS will provide early warning and intelligence that is otherwise vulnerable or not available. Heavy mortars are more transportable than howitzers, yet provide formidable firepower at high sustained rates. When the mortars are coupled with a fire-and-forget smart munition, they will provide the infantry commander close- and intermediate-range precision antiarmor capability. Long-range electro-optic devices provide a visual "see deep" capability, especially in desert environments. Deception devices will duplicate electronic, visual, aural, and thermal signatures of HTLD elements to deceive the enemy and avoid decisive engagement on the enemy's terms. Two items for which Congress approved FY 1982 reprogrammings but which had no subsequent

Program Element: #64323A | Title: High Technology Light Division (HTLD)

DOD Mission Area: #211 — Direct Fire Combat | Budget Activity: #4 — Tactical Programs

FY 1983 and FY1984 funding are the Mark-19 40mm Machine Gun and the Towed CHAPARRAL. The Mark-19 is an automatic grenade launcher which will provide the HTLD units with the capability of defeating personnel and light armored vehicles beyond 1000 meters. The Towed CHAPARRAL will provide a helicopter transportable Air Defense System for the HTLD. The projects in this program element allow the fastest possible upgrade of our light forces and will have a positive impact on our rapid deployment capabilities in the late 1980s. Technology refined for the HTLD will have applications to other Army units, active Army as well as reserve component units.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands) Not Applicable. New program element.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Weapons and Tracked Combat Vehicles[1]						
Funds (current requirements)	5200	- 0 -	2500	19600	327200	348500
Quantities (current requirements)	190	- 0 -	72	340	9074	9676
Ammunition Procurement, Army[2]						
Funds (current requirements)	- 0 -	- 0 -	- 0 -	- 0 -	Continuing	Not Applicable
Quantities (current requirements)	- 0 -	- 0 -	- 0 -	- 0 -	Continuing	Not Applicable
Other Procurement, Army[3]						
Funds (current requirements)	- 0 -	- 0 -	- 0 -	2800	13791	16591
Quantities (current requirements)	- 0 -	- 0 -	- 0 -	40	118	158

Program Element: #64323A Title: High Technology Light Division (HTLD)

DOD Mission Area: #211 — Direct Fire Combat Budget Activity: #4 — Tactical Programs

[1] (U) Weapons and Tracked Combat Vehicles: FY 1982 funds procure Mark-19 40mm Machine Guns for the High Technology Light Division (HTLD). A reprograming to procure 761 additional machine guns for the HTLD will be submitted in FY 1983. Procurements beyond FY 1983 are for other Army units.

[2] (U) Ammunition Procurement, Army: Outyear procurements are planned for improved conventional ammunition and Smart Munitions to support the mortar program. Up to 200 thousand conventional and 100 thousand Smart Munitions are anticipated to be procured for the HTLD.

[3] (U) Other Procurement, Army: FY 1985 funds procure 40 devices to simulate communications nets. Outyear procurements will obtain a variety of devices to simulate other HTLD tactical activities.

E. (U) RELATED ACTIVITIES: This program element supports the Army's overall initiative to improve combat readiness and effectiveness by infusion of available technology into tactical units through High Technology Test Bed operations. It also relates to all force modernization and equipping programs which field materiel during the 1980s for our light forces. This project is directly related to Program Element #63324A (Army Development and Employment Activity), formerly the High Technology Test Bed, whose purpose is to develop operational concepts and materiel requirements to be fielded under this program element. Other program elements developing systems vital to the High Technology Light Division (HTLD) include Program Element #62733 (Mobility Equipment Technology), Project #AH20 (Mobility Equipment Technology), which performs technical base research applicable to the HTLD tactical deceptions program; Program Element #63635A (Mobile Protected Gun System), Project #D166 (Mobile Protected Gun Far-Term), and Project #D170 (LAV-25 Light Armored Vehicles). The VOLCANO helicopter-deliverable scatterable mine system, which is vital to the employment concepts of HTLD, is to be developed under Program Element #63619, Project #D005 (Landmine Systems) and Program Element #64619 (Landmine Warfare), Project #D016 (Mine Systems). Program Element #23741 (Product Improved VULCAN Air Defense System (Interim Lightweight Air Defense System)), Project #D696 (Product Improved VULCAN Air Defense System (PIVADS)) provides improvements to the towed VULCAN giving the HTLD a needed helicopter-transportable air defense system. Program Element #64702 (Joint Tactical Information Distribution System (JTIDS)), Project #D451 (Army Support of JTIDS) provides the design of prototype equipment for the AWACS Interface.

F. (U) WORK PERFORMED BY: Contractors to be determined; 9th Infantry Division and Army Development and Employment Activity, Ft Lewis, WA; US Army Armament Research and Development Command, Dover, NJ; US Army Tank-Automotive Command, Warren, MI; Harry Diamond Laboratories, Adelphi, MD; US Army Electronic Research and Development Command, Adelphi, MD, and Ft Monmouth, NJ; US Army Armament Readiness Command, Rock Island, IL; US Army Mobility Equipment Research and Development Command, Ft. Belvoir, VA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D268 — HTLD Airborne Warning and Control System (AWACS) Interface:** A requirement exists to equip the HTLD with a direct interface between AWACS and the division. This capability will not exist until an automated Short Range Air Defense (SHORAD) Command and Control (C^2) capability is available in the 1990 time frame. The interface will be used to provide long range early warning, a secondary source of C^2

Program Element: #64328A | Title: High Technology Light Division (HTLD)

DOD Mission Area: #211 — Direct Fire Combat | Budget Activity: #4 — Tactical Programs

data for the Air Defense Artillery Battalion, and access to AWACS intelligence data. The current source of early warning is via the vulnerable communications link from the HAWK which may not accompany the HTLD on all deployments. This is not a duplication of the Adaptable Surface Interface Terminal (ASIT) program which is designed to interface with the High and Medium Range Air Defense units above divisions. This project will purchase two Joint Tactical Information Distribution System (JTIDS) developmental prototype Class 2 terminals which are shown in Program Element #64702 (Joint Tactical Information Distribution System (JTIDS)), Project #D451 (Army Support of JTIDS). Because of the urgency to field the system in FY 1986 a reprograming request is being made to purchase the JTIDS Class 2 terminals and initiate software development in FY 1983. Other FY 1983 efforts include initialing hardware integration and operator interface for the up link.

2. (U) D347 — HTLD Heavy Mortar Program: This program element provides mobile, heavy mortar, and ammunition to support maneuver elements of the High Technology Light Division. An FY 1983 reprograming request will be used to initiate this program. The effort will include development of a towing carriage and a training round for the 4.2 inch mortar. The ranges of smoke and illumination ammunitions will be increased, and testing will be accomplished to confirm compatibility of the standard M64 sight and the M734 Multi-option fuze. Field Manual updates will be made to reflect system changes. This technology would be applicable to equipment in other active Army units as well as the Reserve Components and National Guard and would be transferable as part of the Equipment Upgrade initiative.

3. (U) D348 — HTLD Smart Munition (NEW START): Provides a precision-guided mortar projectile for the mobile heavy mortar. Fire-and-forget munitions are significant force multipliers on the battlefield and will provide the light forces commander with a lethal capability to engage and defeat otherwise overpowering armor threats. FY 1984 funding will provide tactical design definition, initial hardware fabrication and prototype development, as well as component and subsystem evaluation and tests (seeker, guidance and control mechanism, electronic processes, warhead, airframe). This will be a competitive, two contractor development effort. In FY 1985 and FY 1986, design, prototype fabrication and contractor testing will be accomplished with Development and Operational Tests scheduled for FY 1987.

4. (U) D349 — HTLD Long-Range Electro-Optic System (NEW START): The proposed funds will be used for purchase of Low-Light-Level TV System, including TV control, and sensors. Development efforts will include integration of the hardware to ensure compatibility and system integration into a vehicle. The system will play a vital role in allowing the field commander the capability to "see deep" into his area of influence.

5. (U) D350 — HTLD Deception Devices (NEW START): This project is necessary to provide a tactical deception, capability for the High Technology Light Division (HTLD). The HTLD will employ an organic tactical deception unit to achieve surprise, enhance survivability and optimize combat power by deceiving the enemy concerning the time, nature, location, or objective of tactical operations. This project provides the rapid development of material needed to deceive the enemy by simulating or duplicating the physical, thermal, and electronic signatures of friendly units including equipment and communications nets. Exploratory developments and concept definition accomplished in the tech base in FY 1983 provide the technical approaches that will start engineering development in FY 1984. In FY 1984, preliminary and initial designs of the single and multiple net

Program Element: #64323A Title: High Technology Light Division (HTLD)

DOD Mission Area: #211 — Direct Fire Combat Budget Activity: #4 — Tactical Programs

communications deception devices will be completed and full-scale development prototypes fabricated. Development and operational testing of the single net communications deception device will be initiated. Development will begin on deception materiel to simulate a deep airmobile assault and other tactical operations. Initial designs of the devices that will simulate the signatures of combat forces and active airmobile force landing zones will be completed. First-generation prototypes of these items will be fabricated, tested, and evaluated. Initial design of devices to simulate the airborne aspects of the air assault will continue during FY 1984, and first-generation prototypes will be fabricated for follow-on test and evaluation in FY 1985.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64324A

Title: Joint Tactical Missile System (JTACMS) (Formerly Corps Support Weapons System)

DOD Mission Area: #223 — Close Air Support and Interdiction

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	11857	6086	50160	126512	Continuing	To Be Determined
D302	Joint Tactical Missile System (Army)	11857	6086	50160	126512	Continuing	To Be Determined

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: There is a requirement at corps to interdict and destroy second-echelon enemy forces. The Joint Tactical Missile System (Army) is envisioned as an improved nuclear, conventional, and chemical weapon system to attack targets of importance to the corps at ranges beyond the capability of cannons and rockets. It will be a replacement for, or a modification of, the existing nuclear and nonnuclear-capable Lance. (Note: This program was formerly contained in PE #63320A).

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	11857	6086	50160	Continuing	To Be Determined
Funds (as shown in FY 1983 submission)	10727	6103	TBD	Continuing	To Be Determined

The funding for FY 1982 was increased by $1130 for the Assault Breaker Technology Demonstration Program. The funding decrease of $17 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The FY 1983 summary contained no funds in FY 1984 and FY 1985. The Under Secretary of Defense for Research and Engineering has restructured the Army's CSWS program (formerly

Program Element: #64324A

Title: Joint Tactical Missile System (JTACMS) (Formerly Corps Support Weapons System)

DOD Mission Area: #223 — Close Air Support and Interdiction

Budget Activity: #4 — Tactical Programs

PE #63320A) and the Air Force's CSW program into a single joint Army/Air Force program with Army lead. This restructuring could cause changes ... the above estimates as the joint aspects of the program are completed. The joint program is now called the Joint Tactical Missile System (JTACMS).

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Program Element (PE) #62702E (Defense Advanced Research Projects Agency (DARPA)); (Tactical Technology), PE #62303A; PE #62711E (Army Missile Command's Terminally Guided Submissile (TGSM) and SKEET target-sensing submunition work); (the Air Force's Wide Area Antiarmor Munitions (WAAM) Program PE #64613F; (Air Force's Precision Location Strike System (PLSS)) PE #64742F; (JTACMS (Air Force)) PE #64324F; (Warhead technology associated with the Lance Missile System: Multiple Launch Rocket System (MLRS), Terminal Guidance Warhead (TGW)), PE #63303A; Project D216 (target acquisition/surveillance technology associated with the Joint Surveillance and Target Attack Radar System (Joint STARS)), PE #64770A and PE #64770F; (Air Force's Joint STARS Advanced Development) PE #63770F; PE #63604A, Project D135 (Nuclear Development Support) (for integration of nuclear warhead design); PE #63615 (Lethal Chemical); PE #64610 (Lethal Chemical Missile Warhead (this PE not funded in FY 1983 or FY 1984)); and missile booster technology associated with the Lance and Patriot missile systems. The technology from the Assault Breaker demonstration will be considered for any JTACMS antiarmor warhead and the MLRS/TGW. Capabilities of the above systems will be complementary in nature.

F. (U) WORK PERFORMED BY: Sperry Gyroscope, Clearwater, FL; SAI, Science Application, Inc., Huntsville, AL; Analytics, Willow Grove, PA; Computer Sciences Corp., Huntsville, AL; EAI, Electronics Associates, Inc. West Long Branch, NJ are the main contractors. Twelve smaller contracts totaling $1,082,108 were also awarded. In-house participants were the US Army Armament Research and Development Command, Dover, NJ; US Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD; US Army Atmospheric Sciences Laboratory, Adelphi, MD; US Army Ballistic Research Laboratory, Aberdeen Proving Ground, MD; US Army Chemical Systems Laboratory, Aberdeen Proving Ground, MD; US Army Training and Doctrine Command, Fort Monroe, VA; CSWS Special Task Force, Fort Sill, OK; US Army Tank-Automotive Command, Warren, MI; US Army Chemical School, Ft McClellan, AL; US Army White Sands Missile Range, NM; US Army Training and Doctrine Command Systems Analysis Activity, White Sands Missile Range, NM; US Army Engineers Waterways Experiment Station, Vicksburg, MS; Defense Nuclear Agency, Washington, DC; Hanscom Air Force Base, MA; Eglin Air Force Base, FL; Air Force Wright Aeronautical Laboratories, Wright-Patterson Air Force Base, OH; Government Services Administration, Interagency Data Systems Facility, Huntsville, AL; Department of Energy Nuclear Weapons Development Laboratories, Livermore, CA, Albuquerque, NM, Los Alamos, NM.

Program Element: **#64324A**

Title: **Joint Tactical Missile System (JTACMS) (Formerly Corps Support Weapons System)**

DOD Mission Area: **#223 — Close Air Support and Interdiction**

Budget Activity: **#4 — Tactical Programs**

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D302 — Joint Tactical Missile System (Army)**

a. **(U) Project Description:** The Joint Tactical Missile System (Army) will be a replacement for, or modification of, the existing nuclear and nonnuclear-capable Lance. JTACMS (Army) is envisioned as an improved conventional, nuclear, and chemical weapon system to attack targets of importance to the corps at ranges beyond the capability of cannons and rockets. A Department of the Army Special Task Force (STF) was convened in March 1981 to evaluate corps indirect firepower requirements and conduct exploration, analysis, and selection of alternative concept solutions to refine the needs described in the mission element need statement. The results of their efforts will be used by the Army and Air Force to define and then merge their requirements into a Joint Statement of Operational Requirement (JSOR). The objective of the joint development is to field a basic missile with maximum commonality of subsystems that meets the needs of both Services.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** A draft requirements document has been prepared and a preliminary cost and operational effectiveness analysis conducted on six possible alternatives. The Army has continued its participation in the Assault Breaker Technology Demonstration by reducing and analyzing the Assault Breaker data; by conducting nuclear, conventional, and chemical warhead analysis; and by conducting analysis of targets, ranges, and effects on the targets with selected system alternatives.

(2) **(U) FY 1983 Program:** Formation and staffing of the Joint Program Office. Complete Inter-Service and Department of Defense secretarial coordination of Joint Statement of Operational Requirement (JSOR). Designate Source Selection Authority for Full-Scale Engineering Development (FSED), and prepare and process secretarial Determination and Findings and Acquisition Plan for FSED. Continuation of analyses related to Assault Breaker Technology Demonstration, nuclear and chemical warheads, alternative conventional warheads, infrared and millimeter-wave sensors, ground support equipment, flight simulators, countermeasures, command/control/communications/intelligence interfaces, and early resolution of design/packaging issues.

Program Element: **#64324A**

Title: **Joint Tactical Missile System (JTACMS) (Formerly Corps Support Weapons System)**

DOD Mission Area: **#223 — Close Air Support and Interdiction**

Budget Activity: **#4 — Tactical Programs**

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Prepare and release draft Request for Proposals (RFP) on FSED to industry for comment, after considering comments received, prepare and release formal RFP. The final designs for the joint air vehicle, warhead, and ground support equipment will be initiated. The FSED contract will be awarded and FSED begun. Fabrication of test missiles will begin. The plan for integrating all subsystem components and interface requirements will be completed. Plan for production line, facilities, and support requirements will be updated and completed. Planning will be conducted for the qualification testing of hardware and for developing the long-lead (LLP) listing.

(4) **(U) Program to Completion:** Continue the development of joint weapons interface, ground/air launch and support systems. Conduct Development Tests/Operational tests and evaluate systems performance. Conduct Milestone Decision Reviews and make production decision; field the new systems at the earliest possible date.

c. **(U) Major Milestones:**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Begin Assault Breaker Technology Demonstration	April 1978	April 1978
Mission Element Need Statement (MENS) Approval	April 1981	April 1981
Begin Special Task Force	March 1981	March 1981
Joint Program Directed	Jun 1982	N/A
Complete Assault Breaker Technology Demonstration	Dec 1982	Oct 1982
Army Systems Acquisition Review Council	TBD	Jun 1984
Defense Systems Acquisition Review Council	TBD	TBD

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64601A

Title: Infantry Support Weapons

DOD Mission Area: #211 — Direct Fire Combat

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	11478	3688	4576	3021	Continuing	Not Applicable
D029	Lightweight Company Mortar System (LWCMS)	1106	585	897	300	- 0 -	23607
D030	Multipurpose Ammunition	234	1368	3022	- 0 -	- 0 -	4624
D031	25mm Ammo PIPs	- 0 -	64	- 0 -	2721	- 0 -	2785
D032	High Explosive Antiarmor Grenade	1279	- 0 -	- 0 -	- 0 -	- 0 -	1649
D033	Improved Law	40	- 0 -	- 0 -	- 0 -	- 0 -	40
D144	Smoke Mortar Rounds	3268	1671	657	- 0 -	- 0 -	7140
D227	Battalion Mortar System	5531	- 0 -	- 0 -	- 0 -	- 0 -	20067

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program supports development to improve the performance and effectiveness of Army mortar systems and other infantry support weapons. Mortar systems provide the small-unit ground commanders with their own responsive, high-angle, indirect fire support capability. The 81mm battalion mortar system will provide the battalion commander with a weapon system capable of achieving greater range, greater lethality, a higher sustained rate of fire, improved stability, and enhanced illumination over the current 81mm mortar. The current smoke cartridge for the 81mm mortar, in use since the 1940s, is lacking in screening capability. The addition of a long-lasting screening smoke cartridge with greater range at the battalion level will provide the ground commander with a greatly improved battlefield obscuration capability. Multipurpose ammunition employs a fuzeless technology developed in Norway to provide a significant increase in explosive and incendiary effects against light armor and aircraft targets at a reduced cost. Rights to produce this ammunition have been obtained to facilitate application of the technology to US weapons. This fuzeless ammunition technology will be developed in 25mm and 40mm sizes for tri-Service application. Project D031 will support the Army's effort to improve a 25mm cartridge that will provide a significant increase in engagement and standoff range capabilities against enemy light armor threats for the fighting vehicle system.

Program Element: #64601A Title: Infantry Support Weapons

DOD Mission Area: #211 — Direct Fire Combat Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	11478	3688	4576	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	11707	5601	4870	Continuing	Not Applicable

Decrease of $229 thousand in the FY 1982 funding level is a result of revised civilian pay pricing indices. The funding decrease of $1913 thousand in FY 1983 is the result of reprograming for the High Technology Light Division, the termination of development of the High Explosive Anti-Armor Grenade, and a pro rata application of general Congressional reductions to the RDTE,A appropriation. Decrease of $294 thousand in FY 1984 funding results from restructuring of resources within the project and revision of estimates required for project development.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Weapons and Tracked Combat Vehicles, Army						
Mortar, 81mm, XM252						
Funds (current requirements)	- 0 -	- 0 -	- 0 -	39300	126700	166700
Quantities (current requirements)	- 0 -	- 0 -	- 0 -	1097	3388	4515

Program Element: #64601A Title: Infantry Support Weapons

DOD Mission Area: #211 — Direct Fire Combat Budget Activity: #4 — Tactical Programs

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Procurement Ammunition, Army						
Cartridge, 60mm, LWCMS, (all types)						
Funds (current requirements)	20000	3100	20200	27400	Continuing	Continuing
Quantities (current requirements)	130000	2300	148000	258000	Continuing	Continuing
Cartridge 81mm, Improved (all types)						
Funds (current requirements)	- 0 -	- 0 -	5100	93100	Continuing	Continuing
Quantities (current requirements)	- 0 -	- 0 -	21	404000	Continuing	Continuing

Fielding of battalion mortar system has been delayed from FY 1985 to FY 1987 so that the full family of improved ammunition to include US-developed smoke and illumination can be fielded with the mortar. This delay in planned fielding caused a deletion of funding in FY 1982, FY 1983, and FY 1984. FY 1982 funds the High Explosive round only. The quantity decreased and funds increased due primarily to settlement of claims against the Government by fuze and increment container contractors. FY 1983 program funds and quantities are reduced due to deletion of requirement for HE w/gutted multioption fuze (MOF), for training. FY 1984 program funds and quantities are reduced due to deletion of HE/gutted MOF and new training round for which initial procurement is in FY 1985.

E. (U) RELATED ACTIVITIES: These developments will also satisfy the US Marine Corps' requirements for a mortar and mortar ammunition. Full coordination of this development with the Marine Corps continues. Program Element (PE) 63606A, Weapons and Ammunition, Lightweight Company Mortar System (LWCMS), supported advanced development of the LWCMS except for the multioption fuze. PE 63613A, Advanced Fuze Design, supporting the advanced development of the multioption fuze, XM734. PE 64602A, Field Artillery Ammunition, supported engineering development of the fuze initially until it was transferred to this PE in FY 1974. PE 63613A, Advanced Fuze Design, supported the advanced development of an electronic time fuze for one year in FY 1978 in order to demonstrate that technology is in hand to provide an electronic time fuze for the LWCMS

Program Element: #64601A Title: Infantry Support Weapons

DOD Mission Area: #211 — Direct Fire Combat Budget Activity: #4 — Tactical Programs

illuminating round. PE 63627A, Combat Support Munitions, supported advanced development of 81mm smoke mortar round. The British L16A2 evaluation has undergone feasibility testing under PE 65709A, Exploitation of Foreign Weapons. PE 63628A D007, Field Artillery Ammunition and Fuzes, and PE 64628AD250, Indirect Fire Training Munitions, support development of full range (6.4) and 1/10 range (6.3) Low Cost Indirect Fire Training Rounds (LITR) for 60mm LWCMS and I81mm systems. The multipurpose ammunition has been evaluated under PE 62617, Small Caliber and Fire Control Technology, and PE 65714D, International Materiel Evaluation. PE 63633, Long-Rod Penetrator, supports the 25mm PIP effort.

F. (U) WORK PERFORMED BY: In-house efforts are accomplished by the US Army Armaments Research and Development Command, Dover, NJ; US Army Test and Evaluation Command, Aberdeen, MD; and Harry Diamond Laboratories, Adelphi, MD. Major contractors are: Eastman Kodak, Rochester, NY; Bergman Manufacturing, Garland, TX; Ruoff, Inc., Runnemede, NJ; Norris Industries, Los Angeles, CA; International Telephone and Telegraph Research Institute, Chicago, IL; the United Kingdom Royal Ordnance Factories; and A/S Raufoss Ammunisjonsfabrikker, Norway.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D029 — Lightweight Company Mortar System (LWCMS):** Engineering Development of the XM721 illumination round with M65A1E1 fuze was initiated in FY 1982, including preparation of preliminary TDP, award of ED contract, completion of tail cone integrity ballistic testing, and initiation of projectile testing. ED will continue in FY 1983 with completion of component and complete round engineering tests, and FY 1984 with procurement of DT/OT II hardware and initiation of DT/OT II.

2. **(U) D030 — Multipurpose Ammunition:** The Norwegian multipurpose family of ammunition has been designed, developed, produced, and marketed by the Norwegian firm A/S Raufoss Ammunisjonsfabrikker. The ammunition is designed to be multipurpose because of its effectiveness against aircraft targets, light armor, and unarmored ground targets. The round employs two incendiary fills and an HE charge. The round is detonated by impact and requires no fuze. The greatest feasibility of employing multipurpose ammunition in the US Army appears to be for ammunition for the 25mm Bushmaster and 40mm DIVAD. This technology could eliminate the costly fuzes now required on this ammunition while providing a superior performance. In August 1982, an advanced development contract was awarded to Raufoss A/S for the m urpose ammunition in 25mm for application to the Bradley Fighting Vehicle. The FY 1982 program will award a competitive contract (continental US (CONUS)) for a mechanical interrupter for application to the 25mm Multipurpose Trace Self Destruct (MPT-SD) cartridge. In FY 1983, a competitive contract will be awarded to a CONUS producer for the engineering development and fabrication of DT II/OT II qualification, for 25mm MPT-SD cartridge. This effort will be the completion of the Technology Transfer Fabrication & Test (TTF&T) for Multipurpose Cartridge (MPC). The FY 1984 program will award a competitive contract to a CONUS producer for the engineering development and fabrication of DT II /OT II hardware for the 40mm MPT-SD cartridge for DIVAD. This technology will be explored for use in other 25mm to 40mm systems currently in use by US active and reserve component forces.

Program Element: #64601A

Title: Infantry Support Weapons

DOD Mission Area: #211 — Direct Fire Combat

Budget Activity: #4 — Tactical Programs

3. (U) D032 — High Explosive Antiarmor Grenade: The HAG will enhance the infantry close-in antiarmor capability. Continued development is not funded due to an Army decision to fund higher priority projects.

4. (U) D144 — Smoke Mortar Rounds: Smoke mortar cartridges are required to provide small-unit ground commanders at the company and battalion levels with their own responsive screening capability. Current smoke cartridges were developed before and during World War II and do not provide the rapid, long-lasting, extended-range screening capabilities required on the modern battlefield. The purpose of this project is to support the engineering development (ED) of improved mortar smoke screening cartridges. During FY 1982, the XM819 81mm smoke mortar cartridge was continued, the redesign of the propellant/igniting cartridge was completed, and the procurement of 3600 cartridges for Development Test/Operational Test II (DT/OT II) was initiated. Engineering design testing will be completed, and DT/OT II will be initiated during FY 1983. During FY 1984, DT/OT II will be completed, and the cartridge will be type classified.

5. (U) D227 — Battalion Mortar System: The FY 1982 codevelopment effort resulted in the design, fabrication, and test of a blast attenuation device and water-resistant propellant system and Development Test II (DT II). Mounts for vehicle application were fabricated and tested. Integrated logistic support items were updated. Operational Test II was conducted to confirm the suitability of the system. The technical data package was prepared, and a producibility engineering and planning effort undertaken for US production of the 81mm high-explosive round.

6. (U) D031 — 25mm PIPs: Project was not funded in FY 1982. FY 1983 funding supports conduct of testing for extended range sensitivity on the HEI-T (High Explosive Incendiary Tracer) fuze on 25mm ammunition to determine fuze reliability. FY 1984 is not funded.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64603A

Title: Nuclear Munitions

DOD Mission Area: #241 — Battlefield Theater Nuclear Warfare

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	33864	29054			Continuing	Not Applicable
	QUANTITIES	*	*	*	*		*
D385	Improved 155mm Nuclear Projectile	31702	27373				
D584	Command Control and Security Systems	1912	1681	1005	- 0 -	Continuing	Not Applicable
D663	Improved 8-in Nuclear Projectile	250	- 0 -	- 0 -	- 0 -	- 0 -	48850

* Warhead quantities exceed the classification of this document.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The mission of the Theater Nuclear Force (TNF) is to deter both nuclear and conventional attack by enemy forces, and should deterrence fail, to support the defense of the theater. . This program element is the foundation of the program to complete the modernization of the Army's battlefield nuclear weapons by improving the 8-inch and 155mm artillery-fired atomic projectiles (AFAP). The NATO cannon artillery force structure is predominantly (80%) 155mm, and the 8-inch AFAP alone or with the old 155mm AFAP will not provide an adequate cannon-delivered nuclear capability. The combined US and non-US NATO forces have only about deployable 8-inch cannon, versus approximately deployable 155mm cannon. Some countries have only a small number of 8-inch cannon, and others have . The 155mm AFAP program has from its initiation been developed in conjunction with, and in consideration of, the Allied interest. A modernized nuclear projectile capability is required to replace the 155mm and operationally limited 8-inch artillery-fired atomic projectiles (AFAP) currently available for NATO forces. This program element also supports the development of prototype Weapons Access Delay System (WADS) barriers and access-inhibitors which will be installed in nuclear weapons storage igloos in Europe and in test structures in the US.

Program Element: #64603A

Title: Nuclear Munitions

DOD Mission Area: #241 — Battlefield Theater Nuclear Warfare

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	33864	29054		Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	33920	29136		Continuing	Not Applicable

(U) The $56 thousand decrease in FY 1982 is a net result of: decrease of $1196 thousand in project D385 to accommodate an 11-month initial operational capability slip necessitated by Congressional reductions in the Department of Energy long-lead production budget request; increase of $890 thousand in project D584 to accelerate development of security hardware for nuclear weapon storage sites; and an increase of $250 thousand in project D663 for 2 full-function projectile firings needed by the Department of Energy to complete development qualification. The funding decrease of $82 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. A $221 thousand increase in FY 1984 is a net result of: increase of $3522 thousand in project D385 to fund increased engineering design test (reducing program risk) and to develop an integrated control unit that will combine in one piece of hardware the functions of fuze setting, command disable, and permissive action link operations; and a decrease of $3301 thousand in project D584 due to the expected completion in FY 1984 ahead of schedule and below cost.

Program Element: #64603A

Title: Nuclear Munitions

DOD Mission Area: #241 — Battlefield Theater Nuclear Warfare

Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Ammunition Procurement, Army 155mm Funds (current requirements)	- 0 -	- 0 -				
Department of Energy funding to support 155mm program						
Ammunition Procurement, Army — 8-inch: Funds (current requirements)	16100	14400				
Department of Energy funding to support 8" program						
Ammunition Procurement, Army — Weapons Access Delay System Funds (current requirements)	68	2067	16490	6500	7500	32625

Program Element: #64603A

Title: Nuclear Munitions

DOD Mission Area: #241 — Battlefield Theater Nuclear Warfare

Budget Activity: #4 — Tactical Programs

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army —						
Weapons Access Delay System Funds (current requirements)	- 0 -	- 0 -	19000	1915	13000	33915

Warhead quantities exceed the classification of this document. Department of Energy costs are for total planned stockpile life, to include maintenance and tritium replacement.

The $40500 thousand decrease in total estimated procurement costs for the Improved 155mm Nuclear Projectile from FY 1983 to FY 1984 is due to savings associated with procuring the integrated control unit rather than separately procuring permissive action link controllers, fuze setters, and command disable controllers ($30 million) and refinement of production cost estimates ($10.5 million). The $22100 thousand increase in total estimated procurement costs for the Improved 8-inch Nuclear Projectile from FY 1983 to FY 1984 results from a Department of the Army decision to equip all reserve component eight-inch units for the nuclear mission with the M753 improved 8-inch nuclear projectile.

E. (U) **RELATED ACTIVITIES:** The development of improved nuclear projectiles is a joint Department of Defense (DOD) and Department of Energy-Defense Programs (DOE-DP) undertaking. In addition, the 8-inch nuclear projectile (Project D663) uses the rocket motor developed for the M650 conventional 8-inch projectile (SSN E69600). The M650 is the conventional ballistic mate that will be used to derive firing data corrections for the XM753. The M549 conventional round will be used to derive firing data corrections for the improved 155mm nuclear projectile. Items in this program element progress to engineering development where applicable from Program Element 63604A (Nuclear Munitions and Radiacs). All Army nuclear munitions projects are coordinated through the Project Manager for Nuclear Munitions as well as the Army Staff to preclude duplication of effort.

F. (U) **WORK PERFORMED BY:** US Army Research and Development Command (ARRADCOM), Dover, NJ; Harry Diamond Laboratories, Adelphi, MD; Army Material and Mechanics Research Center, Watertown, MA; Ballistics Research Laboratory, Aberdeen, MD; Department of Energy-Defense Program activities and contractors in Germantown, MD; Albuquerque, NM; Amarillo, TX; Kansas City, MO; Los Alamos, NM; Las Vegas, NV; Livermore, CA; Denver, CO; Aiken, SC; Ferrulmatics Inc., Patterson, NJ; Chamberlin Corporation, Waterloo, IA; Motorola Corporation Incorporated, Scottsdale, AZ.

Program Element: #64603A

Title: Nuclear Munitions

DOD Mission Area: #241 — Battlefield Theater Nuclear Warfare

Budget Activity: #4 — Tactical Programs

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D584 — Command, Control, and Security System: This project funds development of the Weapons Access Delay System (WADS). WADS consists of a series of components designed to delay terrorist or other intruders attempting to gain access to overseas nuclear weapon storage sites. WADS imposes a guaranteed minimum delay to allow security backup forces time to react to engage unauthorized site intruders. This program is in response to an urgent theater requirement to increase security beyond that provided in the Long-Range Security Program (LRSP) storage site upgrade. WADS will be applied to nuclear weapon storage sites in Europe which are of differing configurations. Thus, WADS application will differ from site to site, depending on a local assessment of the site being upgraded. The stateside project manager is tasked to develop technical data packages for a series of components which together provide the minimum delay. The technical data packages, when approved by the Department of the Army, are released to the theater, where subsequent application is made in a manner dependent on the in-theater site assessment. The majority of WADS components will be locally procured in Europe, and will be funded in the Military Construction, Army account. In FY 1982, technical data packages were completed for an external Z-cage, a portable weapon tiedown, and a concertina blanket. In FY 1983, technical data packages will be completed for the pneumatic deadbolt door-locking system, the pallet cage, weapon tiedowns, and an alignment lock system. The project will terminate in FY 1984, when development testing is completed. Because of the urgency of need, technical data packages are released to Europe on a component-by-component basis (immediately after Department of the Army approval) to accelerate the site upgrade process.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D385 — Improved 155mm Nuclear Projectile**

a.(U) Project Description: The objective of this project is the development of an improved 155mm Nuclear Projectile, the XM785, to replace the current 155mm Artillery-Fired Atomic Projectile (AFAP) that is Soviet-Warsaw Pact (WP) tactical doctrine is based on massing maneuver forces to achieve a numerical superiority ratio of at the decisive point in battle and to support their maneuver forces with massive firepower. Overall Soviet-WP maneuver forces outnumber NATO maneuver forces by about , their cannon artillery outnumbers NATO cannon artillery by more than and their maneuver forces are highly mobile with armored protection. AFAPs give NATO forces an additional battlefield fire support capability to counter the massive Soviet-WP forces. AFAPs degrade the Soviet offensive capability by forcing them to disperse their combat formations. A credible AFAP war-fighting capability helps to deter conventional conflict while providing the capability for direct defense and deliberate escalation within NATO's flexible response strategy. The low yield short range of the current 155mm AFAP limit and restrict its utility. Numerous comprehensive analyses by the Army, Office of the Secretary of Defense, Department of Energy, and the Defense Science Board have all concluded that both a modernized 8-inch AFAP and a modernized 155mm AFAP are essential to a credible battlefield nuclear capability. The NATO cannon artillery force is predominantly (80%) 155mm with some NATO countries maintaining only a token number of 8-inch cannons which are primarily employed in the nuclear role. A modernized AFAP capability in both 8-inch and 155mm cannon systems will insure adequate availability of nuclear delivery units throughout the NATO

Program Element: #64603A

Title: Nuclear Munitions

DOD Mission Area: #241 — Battlefield Theater Nuclear Warfare

Budget Activity: #4 — Tactical Programs

theater of operations, and will enhance overall survivability of the theater nuclear force by complicating enemy efforts to target nuclear forces. The 155mm AFAP project has been developed from the beginning in conjunction with and in consideration of Allied interests. Based on the public knowledge of this ongoing modernization, the NATO Allies have The modernized 155mm AFAP will have a yield times greater than the 1950s technology could provide in the old 155mm AFAP and will provide times the lethal coverage. With rocket-assist, it will achieve approximately the range of the old 155mm AFAP allowing increased standoff from Soviet cannon artillery. The modernized 155mm AFAP will have an improved radar fuze which will produce a more accurate height-of-burst and provide a greater assurance of precluding fallout than exists in the current 155mm projectile. Firing data corrections derived from firing conventional ammunition will reduce the delivery probable errors by or more compared to the method of calculated corrections used for the current 155mm AFAP. Finally, weapon control on the new AFAP will be provided by an electromechanical multiple-code coded switch permissive action link (PAL) instead of a mechanical lock, and security will be improved by an integral nonviolent command disablement system.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** The Titanium Verification Ballistic Projectile (TVBP) program through which ballistic similitude with the M549 conventional projectile will be demonstrated, was initiated. Fuze structural and functional tests, shipping and storage container tests, and rocket motor safety and ground safety tests were continued. The FH70 NATO cannon in-bore environments were characterized, and verification testing for qualification of the 155mm nuclear projectile for NATO cannons was initiated. Development of an integrated control unit (ICU) was initiated. The ICU will combine the functions of command disable, fuze setting, and the permissive action link into a single component. A cost avoidance of $30 million in procurement will result from the ICU development.

(2) **(U) FY 1983 Program:** Continue the TVBP firing program to demonstrate ballistic similitude with the M549 projectile. Initiate DOD-DOE joint full-function testing (JFF-1) to examine the compatibility of the fuze-warhead interface. Continue verification testing for NATO cannons. Continue fuze structural and functional ballistic tests. Conduct ballistic similitude firings with a functional fuze aboard. Continue development of the ICU. Continue shipping and storage container tests, and rocket motor safety and ground safety tests.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Complete qualification of the improved 155mm nuclear projectile for use with NATO cannon. Complete fuze structural and functional testing. Initiate JFF-2 testing to evaluate the performance of the warhead and fuze over the full range of use conditions. Develop the firing tables for the M109A1, M198, and M114A2 155mm howitzers. Complete shipping and storage container tests and rocket motor safety and ground safety tests. Initiate Development Test II.

Program Element: #64603A

Title: Nuclear Munitions

DOD Mission Area: #241 — Battlefield Theater Nuclear Warfare

Budget Activity: #4 — Tactical Programs

(4) **(U) Program to Completion:** Complete DT/OT II, the firing table flight program, and environmental testing in FY 1985, FY 1986. Type classify Army components in FY 1985 and the total system in FY 1987. Achieve initial operational capability

c. **(U) Major Milestones:**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Army requested joint Department of Defense-Department of Energy (DOD-DOE) Engineering Development of new 155mm Nuclear Projectile	May 1977	May 1977
OSD forwarded request to DOE	Oct 1977	Oct 1977
DOE accepted request (Initiated Phase 3)	Feb 1978	Feb 1978
DOE underground nuclear test proves technology		
In-Process Review (IPR) to approve Acquisition Plan	Mar 1979	Mar 1979
DOE underground nuclear test proves weaponization		
Begin development testing/operational testing (DT/OT II)	2Q FY 1984	2Q FY 1983
Development Acceptance (DEVA) IPR (DOD components only)	2Q FY 1985	2Q FY 1985
First DOE Production Unit		

Program Element: **#64603A** Title: **Nuclear Munitions**

DOD Mission Area: **#241 — Battlefield Theater Nuclear Warfare** Budget Activity: **#4 — Tactical Programs**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Type Classify Total System (DOD & DOE components)	3Q FY 1986	3Q FY 1986
First War Reserve Hardware Available for DOD		
Initial Operational Capability (IOC)		

(U) The-one year delay in beginning DT II/OT II results from the 11-month program slip associated with the Congressional reduction in the Department of Energy (DOE) FY 1982 budget request. The milestone adjustment was not reflected in the FY 1983 budget request due to an administrative oversight. The impact of Congressional reductions in the Department of Energy FY 1982 supplemental budget request and the adverse impact associated with the FY 1983 continuing resolution are not reflected in the current milestone dates. The delay of one quarter in achieving Initial Operational Capability results from a Congressional reduction in the DOE FY 1983 capital budget request.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64604A** Title: **Mobility**

DOD Mission Area: **#216 — Intratheater Land Transport** Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	- 0 -	4437	12829	6010	23276
	QUANTITIES						33
D403	Medium Tactical Truck	- 0 -	- 0 -	4437	12829	6010	23276

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: *The Medium Tactical Truck (MTT) Program will develop a family of vehicles to* meet critical Army and other Services' combat support and combat service support mission requirements in the medium-weight class. The MTT will be a fuel-efficient, diesel-powered, highly mobile tactical truck using the latest technology of the automotive industry and will replace the current standard, 6x6, 2-1/2-ton truck series, whose basic design has remained stable since 1951. The MTT will also fill requirements that overload the nominal 5/4-ton class. A replacement family for the aging 2-1/2-ton fleet is essential to meet military operational requirements and various Federal performance and safety standards. The current fleet will be 90% over 15 years of age and nearly 50% over 20 years of age by 1987. The MTT will serve the Army and other Services well into the 21st century. Typical mission requirements include communications shelter transport, maintenance and repair parts movements, unit mobility tasks (unit equipment, supply, mess) and airborne and air assault division weapons prime mover vehicle. (The MTT will be air droppable as well as air transportable.) To the maximum extent possible, existing advanced commercial and military components will be used in the MTT. A required operational capability document will be approved in 1983. The new vehicle family of modern design will provide the required mobility, capability, and improved performance at a lower operating and procurement cost than that of the existing 2-1/2-ton fleet.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands) Not Applicable. This is a new start in FY 1984; there was no FY 1983 submission for this program element.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Related programs include Program Element (PE) #61102A (Defense Research Sciences), Project #AF22 (Research in Vehicle Mobility); PE #62601A (Tank and Automotive Technology); PE #63621A (Combat Vehicle Propulsion System), Project #DG07 (Combat Vehicle Engine Development); and PE #64624A (High Mobility Multipurpose Wheeled Vehicle (HMMWV)). This program is not duplicative of any other such effort within the Army or Department of Defense.

Program Element: **#64604A** Title: **Mobility**

DOD Mission Area: **#216 — Intratheater Land Transport** Budget Activity: **#4 — Tactical Programs**

F. (U) WORK PERFORMED BY: US Army Tank-Automotive Command, Warren, MI, has the responsibility for implementation of this program. It is anticipated that a number of automotive contractors will compete.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D403 — Medium Tactical Truck (MTT) (NEW START): Considering current market/industry capabilities, a concept of a lighter, shorter, highly mobile, diesel-powered, more efficient system will result. A performance specification based on Services' requirements will be developed that is not design intensive but rather that emphasizes use of advanced commercial componentry and manufacturer initiative in responding to the requirement. This specification will be submitted to industry for their proposals. Contractor proposals must include not only technical and configuration requirements, but also development cost, production estimates, and life cycle cost/integrated logistics supportability assessment and projections. A selection process will orient on selecting the three best overall systems from competing contractors. Development contracts will be awarded in FY 1984 with development continuing through 1985 and 1986. Production contract award will be in FY 1987. The competitive prototyping plus price competition for the production contract based on a performance specification will maximize commercial involvement and reduce cost to the Government.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64609A** Title: **Combat Support Systems**

DOD Mission Area: **#215 — Land Warfare Support** Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	648	2633	2106	2826	Continuing	Not Applicable
D191	Smoke Munitions and Materiel	648	2633	2106	2826	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: New and significantly improved smoke/obscurant systems are required to protect US forces from advanced Soviet surveillance and target acquisition devices which operate across the electromagnetic spectrum (from visible to the radar region). The currently fielded US Army smoke systems were largely developed before and during World War II and are not capable of providing the rapid, broadband, long-duration screening required for our armored vehicles, critical installations, assembling forces, and logistical complexes to survive on the modern battlefield. This program element supports the engineering development of new and improved smoke munitions and materiel.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	648	2633	2106	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	3037	2640	4431	Continuing	Not Applicable

The decrease of $2389 thousand in FY 1982 and $2252 thousand of the FY 1984 reduction is largely a result of the decision to change the thrust of the Large Area Screening System effort to emphasize infrared (IR)-defeating rather than visual obscuration and continuing the program in advanced development (Program Element #63727A) through FY 1984 rather than transitioning to engineering development. This decision terminated the XM49 Large Area Screening System and, after reformulation of the development plan, initiated development of the XM52 Large Area Screening System. The original XM49 program included a secondary capability of IR screening, but also required the system to be man-portable. The size and weight restrictions imposed by the manportable requirement made the XM49 less than fully effective in disseminating the heavier IR-screening materiel. A change in

Program Element: #64609A Title: Combat Support Systems

DOD Mission Area: #215 — Land Warfare Support Budget Activity: #4 — Tactical Programs

the user employment concept to vehicular-mounted systems and increased concern about the threat IR capabilities made it both possible and necessary to increase the capacity of the Large Area Screening System. The XM52 is based on the technology developed for the XM49, but provides the increased capability required to effectively disseminate IR-screening materiel. This decision has little impact on FY 1983 since the earlier transition of the XM76 IR Defeating Grenade program to engineering development allowed the Large-Area Screening System funding to be applied to the XM76. The XM76 program was transitioned early to exploit the excellent performance achieved to date in the program and address the increased concern about threat IR weapon sights and guided munitions. The remaining FY 1984 reduction of $73 thousand resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget. The funding decrease of $7 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This program is supported by Program Elements #62622A (Chemical and Smoke Munitions) and #63627A (Combat Support Munitions). In order to meet other Service needs and prevent unnecessary duplication of effort, liasion personnel from each Service monitor the developing agency's programs.

F. (U) WORK PERFORMED BY: The Smoke Systems program is managed by the Project Manager-Smoke/Obscurants. In-house work is performed by Chemical Systems Laboratories, Aberdeen Proving Ground (APG), MD; Test and Evaluation Command, APG, MD; and Armament Materiel Readiness Command, Rock Island, IL. Contractors are Teledyne Continental Motors Corporation, Muskegon, MI, and AAI Corporation, Cockeysville, MD.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D191—Smoke Munitions and Materiel: New and significantly improved smoke/obscurant systems are required to protect US forces from advanced Soviet surveillance and target acquisition devices which operate across the electromagnetic spectrum. This project supports the engineering development (ED) of new and improved smoke munitions and materiel. In FY 1982, the project continued applications of smoke grenade launcher system and the Vehicle Engine Exhaust Smoke System to fielded and developmental vehicles. Smoke grenade launcher application programs were initiated for the DIVAD Gun, Light Armored Vehicle, Mobile Protected Gun, and the Fire Support Team Vehicle. The Vehicle Engine Exhaust Smoke System installation on the M88A1 Medium Recovery Vehicle achieved Initial Operational Capability during FY 1982. During FY 1983, ED will be initiated on the XM76 Infrared (IR) Defeating Grenade, and application of the Vehicle Engine Exhaust Smoke System to DIVAD Gun, Mobile Protected Gun, and Light Armored Vehicle will be continued. The XM76 ED design will be finalized, 2200 grenades will be fabricated for testing, and Engineering Design Testing (EDT) will be conducted. In FY 1984, the XM76 IR Defeating Grenade will complete ED, and support of the Vehicle Engine Exhaust Smoke System applications program will continue. During FY 1984, the XM76 Development Test (DT) II will be conducted, and the grenade will be type classified.

Program Element: **#64609A** Title: **Combat Support Systems**

DOD Mission Area: **#215 — Land Warfare Support** Budget Activity: **#4 — Tactical Programs**

H. (U) PROJECTS OVER $10 MILLION IN FY 1994: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64612A

Title: Countermine and Barriers

DOD Mission Area: #213 — Land Combat Engineer Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1357	5485	5337	4750	Continuing	Not Applicable
D021	Explosive Demolitions	34	- 0 -	- 0 -	- 0 -	Continuing	Not Applicable
D145	Surface-Launched Unit, Fuel-Air Explosive (SLUFAE)	549	- 0 -	1159	- 0 -	- 0 -	28757
D415	Mine Neutralization/Detection	774	5485	4178	4750	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for engineering development of a group of mutually complementary mine detection and neutralization systems. Historically, minefields have proven to be effective combat multipliers used primarily in the defense. Defensive minefields are selected to take advantage of natural obstacles and to stop or canalize attacking forces. Mines are also used offensively for flank protection of advancing formations to deny access to vital terrain and routes of communications. The Warsaw Pact, whose doctrine specifies the use of minefields during both offensive and defensive operations, can emplace minefields rapidly from ground, rocket, and helicopter systems. The current fielded US capability to counter this mining threat is extremely deficient in that it consists of handheld detectors which require a slow point-to-point search and then manual or explosive neutralization of individual mines. Priority is placed on development of detection/neutralization devices and systems which allow friendly forces to maintain the momentum of the attack by rapidly breaching enemy minefields and neutralizing their barrier potential.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1357	5485	5337	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	2974	6192	7677	Continuing	Not Applicable

Program Element: #64612A

Title: Countermine and Barriers

DOD Mission Area: #213 — Land Combat Engineer Support

Budget Activity: #4 — Tactical Programs

The funding decrease of $1617 thousand in FY 1982 reflects delays in starting engineering development (ED) on the portable mine neutralization system (POMINS) and reprograming to higher priority countermine programs. The funding decrease of $707 thousand in FY 1983 is the result of an amended budget submit to support the "greater slope" program as well as Congressional direction in the FY 1983 Appropriations Act. The decrease in FY 1984 funding reflects the delayed transition to ED of the Vehicle Magnetic Signature Duplicator (VEMASID) and POMINS.

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Ammunition Procurement, Army Mine Clearing Line Charge (MICLIC)						
Funds (current requirements)	- 0 -	500	- 0 -	9500	Continuing	Not Applicable
Quantities (current requirements)	- 0 -	- 0 -	- 0 -	500	Continuing	Not Applicable

Procurement of MICLIC beginning in FY 1985 is consistent with the scheduled completion of engineering development. FY 1983 funding permits procurement of sufficient Marine Corps-developed systems to support the requirements of the High Technology Test Bed (HTTB).

E. (U) RELATED ACTIVITIES: Countermine developments in this program element (PE) follow advanced development (AD) efforts in PE #63619A (Landmine/Barrier Systems). Army countermine efforts are closely coordinated with the Armament Systems Directorate, Armaments Research and Development Command (ARRADCOM), Dover, New Jersey, which is responsible for the development of mine fuzes, sensors, kill mechanisms, and logic in PE #63606A (Landmine Warfare and Barrier Development), #63619A (Landmine/Barrier Systems), and #64619A (Landmine Warfare). The US continues to monitor RDTE efforts of foreign nations for technological breakthroughs in the detection and neutralization of landmines. Participation in RDTE efforts of sister Services also pays dividends. The procurement of the USMC-developed Mine-Clearing Line Charge (MICLIC) for testing and possible follow-on procurement is an example.

Program Element: #64612A

Title: Countermine and Barriers

DOD Mission Area: #213 — Land Combat Engineer Support

Budget Activity: #4 — Tactical Programs

F. (U) WORK PERFORMED BY: The US Army Mobility Equipment Research and Development Command (MERADCOM), Fort Belvoir, VA, is assigned responsibility for the Army Countermine and Barrier Program. In-house support is provided by: Naval Weapons Center, China Lake, CA; Naval Surface Weapons Center, White Oak, MD; US Army Test and Evaluation Command, Aberdeen, MD; Yuma Proving Ground, Yuma, AZ; and the US Army Missile Command (MICOM), Huntsville, AL. Contractors include: Honeywell Corporation, Hopkins, MN; Lanson Industries, Cullman, AL; Cubic Corporation, La Jolla, CA; and Martin Marietta, Orlando, FL.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DO21 — Explosive Demolitions:** Funds were expended in FY 1982 to terminate work on blasting agent as a result of changes in the Army priority for this system. The Blasting Agent project has been terminated.

2. **(U) D145 — Surface-Launched Unit, Fuel-Air Explosive (SLUFAE):** Integrated logistics System (ILS) data were completed in FY 1982. Funding through FY 1984 will permit changes in the training round and the shipping and storage container to be finalized. Corrections required by Development and Operational Testing (DT II/OT IIA) will be completed with the final revisions to all technical data sets and corrections to operator and maintenance manuals.

3. (U) **D415 — Mine Neutralization/Detection:** Engineering development continued on the vehicle-mounted mine detector, AN/VRS-5, to include operational testing (OT II) in FY 1982. ED will be initiated on the trackwidth plow, the cleared lane marking system (CLAMS) and the mine-clearing line charge (MICLIC) during FY 1983. This will continue in FY 1984 along with transition into ED of the Portable Mine Neutralization System (POMINS) and the Vehicle Magnetic Signature Duplicator (VEMASID). FY 1984 work will include fabrication of test hardware and conduct of Developmental Test II (DT II) for CLAMS, the design of integrated circuitry for VEMASID electronics, and fabrication of hardware for the trackwidth mine plow.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64616A

Title: Bradley Fighting Vehicle System (BFVS)

DOD Mission Area: #211 — Direct Fire Combat

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	103393	45869	9095	24466	7801	438824*
D258	Bradley Fighting Vehicles (BFV)	103393	45869	9095	24466	7801	438824*

* Includes FY 1981 and prior.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Warsaw Pact doctrine envisions the employment of highly mobile, armor-heavy maneuver forces supported by massive artillery fire and air strikes to rapidly breach enemy defenses and penetrate deep into rear areas. Opposing the numerically superior Warsaw Pact forces is the NATO combined arms team. In the 1980s, the primary US antiarmor system within that team will be the M1 main battle tank. However, in order to defeat the threat, complementary systems within the combined arms team must provide long-range tank-killing capabilities to supplement the M1. The Infantry and Cavalry Fighting Vehicles (IFV/CFV) were developed to increase the firepower and survivability of the mechanized infantry and the armored cavalry in both mounted and dismounted operations. Both the IFV and CFV feature a two-man turret which mounts a stabilized, dual-feed 25mm cannon, a 7.62mm coaxial machine gun, and the Tube-Launched, Optically Tracked, Wire-Guided Missile (TOW) system. The IFV carries a ten-man squad with an adaptation for six Firing Port Weapons (FPW). The CFV carries a five-man squad, has the same armament as the IFV (less the FPW), and is principally designed to accomplish reconnaissance, security, and economy of force operations. Both IFV/CFV are compatible with the M1 Tank System, have an inherent swimming capability, and are air-transportable in the C141 and C5A aircraft.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	103393*	45869	9095	32267	438824
Funds (as shown in FY 1983 submission)	103393*	50488	33512	31419	467012

Program Element: **#64616A** Title: **Bradley Fighting Vehicle System (BFVS)**

DOD Mission Area: **#211 — Direct Fire Combat** Budget Activity: **#4 — Tactical Programs**

* Includes $11.8 million pending Congressional approval of reprograming to Sgt York Air Defense Gun System (DIVAD).

The FY 1983 variance is attributable to Congressional direction in the FY 1983 Appropriations Act. FY 1984 and beyond variances are due to the termination of a program to improve the Bradley Fighting Vehicle TOW missile guidance system, the restructuring of the Energy Hardening product improvement program into Program Element #23735, Combat Vehicle Improvements, and revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Weapons and Tracked Combat Vehicle Procurement, Army:						
Funds (current requirements)	856800	823300	795800	1051700	4891700	9323000
Quantities (current requirements)	600	600	600	830	3752	6882*

Program Element: #64616A

Title: Bradley Fighting Vehicle System (BFVS)

DOD Mission Area: #211 — Direct Fire Combat

Budget Activity: #4 — Tactical Programs

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army						
Funds (current requirements)	4700	42600	22000	6200	14400	89900

*Includes FY 1981 and prior years; does not include initial spares.

The above procurement program combines IFV and CFV under the BFVS program. The FY 1982 requirement in the previous submission includes $11.4M in supplemental funds not appropriated. The funding requirements for FY 1984 and FY 1985 will ramp production to an economical production rate of 90 vehicles per month. A production rate of 50 vehicles per month will be achieved during the FY 1981 funded delivery period.

E. (U) RELATED ACTIVITIES: Funds are provided to Bradley FVS from Project Manager (PM) Multiple Launch Rocket System (MLRS), Program Element #63303A, for development of Fighting Vehicle System MLRS Derivative Vehicle. In addition, modifications to the basis IFV/CFV vehicle and the IFV/CFV 25mm ammunition are funded in Program Element #23735A (Fighting Vehicle Improvements), Project #D332; Program Element #63633A (Long-Rod Penetrator), Project #D164; and Program Element #64601A (25mm Ammo PIPS), Project #D031. Discrete program elements for these requirements preclude duplication of effort within the Army or Department of Defense.

F. (U) WORK PERFORMED BY: The IFV/CFV engineering development is being conducted by FMC Corporation, San Jose, CA. Major subcontractors involved in this program are General Electric, Pittsfield, MA; Cummins Engine Co, Columbus, IN; Hughes Aircraft Co., El Segundo, CA; and Hughes Helicopter Inc., Culver City, CA. Support, as required, is being performed by the US Army Tank-Automotive Command, Warren, MI; US Army Armament Research and Development Command, Dover, NJ; US Army Electronics Research and Development Command, Adelphi, MD; US Army Missile Command, Huntsville, AL; the Project Manager, TOW, Huntsville, AL; and the Project Manager, Training Devices, Orlando, FL.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D258 — Bradley Fighting Vehicle Systems (BFVS): This is the only project in this program element. The purpose of this project is to complete development of the Bradley Fighting Vehicle Systems. FY 1982 accomplishments include major progress on fielding support activities, intensive effort on BFVS training devices and maintenance test equipment, award of effort to analyze Energy Hardening of the BFVS, and initiation of BFVS Initial Production Testing. Primary efforts in FY 1983 are the completion of Unit Conduct of Fire

Program Element: **#64616A** Title: **Bradley Fighting Vehicle System (BFVS)**

DOD Mission Area: **#211 — Direct Fire Combat** Budget Activity: **#4 — Tactical Programs**

training device development, continuation of Turret Maintenance Trainer development, and initiation of the Institutional Conduct of Fire Trainer. Continue development of Test, Measurement and Diagnostic Equipment and Integrated Logistics Support efforts such as Depot Maintenance Work Requirements, manuals for training and vehicle maintenance, and fielding support. FY 1984 program includes completion of the Turret Maintenance Trainer development, continuation of the Institutional Conduct of Fire Trainer, and continuation of Integrated Logistic Support for BFVS fielding. Complete development of the Ventilated Face Piece.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

Program Element: #64616A

Title: **Bradley Fighting Vehicle System (BFVS)**

DOD Mission Area: #211 — **Direct Fire Combat**

Budget Activity: #4 — **Tactical Programs**

I. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. **(U)** The Program Manager for the BFVS is BG Donald P. Whalen, assigned 2 July 1980. The prime contractor is FMC Corporation, San Jose, CA. Some of the major subcontractors/vendors include Hughes Aircraft Corp., Hughes Helicopter Corp., General Electric, and Cummins Engine Co. The development tester is the US Army Test and Evaluation Command (TECOM), and the evaluator is the US Army Materiel Systems Analysis Activity (AMSAA).

b. **(U)** Development Testing (DT) began in January 1974 with the Mechanized Infantry Combat Vehicle (MICV). The MICV/20mm program was terminated in March 1977 after an Army review determined it was not cost effective for development in view of its operational shortfalls. Results of MICV contractor testing were based on completion of 142,000 miles and 140,000 rounds of 20mm ammunition fired. Subsequent contractor testing of the Infantry Fighting Vehicle (IFV) and the Cavalry Fighting Vehicle (CFV) was comprised of 18,000 miles traveled, 118,000 rounds of 25mm ammunition fired, and 66 TOW missiles fired. Contractor testing revealed only minor deficiencies which were all correctable.

c. **(U)** Development Test II (DT II) ran from June 1979 to June 1980 at Aberdeen Proving Ground (APG), MD. Development testing assured that engineering was reasonably complete; that all significant design problems associated with survivability/vulnerability, human factors, and supportability had been identified; that solutions to these problems were at hand; and that all test issues critical to the production decision had been resolved. Critical milestones are listed: Interim Evaluation Report (IER) to the Army Systems Acquisition Review Council (ASARC III) — Dec 79; IER to the Defense Systems Acquisition Review Council (DSARC III) — Jan 80; "Final Report of Development Test II (DT II) of Infantry Fighting Vehicle and Cavalry Fighting Vehicle, US Army Aberdeen Proving Ground," was published by TECOM in February 1981.

d. **(U)** Two IFV and one CFV were tested during DT II. Vehicles were used as weapon-mounted fighting stations as well as troop carriers. Vehicles have two-man turrets which incorporate the 25mm Gun, the 7.62mm Coaxial Machinegun, and the Tube-Launched, Optically Tracked, Wire-Guided (TOW) Missile System. Except for minor design changes, the configuration tested was the one procured. Test Measurement and Diagnostic Equipment (TMDE) and the logistics support system were still being developed and were not available for test during DT II and OT II. The designated TMDE will be evaluated during Initial Production Testing (IPT). The TMDE is comprised of the Built-in Test Equipment (BITE), the Simplified Test Equipment-M1/FVS (STE-M1/FVS), the Direct Support Electrical System Test Set (DSESTS), TOW Subsystem Support Equipment (TSS-SE), and the AN/USM-410 for GS and depot-level support. The logistic support package (except for the AN/USM-410) will be tested during IPT and during Force Development Testing and Experimentation (FDTE) scheduled for late FY 1983.

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e. (U) Reliability results achieved during Government testing are based on the following test measurements: 12,500 miles traveled; 27,300 rounds fired by primary weapon; and 68 TOW missiles fired. The minimum acceptable value for system performance in test was 195 mean miles between failure (MMBF); reliability demonstrated was 289 MMBF. Maintainability standards require scheduled organizational maintenance and service no more frequently than every six months or 1500 miles. The demonstrated reliability and maintainability results are tabulated in paragraph 3 below. A number of problem areas were recorded during testing on the Integrated Sight Unit (ISU). These included image flutter, detent mechanism failure of boresight knobs, electromagnetic interference, reticle brightness, faulty thermal switch rheostat control, and vertical wavy lines in the sight picture. Corrective action has been identified for each and will be verified during IPT. Other problems cited during the test included a sporadic U-joint torque spike; excessive power converter failures; toxic fumes (high carbon monoxide levels) when firing all weapons in buttoned-up configuration; powertrain and powerpack cooling failures; faulty catch bar on driver's hatch; degraded communications due to high noise levels; no backup sight; inadequate test equipment and technical manuals. Corrective actions have been identified for each problem area. In nearly all cases, corrections will be incorporated into the production vehicles and ancillary equipment.

f. (U) DT II testing was completed with no significant technical problems beyond those cited above. All significant Army requirements for transportability have been demonstrated in test. Accuracy requirements for the M242 25mm Cannon exceeded the stated requirements for all rounds and all rates. Reliability, durability, and maintainability requirements for the M231 Firing Port Weapon (FPW) have been demonstrated. Results are tabulated in paragraph 3.

2. (U) Operational Test and Evaluation:

a. (U) A combined Operational Climatic Test/Force Development Testing and Experimentation (OCT/FDTE) was conducted at Ft Knox, KY, during January-March 1976 for the MICV/20mm program. The OCT provided limited data on capabilities, limitations, and safety aspects of the system and developed mobility/movement rate data. The initial Operational Test was conducted by the US Army Operational Test and Evaluation Agency (OTEA) at Fort Benning, GA. The test started 4 October 1976 and continued through 31 January 1977. A need for additional user training and 20mm gun modifications became apparent due to the complexity of the one-man fighting station. This test was discontinued as a result of termination of the MICV/20mm gun program in March 1977.

b. (U) Operational Test II (OT II) for the BFVS was accomplished during September-November 1979 at Fort Carson, CO, by OTEA. The purpose of the test was to provide data and associated analyses on the operational effectiveness of the BFVS, the 25mm Cannon and the FPW, to make a full-scale production decision. The objectives of testing were to provide information on the effectiveness, survivability, reliability, availability, maintainability, and logistics support system for the IFV system. The organization, doctrine, training, and human factors, as they pertain to the employment of the IFV system, were also evaluated. Operational testing was conducted independently, yet concurrently, with developmental testing. Hardware in OT II included, for the first time, the improved fire extinguisher system (HALON) and the upgraded Integrated Sight Unit (ISU). Organizational

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and direct support maintenance was performed by military personnel and FMC; general support maintenance was accomplished by FMC. Results of OT II were presented to the Army Systems Acquisition Review Council (ASARC III) in December 1979 and the Defense Systems Acquisition Review Council (DSARC III) in January 1980. The OT II test report, entitled "XM2, Infantry Fighting Vehicle Operational Test II (IFV OT II)," was published by OTEA in February 1980.

c. (U) OT II testing included the following: 8,919 miles traveled; 30,528 rounds fired; and 39 TOW missiles fired. The test vehicles demonstrated the Army's Materiel Need (MN) requirements for all mobility and transportability characteristics in contractor tests, DT and OT. In each performance area, the requirement was either met or exceeded for the 25mm Cannon, the FPW, and the Coaxial Machinegun. The mission profile used for reliability performance is based on combined DT/OT II goals for the IFV/CFV system. Reliability performance during DT/OT II for mobility, firepower, and total system is summarized in paragraph 3. These estimates are based on 21,495 miles for firepower, 20,982 miles for mobility and support, and 49,778 primary weapon rounds fired. All technical problems were isolated and appropriate fixes defined. Among the significant technical problems surfaced during the test were the following: vibrations of the vertical lines in the night sight of the ISU; universal joint/final drive failures; coaxial machinegun failure due to bad ammunition lots, damaged feed chutes and mounts, and poor weapon maintenance; insufficient electrical power for "silent watch" mode of operation caused by less than fully charged batteries and possible inadequate power source; heater and ventilation system failures; easily damaged swim barrier; excessive generator failures due to malfunction of diodes; and excessive transmission wear due to engine torsional vibration. Fixes were identified for each problem.

d. (U) The Armor and Engineer Board, Fort Knox, KY, conducted a CFV FDTE during April-August 1980. This evaluation was accomplished to provide data to determine the adequacy of doctrine and tactics, institutional/exportable training and organizational maintenance training programs. The test was completed on schedule with all major objectives met. The final report, entitled "Force Development Test and Experimentation of Cavalry Fighting Vehicle (CFV)," was prepared by the US Army Armor and Engineer Board at Fort Knox, KY, and published in December 1980.

e. (U) Vulnerability testing to include full-up ballistic nondestructive and destructive testing was accomplished from November 1980 to November 1981. Results from conventional warfare testing demonstrated an overall protection probability of which exceeds the MN requirement . However, some vehicle components did not achieve their individual protection levels and are being addressed by the PM.

f. (U) Initial Production Testing (IPT) is presently ongoing at APG, Yuma Proving Group (YPG), and the US Army Cold Regions Test Center (CRTC). Testing is scheduled to end in April 1983. The purpose of the IPT is to verify the quality of performance and materiel when produced in accordance with Technical Data Package (TDP) and the full-production process. IPT has a total of eight vehicles, five vehicles are being used for RAM testing, two for performance testing, and one for environmental testing (YPG and CRTC). RAM vehicles will accumulate the aggregate of 6,000 miles and 12,000 rounds of ammunition. The M240 coaxial machinegun and TOW launcher will also be fired during this test. Performance vehicles will run 1,000 miles. Environmental testing will place approximately 3,000 miles on a vehicle to include a 1,500-mile desert environment add-on test. TMDE

and validated or verified technical manuals are available to support vehicle maintenance. Additionally, AMSAA will conduct an independent maintainability assessment at APG. One Comparison Test vehicle will be taken from the first-year production run and accrue 2,000 miles to verify quality. Three Extended Comparison Test vehicles will run a total of 13,000 miles and fire 26,000 25mm rounds to validate the Level 1 TDP. These vehicles will come from second-year production. Additional 2,000-mile Comparison Test vehicles will be taken from subsequent production years to again verify production quality.

g. **(U)** As of 15 Jan 1983, IPT data (based on about 11000 miles) has been extremely favorable. A vehicle/TMDE interface problem identified during initial inspection has been resolved. With 35 percent of the data scored, the system reliability for the BFVS is 417 mean miles between failures (MMBF). The production vehicle goal is 240 MMBF.

h. **(U)** Maintainability will be addressed in an FDTE scheduled during 1983 at Ft Hood, TX. OTEA and the TRADOC Combined Arms Test Activity will collect data during the training and fielding of the first Bradley battalion. OTEA will conduct an independent assessment of the data. A dedicated Sample Data Collection (SDC) effort has been planned by the Tank-Automotive Command (TACOM) during this same time period. The SDC and FDTE will be directed toward the adequacy of technical manuals, maintenance procedures, logistic task allocations, the adequacy of new training, and insights on maintainability.

3. (U) System Characteristics:

Operational/Technical Characteristics	Objectives	Demonstrated Performance
Reliability (PQT-G/OT II)		
Mobility (mean miles between failure)	600	636
Firepower (mean miles between failure)	290	706
System (mean miles between failure)	195	289
Maintainability (System)—(PQT-G)		
Fraction of Maximum-Time-To-Repair for Organizational actions, (not to exceed 4 hrs)	95%	88%
Fraction of Maximum-Time-to-Repair for Direct Support action (not to exceed 12 hrs)	90%	96%
Fraction of Maximum-Time-to-Repair for General Support Item, (not to exceed 12 hrs)	90%	86%

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Operational/Technical Characteristics	Objectives	Demonstrated Performance
Firepower		
(a) (U) 25mm Gun		
Muzzle Velocity (feet per second)—(CPT-1)		
Armor Piercing (APDS-T)	4300-4500	4460
High Explosive Incendiary Tracer (HEIT)	3000	3600
Rate of Fire		
Maximum—(PQT-G) (rounds per minute)	450-600	Motor Depend.
Controlled—(FAT-G 25mm gun) (shots per minute)	200/100	200/100
Lethal Area—(PQT-G)		
Reliability [1]—(FAT-G-25mm gun)		
Mean rounds between stoppage (MRBS) [2]	6000	9021
Mean Rounds between clearable stoppage (MRBCS) [3]	4000	11,276
Maintainability—(FAT-G-25mm gun)		
Mean time to repair — (MTTR)	15 min	8 min
Max time to repair — (MXTTR)	60 min	24 min
Availability—(FAT-G 25mm gun)	.95	.99
Durability (25 min)—(FAT-G-25mm gun)		
Barrel life (rds)	13000	20000
Receiver life (rds)	25000	30000
APDS-T Ammunition—(PQT-G)		
Penetration 1 inch @1000m		
Velocity (m/sec)	1100	1270
Tracer Rng (meters) [4]	1400	1270-1930
HEIT Ammunition—(PQT-G)		
Velocity (m/sec)	1000	1050
Tracer Rng (meters)	3000	2060-2260

Program Element: #64616A

Title: Bradley Fighting Vehicle System (BFVS)

DOD Mission Area: #211 — Direct Fire Combat

Budget Activity: #4 — Tactical Programs

Operational/Technical Characteristics	Objectives	Demonstrated Performance
(b) (U) Firing Port Weapon—(PQT-G/OT II)		
Sustained Firing Rate (rounds per minute)	60 rpm	at 5 min intervals
Min Range (meters)	3-5	TBD during IPT
Length (in)	15-27	28.5
Protrusion (in)	3-5	7
Weight (lb)	4-8	8.5
Reliability [1]		
Mean Rounds between Stoppage (MRBS) [2]	2000	4701
Mean Rounds between failure (MRBF) [3]	4500	5289
Durability		
Receiver life (rds)	10000	10000
Barrel life (rds)	10000	Exceeded 10000
Mobility—(PQT-G)		
Range (mi) (Ave 25 mph)	300 mi	303 mi
Acceleration	0-30 mph in 18-22 sec	19.7 sec
Fwd Speed	40-45 mph	41.8 mph
Cbt Weight (lb)	35-40,000	50,000
Reverse Speed	5-10 mph	13 mph
Braking Deceleration	35 feet (from 25 mph)	24 feet
Ascend Slope	60%	YES
Min Speed	2.5 mph	1.9 mph
Turning Radius	32'	24.6'
Water Speed	4.5 mph	4.4 mph

Program Element: **#64616A**

Title: **Bradley Fighting Vehicle System (BFVS)**

DOD Mission Area: **#211 — Direct Fire Combat**

Budget Activity: **#4 — Tactical Programs**

[1] Reliability data were determined during hardstand testing.
[2] MRBS — Firing malfunction which requires more than 10 seconds to clear for the 25mm gun and less than 20 seconds for the Firing Port Weapon.
[3] MRBCS — Firing malfunction which can be cleared in 10 seconds or less.
[4] 1270 meter range at -65°F.
[5] Firing malfunction which requires 20 sec or more to clear for the FPW.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64619A

Title: Landmine Warfare

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	8942	9675	7185	25509	Continuing	Not Applicable
	QUANTITIES						
D016	Mine Systems	- 0 -	4878	2844	25509	Continuing	Not Applicable
D088	Modular Pack Mine System	7397	4797	4341	- 0 -	- 0 -	37496
D568	Ground-Emplaced Mine Scattering System Antitank/Antipersonnel Mines	1545	- 0 -	- 0 -	- 0 -	- 0 -	16010

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for increased tactical effectiveness and responsiveness of landmines by supporting the development of a Family of Scatterable Mines (FASCAM) which can be dispensed rapidly from helicopters, ground dispensers, cannon artillery, and tactical aircraft. The minefield continues to be one of the most effective, efficient, and adaptable obstacles to threat armor mobility. The dynamics of today's battlefield make the use of labor-intensive, mechanically buried or hand-emplaced, logistically burdensome, conventional landmines totally nonsupportive of the commander's needs. Current mines, which must be emplaced well in advance of the actual tactical need, lack the responsiveness and flexibility necessary for effective employment in rapidly changing tactical situations. Scatterable mines placed by highly responsive multiple delivery means provide a formidable deterrent to mass armor attacks such as can be mounted by the Warsaw Pact. Scatterable mines will be used to deny selected areas, delay, canalize, and interdict attacking enemy forces.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	8942	9675	7185	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	4943	9701	7459	Continuing	Not Applicable

Program Element: #64619A

Title: Landmine Warfare

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

The increase of $3999 thousand in the FY 1982 funding level is a result of restructuring within the mine program to compensate for slippages in prior year funding. The funding decrease of $26 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The funding decrease of $274 thousand in FY 1984 is due primarily to a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Ammunition Procurement, Army: (Artillery AT Mines)						
Funds (current requirements)	82500	77000	123300	126500	Continuing	Not Applicable
Quantities (current requirements) (rounds)	34000	29000	51000	45000	Continuing	Not Applicable
Ammunition Procurement, Army: (GEMSS XM74/ XM75 Mines)						
Funds (current requirements)	31500	23800	- 0 -	30100	Continuing	Not Applicable
Quantities (current requirements) (mines)	59000	52000	- 0 -	81000	Continuing	Not Applicable

Program Element: #64619A Title: Landmine Warfare

DOD Mission Area: #212 — Indirect Fire Support Budget Activity: #4 — Tactical Programs

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement Army: (GEMSS Dispensers)						
Funds (current requirements)	7700	6200	6200	24400	Continuing	Not Applicable
Quantities (current requirements) (each)	22	23	35	60	Continuing	Not Applicable

The FY 1983 decrease in artillery-delivered AT mines is the result of slippage in prior year production deliveries beyond the normal procurement leadtimes and constraints on total obligation authority (TOA). As a result, procurement quantities were held below economic production rates, and unit costs increased accordingly. The decrease in GEMSS funding for mines in FY 1983 reflects a shortfall in overall ammunition procurement funding, and a resultant reduction in GEMSS production to minimum sustaining rate (MSR). GEMSS dispenser costs for FY 1982 and FY 1983 reflect reduced unit costs as a result of competitive procurement. The elimination of FY 1984 funding for GEMSS mines is a result of a decision to stretch out earlier year procurements in order to constrain the total FY 1984 ammunition budget.

E. (U) RELATED ACTIVITIES: This program follows from advanced development (AD) Program Elements (PE) #63606A (Land Warfare/Barrier Development) and #63619A (Barriers Systems), where components and mine hardware concepts are devised and tested. Principal system technical development responsibility is assigned to the US Army Armament Research and Development Command (ARRADCOM), Dover, NJ, under the management of the Armament Systems Directorate. Closely related to this program element is the US Air Force-managed joint-Service development of air-delivered scatterable mines, GATOR, also a member of the Family of Scatterable Mines (FASCAM). The scope of this development is controlled by an approved joint development plan. The Army is developing both Antipersonnel (AP) and Antitank (AT) mines for the GATOR system using existing components. Joint-Service mine requirements are coordinated through the Department of Defense (DOD) Armaments/Munitions Requirements and Development Committee and the joint Technical Coordination Group for Bombs, Mines, and Clusters.

F. (U) WORK PERFORMED BY: The principal Army management agency is the Armament Systems Directorate, ARRADCOM, Dover, NJ. In-house support is provided by the US Army Mobility Equipment Research and Development Command, Fort Belvoir, VA; US Army Test and Evaluation Command and the US Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD; and Yuma Proving Ground, Yuma, AZ. Principal

Program Element: **#64619A** Title: **Landmine Warfare**

DOD Mission Area: **#212 — Indirect Fire Support** Budget Activity: **#4 — Tactical Programs**

contractors are: Aerojet Ordnance and Manufacturing Company, Downey, CA; Hughes Aircraft Company, Fullerton, CA; Honeywell, Inc., Hopkins, MN; and RCA Solid State Division, Sommerville, NJ.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D016 — Mine Systems:** This project was not funded in FY 1982. In FY 1983 engineering development (ED) will be initiated on the Off-Route Antitank Mine System (ORATMS) and an auxiliary dispenser (FLIPPER) for Ground Emplaced Mine Scattering System (GEMSS) mines. Development efforts on ORATMS in FY 1984 will include fabrication of Final Engineering Development Test (FEDT) hardware and the conduct of initial testing. Final ED testing will also be conducted on FLIPPER and the Pursuit Deterrent Munition (PDM) and hardware for Operational Testing (OT II) will be procured.

2. **(U) D068 — Modular Pack Mine System (MOPMS):** In FY 1982 engineering development (ED) continued with engineering design completed. Hardware for Developmental Testing and Operational Testing (DT II/OT II) was procured. Additional test hardware will be procured and tests conducted in FY 1983. Tests will be concluded and the system type classified in FY 1984.

3. **(U) D568 — Ground-Emplaced Mine Scattering System Antitank/Antipersonnel Mines (GEMSS):** FY 1982 funding was needed to complete user manuals and final revisions to the technical data package (TDP).

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64630A

Title: M1E1 Development Program

DOD Mission Area: #211 — Direct Fire Combat

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	82724	54188	55977	12580	15553	369522
	QUANTITIES						14
D060	120mm Gun Development	2922	1357	949	- 0 -	- 0 -	24328
D064	120mm Tank Gun Ammo	23453	21368	5046	- 0 -	15553	126320
D287	System Integration	56349	31463	49982	12580	- 0 -	218874

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program is required to assure the availability of a main battle tank capable of defeating the postulated tank threat with advanced armor of the late 1980s and beyond, to maintain interoperability with NATO tank fleets equipped with the Leopard 2 tank, and enhance survivability of US crewmen. This program element incorporates the Army decision of 18 September 1981 which approved composition of improvement Block 1, and directed simultaneous integration of the 120mm tank gun and Block 1 improvements into Abrams tank production. This up-gunned, product-improved tank is designated the M1E1.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	82724	54188	55977	15553	369522
Funds (as shown in FY 1983 submission)	82724	54342	61252	35134	381883
Quantities (current requirements)				14 prototype M1E1 tanks	
Quantities (as shown in FY 1983 submission)				12 prototype M1E1 tanks	

FY 1983 reduction is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. FY 1984 reduction is a result of program adjustments and revision of the anticipated inflation in the proposed Army RDTE budget.

Program Element: #64630A

Title: M1E1 Development Program

DOD Mission Area: #211 — Direct Fire Combat

Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Weapons and Tracked Combat Vehicles, Army						
Funds (current requirements)	10000	20000	22400	73300	385200	510900
Ammunition Procurement, Army						
Funds (current requirements)	15000	121600	76800	239700	Continuing	Not Applicable
Quantities (current requirements)	- 0 -	- 0 -	35000	199000	Continuing	Not Applicable
Military Construction, Army						
Funds (current requirements)	- 0 -	9400	2550	2950	3000	23700

FY 1983 WTCV-A funding reflected only 120mm gun facilitization. FY 1984 WTCV-A includes funding for production hardware also. FY 1983 funding decrease in Ammunition Procurement is a result of Congressional direction in the FY 1983 Appropriation Act and reduced PBS estimate. Decrease in FY 1984 Ammunition procurement funding results from OSD budget reduction decision, revised ammunition unit cost estimates and revised PBS estimates. MCA projects support the fielding of the M1 weapon system.

E. (U) RELATED ACTIVITIES: This program is related to Program Element (PE) #64620A (Tank M1), Project #D330; PE #23735 (M1E1 Block Improvements), and is dependent upon technology developed under PE #62618A (Ballistic Technology) and PE #62603A (Large Caliber and Nuclear Technology). Program activities are fully coordinated to assure no unnecessary duplication of effort, either within the Army or other Department of Defense agencies.

Program Element: #64630A Title: M1E1 Development Program

DOD Mission Area: #211 — Direct Fire Combat Budget Activity: #4 — Tactical Programs

F. (U) WORK PERFORMED BY: General Dynamics, Land Systems Division, Warren, MI; US Army Armament Research and Development Command, Dover, NJ; US Army Test and Evaluation Command, Aberdeen, MD; US Army Operational Test and Evaluation Agency, Falls Church, VA; Rheinmetall Limited, Dusseldorf, Germany; and Honeywell Inc., Hopkins, MN.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D060 — 120mm Gun Development:** Using the German 120mm smoothbore tank cannon as a basis for continued development, this project provides for development of a 120mm gun for future incorporation on the M1 tank. The purpose of the project is to provide the best main armament system for the M1 tank to counter the long-term armor threat while maintaining interchangeability with the German 120mm system. First production delivery of a 120mm gun tank (M1E1) is planned for 4Q FY 1985. Since program initiation in FY 1979, the German design has been translated, the production facilities have been established at Watervliet Arsenal, NY, and prototype cannon have been developed for evaluation and testing. Gun tube and breech testing has been completed. Additional cannon have been fabricated for integration into pilot M1E1 vehicles which will be used for contractor and Government testing. Functional reliability testing has been conducted as well as automotive and fire control testing of pilot M1E1 vehicles by the contractor. In FY 1983, the XM256 cannon (tube and breech) will be type classified in preparation for M1E1 DT/OT II which will begin in FY 1983. FY 1984 Planned Program: Complete M1E1 DT/OT II. Convene Army Systems Acquisition Review Council (ASARC) III in June 1984 and Defense Systems Acquisition Review Council (DSARC) III in September 1984 in preparation for initial production in FY 1985. Complete rationalization, standardization, and interoperability (RSI) work and final preparation of technical data package for XM256. The project is scheduled for completion in FY 1985 with initial production of the M1E1 tank scheduled for 4Q FY 1985.

2. **(U) D064 — 120mm Ammunition Development:** The objective of this project is to develop a family of ammunition for the 120mm XM256 tank cannon. The design of the ammunition (except one round) evolves from a basic translation of German design to US manufacturing technology. Five rounds will be developed: a kinetic energy (KE) round with US-designed penetrator replacing the German-designed penetrator (XM827); a modern technology KE round (XM829 — US development); a high-explosive antitank multipurpose round (XM830); a high-explosive antitank (HEAT) training round (XM831); and a KE training round (XM865). FY 1982 and Prior Accomplishments: The German design has been translated, and initial production processes have been established to fabricate test quantities of ammunition. Continued development testing (DT II) of the XM827, XM830, and XM831 rounds. Completed engineering design tests of XM829. Began Government qualification testing of the XM865. FY 1983 Program: Complete DT II and type classify XM827 and XM331. Begin DT II of XM829, XM830, and XM865. FY 1984 Planned Program: Complete DT II of XM829, XM830, and XM865. Type classify XM829 and XM865 in 1Q FY 1984. Program to completion: Complete testing of XM830 and type classify it. Begin full-scale development of the XM859, an improved modern technology 120mm HEAT round.

Program Element: **#64630A**

Title: **M1E1 Development Program**

DOD Mission Area: **#211 — Direct Fire Combat**

Budget Activity: **#4 — Tactical Programs**

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D287 — System Integration.**

a. **(U) Project Description:** This project concentrates on development, testing, and qualifying M1 tank subsystems (gun mount, turret and automotive subsystems, and ammunition storage compartments) required to facilitate integration of the 120mm Tank Main Armament System (gun and ammunition) and block 1 improvements into the M1E1 tank. The addition of the block improvement integration effort results from the 18 September 1981 Army decision to introduce block 1 improvements into M1E1 production concurrently with the 120mm gun system.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Following the 22 February 1979 signing of a 120mm gun system licensing agreement with the German developer, Rheinmetall, the US integration program officially commenced on 8 March 1979. A systems contract was awarded to Chrysler Corporation on 1 June 1979 to initiate concept/feasibility studies for integration of the 120mm gun system into the M1 tank. System engineering and design activities were initiated in the areas of 120mm weapon system/vehicle interface, gun mount/recoil system, fire control and ballistic protection. Detailed system design analysis for all affected M1 system/subsystem components has been conducted. A full-scale engineering development letter contract was awarded to Chrysler Defense Inc, and contractor activity in the areas of armor development, ammunition compartmentalization, fire control, system integration/engineering, logistics, product assurance, human factors, value engineering, producibility engineering and planning (PEP), safety, and life cycle costing was begun. Fabrication of two M1E1 tanks for contractor testing and Physical Teardown/Maintenance Evaluation (PT/ME) was initiated. Formal test planning for Development Test/Operational Test (DT/OT) II and follow-on M1E1 system interoperability tests has continued. Conversion of two M1 tanks (less 105mm components) to the 120mm Gun configuration was completed. Contractor tests and PT/ME were conducted to assess ammunition storage, weapons and fire control performance, and other related system integration factors (fightability, safety, and overall system performance) and conformance to specifications. Fabrication and assembly of four additional 120mm pilot tanks for DT/OT II, incorporating system changes resulting from contractor tests and related system development activities, was initiated. Procurement of necessary 120mm cannon, ammunition, and system hardware and software to support ongoing and pending contractor and Government test programs will continue. System-related activities in such areas as system engineering, quality assurance, logistics, producibility engineering and planning (PEP), value engineering, costing, and scheduling will continue as will planning and preparation for DT/OT II. Procurement of the necessary hardware and fabrication of six M1 tanks in 120mm gun configuration was completed. The major emphasis of FY 1982 was on initiation and conduct of engineering testing of Block 1 improvement hardware and completion of Prototype Qualification Test-Contractor (PQT-C) on 120mm-configured tanks. Contractor activities included system engineering, configuration management, integrated logistics support, PEP, and safety. Weight reduction engineering and procurement of sample armor plate was completed. One ballistic hull and turret was built using plate selected under weight reduction criteria.

Program Element: **#64630A** Title: **M1E1 Development Program**

DOD Mission Area: **#211 — Direct Fire Combat** Budget Activity: **#4 — Tactical Programs**

(2) **(U) FY 1983 Program:** Initiate DT/OT II in January 1983. A system confirmatory test using the XM832 kinetic energy training round will be conducted. The M1E1 tanks required for DT/OT II will be refurbished, and contractor activities, including PEP and preparation of the M1E1 technical data package, will be completed. M1E1 Army Program Review is scheduled in November 1982 prior to negotiating a contract for M1E1 long-lead items.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Complete DT/OT II of M1E1. An Army Systems Acquisition Review Council (ASARC) III production decision is planned in June 1984, with first production delivery of an M1E1 tank planned for 4Q FY 1985. M1E1 Army Program Review is scheduled in November 1983 prior to production contract negotiation.

(4) **(U) Program to Completion:** Introduction of the M1E1 into production, 4Q FY 1985, will result in completion of this project.

c. **(U) Major Milestones:**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Initiate integration of 120mm gun into M1 tank	2Q FY 1979	2Q FY 1979
Equip two M1 tanks to 120mm configuration for contractor testing and physical teardown/maintenance evaluation	3Q FY 1981	FY 1981
Equip four M1 production tanks with 120mm system for DT/OT II	4Q FY 1982	FY 1982
Complete 120mm gun M1 tank system DT/OT II	4Q FY 1984	4Q FY 1984
First Production Delivery of M1E1 Tank	4Q FY 1985	4Q FY 1985

The DT/OT II completion date (4Q FY 1984) ensures that sufficient US-produced 120mm training ammunition is available to support the operational test of the M1E1 tank system and to allow testing of the M1E1 with integrated block improvements. The ammunition delay has been caused by problems encountered during the technical translation of the German ammunition design.

Program Element: #64630A

Title: M1E1 Development Program

DOD Mission Area: #211 — Direct Fire Combat

Budget Activity: #4 — Tactical Programs

I. (U) TEST AND EVALUATION DATA:

1. **(U) Development Test and Evaluation:** The M1E1 Tank is in its Full-Scale Engineering Development (FSED) Phase. The test program itself can be considered as divided into two separate phases: The phase prior to the Vice Chief of Staff, Army (VCSA) decision (18 September 1981) and the phase after the VCSA decision. The initial phase, or Phase I, was the basic M1E1 program, which consisted primarily of upgunning the tank to 120mm. Testing during this initial phase included contractor engineering design and prototype qualification tests. The program phase after the VCSA decision, or Phase II, also includes contractor engineering design and prototype qualification tests plus Government development tests and operational test (DT/OT II). The Phase II testing includes evaluation of the Block Improvement items (armor modification, NBC system, weight reduction, and suspension/transmission/final drive upgrade) plus the upgunning of the tank. The DT/OT II takes place primarily from October 1982 through April 1984 in preparation for the 1 June 1984 ASARC III. In addition to Phases I and II, and in order to introduce the armor modification into production as early as possible, an Improved M1 Test Phase (M1 Tank with armor modification) was accomplished during FY 1982. A Decision Management Review for the Improved M1 Tank is planned for mid-January 1983, with the first production of the Improved M1 Tank scheduled for December 1984.

a. **(U) Prior Development Testing:** Some testing of the basic M1E1 Tank (61.5 tons) was accomplished during FYs 80/81 prior to the 18 September 1981 VCSA decision merging the M1E1 and Block Improvement Programs. This testing included two contractor M1E1 test rigs for Engineering Design Tests (EDT-C) and a contractor Prototype Qualification Test (PQT-C) with two M1E1 Tanks.

(1) **(U)** Engineering Design Test — Contractor (EDT-C) Phase I. Two M1E1 test rigs (FV2, Automotive Test Rig, and PV7, Fire Control Test Rig) were used for this test. The purpose of this test was to evaluate the effects of additional vehicle weight and turret imbalance on automotive and fire control performance. No live firing was done on the fire control test rig. Vehicle dynamic tests were run to determine M1E1 vehicle performance, automotive performance, automotive durability and fire control system baseline characteristics.

(2) **(U)** Prototype Qualification Test — Contractor (PQT-C) Phase I. PQT-C was conducted from February 1981 to September 1981 using two refitted 105mm production vehicles. Refitting included replacement of 105mm main gun components, gun mount, fire control, and ammunition storage provisions to bring the vehicle to the baseline prototype configuration of an M1E1 Tank. The purpose of this test was to provide a significant degree of confidence that the M1E1 Tank would successfully undergo and complete subsequent Prototype Qualification Test-Government (PQT-G) and OT II and demonstrate that the materiel need and system specification requirements have essentially been met. This test emphasized weapon system evaluation, as minimal automotive changes were initially projected in the M1E1 Tank. Contractor testing included the following areas of interest: safety evaluation; fire control system performance; power control performance; exterior ballistics and jump characteristics with confirmation of firing tables for 120mm German rounds; boresight retention; frequency response test; gun control system performance (thermal shroud, muzzle reference system, etc.); gun stabilizer performance; shock and vibration evaluation; RAM-D evaluation; and maintenance evaluation. Over 1500 test miles were accumulated and 750 rounds fired during this test prior to M1E1 program redirection.

Program Element: #64630A | Title: M1E1 Development Program

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(3) (U) Engineering Design Test-Contractor (EDT-C) Phase II. This phase of contractor testing, which involved four vehicles (PV7, L-5, 120-1, and 120-2), took place during FY 1982 at the contractor's Chelsea Proving Ground in Michigan and at Aberdeen Proving Ground (APG), MD. The purpose of this testing was to provide design data for upgrading the suspension, gun turret drive, and final drive for the 63-Ton M1E1 Tank and to determine if any new problem areas surface from this increased vehicle weight. Contractor testing at the Chelsea facility utilized two vehicles, PV7, a fire control test rig, and L5, an automotive test rig. Both had nonballistic armor plate added ("upweighted") to bring total vehicle weight to 63 tons, the expected M1E1 weight. Contractor engineering design tests at APG utilized vehicles 120-1 and 120-2. Vehicle 120-1 was kept at 61.5 tons, the basic M1E1 weight without the block of improvements, to complete testing needed to verify resolution of problems found from earlier testing. Vehicle 120-2 had been "upweighted" to 63 tons and was used to check fire control response and to evaluate the new final drive with the gear ratio changes.

(4) (U) System Testing for Robustness of the 120mm Combustible-Cased Ammunition. This test took place at APG during August-September 1982 utilizing vehicle 120-1. The purpose of this test was to determine: the types and extent of damage the 120mm combustible-case ammunition suffers during normal tank operations; the extent of damage the 120mm combustible case ammunition can withstand without adversely affecting its safety or performance; to what extent the tank crew can detect damage to the cartridge by visual inspection; and the extent the protective coating on the 120mm combustible-case ammunition is scuffed, rubbed off, or otherwise damaged or destroyed by transport, handling, or loading/unloading into the ammunition racks and main gun.

(5) (U) Improved M1 Test Program. This test program utilized two M1 Tanks "upweighted" to 61 tons to simulate the modified armor configuration. Contractor testing took place at Chelsea Proving Ground and APG from November 1981 to May 1982, while Government testing was done at APG from May 1982 through September 1982. Contractor testing examined mobility and fire control performance, while Government testing evaluated some aspects of mobility and fire control performance and included a limited RAM-D test of 2000 miles and 150 rounds per tank.

b. (U) **Future Development Testing.** Testing will be accomplished to determine: that engineering is reasonably complete; that all significant design problems (including survivability/vulnerability, producibility, compatibility, transportability, interoperability, reliability, availability, and maintainability (RAM), durability, safety, human factors, electromagnetic compatibility, and logistic supportability) have been identified; that solutions to problems are in hand; and that test issues critical for the production decision have been resolved. The major tests to be conducted in this phase are: EDT-C, Phase II; PQT-C, Phase II; PQT-G Aberdeen Proving Ground (APG), Yuma Proving Ground (YPG), Cold Regions Test Center (CRTC), Tropic Test Center (TTC), White Sands Missile Range (WSMR), and Dugway Proving Ground (DPG); and an Initial Production Test.

(1) (U) Engineering Design Test-Contractor (EDT-C), Phase II. Three M1E1 Tanks (120-3, 4, and 5) are being used for this test which began at APG on 1 October 1982 and is scheduled for completion 28 February 1983. In addition to the 120mm gun, each tank will have an improved suspension system plus a prototype NBC system. One tank will be dedicated to fire control performance testing; one to NBC performance testing; and

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one to limited durability testing. The durability test tank will also have the final drive with a gear ratio change. This tank is to run for 2,000 miles and fire over 600 main gun rounds.

(2) (U) Prototype Qualification Test-Contractor (PQT-C), Phase II. This testing will be done at APG from January through April 1983 using three M1E1 test vehicles (120-7, 8, and 9). Since these vehicles will not be equipped with the final gun turret drive or NBC systems, the test will be primarily automotive, and each vehicle is to accumulate 2,000 durability miles.

(3) (U) Prototype Qualification Test-Government (PQT-G).

(a) (U) APG — Six M1E1 Tanks equipped with all block improvements will participate in these functional tests at APG. Three of these are the tanks used in PQT-C, Phase II (120-7, 8, and 9), and they will continue RAM-D testing for an additional 4,000 miles each and fire 800 rounds each. The remaining three tanks are the tanks used in EDT-C, Phase II (120-3,4, and 5). After these tanks are updated to final configuration (upon completion of EDT-C), they will be used for PQT-G testing to evaluate fire control, automotive, and NBC performance. A Ballistic Hull and Turret (BH&T) will be used to evaluate the vulnerability aspects of the improved protection system. A Physical Teardown/Logistics Demonstration (PT/LD) will also be conducted at APG. The PT/LD is indicative of a host of logistic support issues that are germane to the M1E1 system (e.g., transportability, support equipment, initial provisioning, technical manuals, maintenance support, and training). The PT/LD will be conducted on one M1E1 (120-2) Tank at APG from July to September 1983.

(b) (U) YPG — One M1E1 Tank (120-11) will be at YPG, AZ, from June through September 1983 for desert environmental testing. Systems to be evaluated are firepower, automotive, and NBC.

(c) (U) CRTC — One M1E1 Tank (120-14) will be tested at CRTC, Ft. Greely, Alaska, from October 1983 through April 1984. Automotive and, especially, fire control performance of the 120mm gun and ammunition will be of primary concern. Operation of the NBC system in an arctic environment will also be evaluated.

(d) (U) TTC — One M1E1 Tank (120-11) will be at the Tropic Test Center, Ft. Clayton, Panama, from January 1984 through January 1985. The purpose of this test is to evaluate the tank's performance in a high-humidity tropic climate. The evaluation will also address the interaction of the M1E1 and combustible-case ammunition in both constant and variable high-humidity conditions.

(e) (U) WSMR — This part of Government testing is accomplished during two separate phases, each using one vehicle. Nuclear Blast Test — Operation "Direct Course," August-October 1983. An operational M1 (LS) equipped with an NBC system will be exposed to a simulated nuclear blast. Thermal simulators will also be utilized. Electromagnetic Radiation (EMR)/Nuclear Test, April-September 1984. On an M1E1 Tank (120-

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7), perform EMR and nuclear testing on those components/subsystems that have changed for the M1E1 Tank and those that are peculiar to it such as the NBC system.

(f) (U) DPG — Challenge tests to the M1E1 vehicle/NBC system will be conducted using simulants and live agents. This testing will be divided into two parts. Part 1 will be an early-on evaluation in the October 1982 to January 1983 timeframe utilizing an unmodified M1 Tank (PV3). The purpose of this test is to determine, under simulated battlefield conditions, how quickly a nonpersistent agent infiltrates into the crew compartment and how quickly it can be purged. Part 2 will be done in the January-April 1984 timeframe utilizing an M1E1 Tank (120-2) painted inside and out with a chemical agent-resistant coating. Simulant and live agent (persistent and nonpersistent) challenge and purge tests will be performed to determine the effectiveness of the NBC system under various operational modes.

(g) (U) Miscellaneous Testing — Several aspects of the M1E1 test program related to the PQT-G test phase are tested separately. These are: the interchangeability test; the armor RAM-D test; and a confirmatory test of the XM829/XM865 ammunition.

US/German Interchangeability Test (ICT). The M1E1 Tank System must demonstrate that the US- and German-produced 120mm weapon systems are interchangeable. This demonstration will be done at APG with three M1E1 vehicles during third quarter FY 1984.

Armor RAM-D Test — Vehicle 120-12 will have the actual armor modification installation and will be run a total of 6000 miles to verify the integrity of the armor's production process and its durability. The first 2550 miles of operation will be done during OT II at Ft. Hood, Texas (October 1983-April 1984), and the remaining mileage will be completed at APG (June 1984-November 1984).

Confirmatory Test of XM829 armor-piercing, fin-stabilized, discarding-sabot, tracer (APFSDS-T) and XM865 training-practice, cone-stabilized, discarding-sabot, tracer (TPCSDS-T) 120mm Ammunition — The development programs for these two rounds parallel the M1E1 Tank development program, and their development will not be completed prior to the M1E1 DT II (PQT-G). Therefore, rather than being an integral part of DT II, this test is being planned to be conducted separately at APG in the July-November 1984 timeframe. The purpose of this test is to demonstrate that the flight characteristics of the new rounds have been properly implemented into the M1E1 Tank and that the accuracy requirements are met.

(4) (U) Initial Production Test (IPT). An IPT will be conducted beginning in the first quarter FY 1986 at APG using four M1E1 production tanks. The purpose of this test is to verify vehicle performance against the production process. The test scope includes 4000 miles plus 800 main gun rounds fired for each tank. An IPT will also be conducted on one improved M1 Tank (4,000 miles/400 rounds) in the January-August 1985 timeframe.

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2. **(U) Operational Test and Evaluation:** Operational testing will provide data to the ASARC III on which to base production and deployment decisions, to include analysis of the performance, military utility, and RAM of the M1E1 Tank System. The test objectives are: to obtain data to assess the operational capability (firepower and mobility) of the M1E1 Tank System; to obtain data to assess the RAM of the M1E1 Tank System; to obtain data to assess the survivability of the M1E1 Tank System and its effectiveness in an NBC environment; to obtain data to assess the fightability (personnel selection and training, human factors, combined arms operation compatibility) of the M1E1 Tank System; to provide information on the logistic supportability of the M1E1 Tank System; and to provide information on the safety aspects of the M1E1 Tank System and the combustible-case 120mm ammunition.

a. (U) Prior Operational Testing: None.

b. (U) Future Operational Testing: Operational Test II (OT II) will be conducted at Ft. Hood, Texas, using four M1E1 Tanks (one platoon), from 1 October 1983 to 30 April 1984. OT II will be done in four phases (Phase I — Training; Phase II — Firing; Phase III — Maneuvering; and Phase IV — Interchangeability). The specific areas to be evaluated include firepower, mobility, fightability, survivability, human factors, training, RAM, logistic supportability, safety, and interchangeability of the tank main armament system components. The Operational Mode Summary (OMS), including five miles accumulated for each round fired will be followed throughout Phases II and III of the test; this ratio will not be maintained during the (initial) training phase. Phases II and III (tactical exercises) will conform to the TRADOC-approved scenario and the operational mode summary for the M1E1. Exercises will employ the tank crew/platoon operating in the battlefield environment of the 1980-1999 timeframe, including battlefield obscuration and NBC conditions. The opposing force (OPFOR) air threat will be limited to rotary-wing and observer-type aircraft as available. Each M1E1 will undergo at least one semiannual periodic service during the test. RAM data will be collected during all phases. Logistic supportability aspects of the test are limited because of the small size of the test unit. Representative maintenance and supply support elements will be used. Phase IV will address the interchangeability of US and German tank main armament system items. Data requirements will be those quantitative measurements required to evaluate specific exercises (elapsed times, rates of fire and hits). Crew questionnaires and debriefings will be used for human factors and qualitative evaluation information.

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Title: M1E1 Development Program

DOD Mission Area: #211 — Direct Fire Combat

Budget Activity: #4 — Tactical Programs

3. (U) System Characteristics:

Operational/Technical Characteristics	Objectives	Demonstrated Performance
Acceleration (hard surface, 0-degree slope, 0-20 mph) (seconds)	6-9	
Speed (mph)		
10% slope	20-25	
60% slope	3-5	
maximum	40-50	
Cruising Range (miles)	230-275	
Height (inches)	90-95	
Width (inches)	120-144	
Stored Ammunition (main gun rounds)	40	
Reliability (miles between failures)		
ASARC II	298-342*	
End IPT	320-342*	
Powertrain Durability (probability of achieving 4000 miles w/o replacement or overhaul of major components)	.50	
Maintenance Ratio (maintenance manhours/operational hours)		
ASARC III	1.4-1.16	
IPT	1.25	

*Does not include failures caused by main gun ammunition.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64631A

Title: Field Artillery Ammunition

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2179	2566	26595	29276	Continuing	Not Applicable
	QUANTITIES	(Not feasible to list due to number of diverse items)					
D175	Field Artillery Fuzes	- 0 -	2566	5732	2965	Continuing	Not Applicable
D286	Field Artillery Ammo (NATO)	443	- 0 -	627	1611	Continuing	Not Applicable
D369	SADARM	- 0 -	- 0 -	20236	24700	Continuing	Not Applicable
D373	Field Artillery Ammo 155mm	1736	- 0 -	- 0 -	- 0 -	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program supports development of 155mm Field Artillery Ammunition to provide increased lethality, range, accuracy, reliability, and speed in delivering fires required to offset the numerical advantage of the Warsaw Pact forces. This program also provides for compatibility testing of US ammunition in NATO country howitzers and NATO ammunition in US howitzers, engineering development of new indirect fire fuzes, and for the engineering development (ED) of the new Sense and Destroy Armor Munition (SADARM), which is expected to enter ED in FY 1984. The Fire Support Mission Area Analysis has identified insufficient munitions lethality against point armored targets as the number one deficiency in the field artillery fire support area. The Army Science Board has identified several areas in which the U.S. has a clear technological lead over potential opponents. These include sensor, semi-conductor, and microprocessing technology among others. Proper emphasis in and financial support of these leads can result in production of Smart munitions which exploit that technological advantage and provide a high degree of leverage to overcome Warsaw Pact numerical advantages. The 8-inch SADARM system is the most advanced of those smart munitions systems and the first in the category of antonomous self-contained munitions.

Program Element: #64631A Title: Field Artillery Ammunition

DOD Mission Area: #212 — Indirect Fire Support Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	2179	2566	26595	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	1460	2573	15824	Continuing	Not Applicable

Increase of $719 thousand in FY 1982 funding level is a result of additional funding to expand testing of NATO-developed munitions in Project #D373 (Field Artillery Ammo (NATO)). The funding decrease of $7 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. Increase of $10771 thousand in FY 1984 funding level is a result of reprograming from PE #63628A, Project #D276 to support expanded Engineering Development of SADARM in Project #D369.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Ammunition Procurement, Army:						
Funds (current requirements)	- 0 -	16100	22400	27600	Continuing	Not Applicable
Quantities (current requirements)						
M825 Projectile 155mm Smoke Screening	- 0 -	31000	44000	52000	Continuing	Not Applicable

FY 1984 Increase in Funding Is Provided To Purchase 3000 Additional Projectiles.

Program Element: #64631A Title: Field Artillery Ammunition

DOD Mission Area: #212 — Indirect Fire Support Budget Activity: #4 — Tactical Programs

E. (U) RELATED ACTIVITIES: This program, which was previously accomplished under Program Element #64614A (Field Artillery Weapons and Ammunition, 155mm) (prior to FY 1981), is the normal engineering development program for advanced development that has been in Program Element #63628A (Field Artillery Ammunition) and is dependent upon technology developed under Program Element #62603A (Large Caliber and Nuclear Technology). Cooperative agreements exist with NATO nations on the characteristics of 155mm howitzers to include the requirement for ammunition interchangeability. A NATO panel has been constituted to insure that duplication of effort is avoided.

F. (U) WORK PERFORMED BY: United States Army Armament Research and Development Command (ARRADCOM), Dover, NJ, Aberdeen, MD; and Yuma Proving Ground, Yuma, AZ. Contractors on the M198 Howitzer production are: Consolidated Diesel Electric Company, Old Greenwich, CT; and Numax Electronics, Incorporated, Hauppauge, Long Island, NY.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D175 — Field Artillery Fuzes:** This project supports Engineering Development of artillery fuzes for all calibers and all types of projectiles. It continues Advanced Development started in PE #63628/D007 (Field Artillery Ammunition and Fuzes). There were no project funds in FY 1982. Project Funds In FY 1983 will be reprogramed to higher priority Army requirements. In FY 1984, engineering development will begin on the XM762, Advanced Remote Set Electronic Time Fuze. This fuze will provide for increased lethality, precision, safety, and operational capability for 105mm, 155mm and 8 inch artillery and 4.2 inch mortar projectiles both developmental and those currently in the munitions stock pile.

2. **(U) D286 — Field Artillery Ammunition (NATO):** This project supports testing of United Kingdom-developed stick propelling charges for use in US 155mm howitzers to prove compatibility with the highest density artillery weapon system in NATO. There is a signed Memorandum of Understanding (MOU) among the United States, United Kingdom, Italy, and the Federal Republic of Germany that provides for interchangeability of 155mm ammunition. Testing is essential to demonstrate interchangeability. Funding in FY 1982 supports Rationalization, Standardization, and Interoperability (RSI) testing using trilateral nations' propelling charges and US smoke projectiles in M198 and M109A1 howitzers to determine interoperability. FY 1983 is not funded. FY 1984 funding will support continuation of evaluating the trilateral nations' 155mm propelling charges, projectiles, and fuzes in US 155mm cannon systems.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D369 — SADARM**

Program Element: #64631A | Title: Field Artillery Ammunition

DOD Mission Area: #212 — Indirect Fire Support | Budget Activity: #4 — Tactical Programs

a. (U) **Project Description:** Project provides for the initiation of Engineering Development of the 8" sense and destroy armor (SADARM) projectile. Advanced development was conducted in PE #63628, Project #D276 (SADARM). This projectile is an autonomous antiarmor munition used for the attack of massed armored vehicles. Development responds to the number one fire support deficiency, "Inadequate antiarmor munitions," determined by the fire support mission area analysis.

b. (U) **Program Accomplishments and Future Efforts:**

(1) (U) **FY 1982 Accomplishments:** Funded in PE #63628, Project #D276.

(2) (U) **FY 1983 Program:** Funded in PE #63628, Project #D276.

(3) (U) **FY 1984 Planned Program and Basis for Budget Year Request:** FY 1984 funding provides for initiation of Engineering Development of the 8-inch SADARM projectile. Following transition from advanced development, the two contractors will continue to develop competitive designs. Procurement and assembly of fully integrated hardware will be initiated to support Engineering test iterations. Manufacturing methods and technology studies of critical components will be initiated relating to millimeter wave, infrared, and self-forging fragment technology. The Army has approved modifications to the SADARM program which will sustain two contractors (Aeroject and Honeywell) through completion of engineering development. The purpose of this revised program is to assure that two qualified competitors are available from the beginning of production. Production under this strategy will be of two separate designs if both are satisfactory, or of one design in a leader-follower approach if only one successful design results. The FY 1984 program incorporates extensive evaluation of the two competing designs in terms of both performance and producibility to determine if the developing designs continue to meet requirements.

(4) (U) **Program to Completion:** This is a continuing program.

Program Element: #64631A

Title: Field Artillery Ammunition

DOD Mission Area: #212 — Indirect Fire Support

Budget Activity: #4 — Tactical Programs

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
DT I	4Q FY 1983	4Q FY 1983
Validation In-Process Review (IPR)	2Q FY 1984	2Q FY 1984
DT II	3Q FY 1986	3Q FY 1986
Development Acceptance IPR	2Q FY 1987	2Q FY 1987
Full-Scale Production	4Q FY 1987	4Q FY 1987

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64832A — Title: 105mm Tank Ammunition

DOD Mission Area: #211 — Direct Fire Combat — Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9194	1059	8309	9191	Continuing	Not Applicable
DG21	Service Ammunition	9194	- 0 -	8309	9191	Continuing	Not Applicable
D173	Tank Target Practice	- 0 -	1059	- 0 -	- 0 -	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The purpose of this program is to develop 105mm combat and training tank ammunition to meet near-term and future enemy threats through the improvement of terminal effectiveness, accuracy, range, and reliability. The program element consists of two projects. Project #D173 supports development of cartridge 105mm, Target Practice, Fin-Stabilized, Discarding Sabot Tracer (TPFSDS-T) XM797. This cartridge is a ballistically similar training companion to the 105mm M774 Armor-Piercing, Fin-Stabilized, Discarding Sabot Tracer (APFSDS-T) cartridge. A reduced flight range permits tank crew training on ranges throughout the world which are too small to accommodate firings of the longer range service ammunition. Project #DG21 will provide for the Engineering Development of Cartridge 105mm XM815 High Explosive, Antitank Multipurpose (HEAT-MP). The 105mm XM815 is an improved HEAT-MP round that will serve as the companion to the 105mm APFSDS-T cartridge and will provide improved capabilities in the areas of hit probability, shape charge performance against modern armors and fusing. It will replace the 105mm M456 series HEAT ammunition.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	9194	1059	8309	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	5195	1059	7938	Continuing	Not Applicable

The increase in FY 1982 reflects internal Army reprograming for the XM833 APFSDS-T 105mm projectile. Technical difficulties were experienced and a program delay incurred when the contractor experienced producibility problems with the staballoy penetrator. The increase in FY 1984 reflects program restructuring to support full-scale engineering development of the XM815 HEAT-MP-T round, a reduction reflecting a decision to delay full

Program Element: #64632A | Title: 105mm Tank Ammunition

DOD Mission Area: #211 — Direct Fire Combat | Budget Activity: #4 — Tactical Programs

scale engineering development of the XM797 105mm training round by one year, and an internal Army reprograming increase to upgrade equipment. The net effect in FY 1984 was a $371 thousand increase.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Procurement of Ammunition, Army XM833 Cartridge						
Funds (current requirements)	- 0 -	79200	75900	89100	Not Applicable	Continuing
Quantities (Current Requirements)	- 0 -	96000	96000	124000	Not Applicable	Continuing

Revised costs reflect unit cost estimate changes for a round that is not yet in production. Previous year's submission assumed a 90-percent learning curve. Current estimate assumes no learning curve since the majority of the components are common to other 105mm M774 rounds in production. The cost growth and difficulties encountered with the penetrators in the 105mm M774 have resulted in increased cost estimates for the XM833 round.

E. (U) RELATED ACTIVITIES: The activities of this program element are a continuation of Advanced Development conducted in Program Element #63633A (Tank Ammunition Development).

F. (U) WORK PERFORMED BY: In-house agencies include the US Army Armament Research and Development Command (ARRADCOM) Dover, NJ; US Army Test and Evaluation Command, Aberdeen, MD; and Yuma Proving Ground, Yuma, AZ. Contractors include: Chamberlain Mfg. Corp., Waterloo, IA, Flinchbaugh Products, Inc., Red Lion, PA; Nuclear Metals, Inc., Concord, MA; Dayron Corp., Orlando, FL; Bulova Systems, Valley Stream, NY; and Physics International, San Francisco, CA. The project is managed by Project Manager, Tank Main Armament Systems, Dover, NJ, to insure no duplication of effort.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

Program Element: #64632A Title: 105mm Tank Ammunition

DOD Mission Area: #211 — Direct Fire Combat Budget Activity: #4 — Tactical Programs

1. **(U) DG21 — Service Ammunition:** Will provide improved kinetic energy (XM833) and improved chemical energy (XM815) 105mm tank rounds to defeat current tank threats. In FY 1982 a core producibility problem was solved in the XM833 Armor Piercing, Fin Stabilized, Discarding Sabot-Tracer (APFSDS-T) projectile. This round did incurr a research and development delay and is now to be type classified 2Q FY 1983. Also, the XM815 round is expected to transition to Full-Scale Engineering Development in FY 1984. An initial Advanced Engineering Development (AD) contract was awarded in September 1982. A follow-on contract for FSED is expected to be awarded in 2Q FY 1984. In FY 1984 design refinements based on advanced development will be accomplished, engineering design test hardware will be manufactured, and Developmental Test-II (DT-II) will be initiated. Producibility Engineering Planning (PEP) will be conducted and PEP hardware manufactured. The Project Management Office will provide technical and administrative management including facility and production planning coordination. The technology developed in this project will be examined for application to other size antiarmor ammunition to upgrade the capacity of weapons in the US active and reserve component inventory.

2. **(U) D173 — Tank Target Practice:** The XM797 round in Project #D173 is reentering Advanced Engineering Development in FY 1983. Funds in this project will be utilized to complete Engineering Development, conduct Government Prototype Qualification Testing (PQT-G), and type classify the 105mm XM797 in FY 1984.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64701A

Title: Communications Engineering Development

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9864	11673	9610	24466	Continuing	Not Applicable
	QUANTITIES						*
D487	Tactical Multichannel Communications	7079	7908	8015	17965	Continuing	Not Applicable
D488	Tactical Net Radio Communications	2785	3765	1595	6501	Continuing	Not Applicable

* Quantity of Diversified Items.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides engineering development of Army Tactical Communications equipment. These types of items include cable/wire systems, telephone/data/record traffic terminals, data distribution equipment/systems, equipment shelters and tracked command post assemblages, antenna configurations, multichannel radio/multiplexer/technical control assemblages, antenna masts, radio couplers and ancillary equipment that increase the reliability, extend the useful life, and/or provide interoperability in the current inventory. The equipment developed under this program is needed to provide tactical commanders with reliable, secure, efficient communications equipment and ancillary items to insure command and control of tactical forces on a highly mobile, rapidly changing, modern battlefield. Where near-term priority user assistance is required, military adoption of commercial items and accelerated product improvement using existing technology will be employed through development by the Communication System Engineering Program. Goals are to achieve greater reliability, increased mobility, and reduced life cycle costs through employing state-of-the-art technology, reduced weight and power consumption, simplified installation and displacement, and reduced operator and maintenance personnel requirements. This program element also provides near-term and immediate improvement of tactical multichannel and single-channel communications/systems for the Reserve and National Guard.

Program Element: #64701A Title: Communications Engineering Development

DOD Mission Area: #345 — Tactical Communications Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	9864	11673	9610	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	8865	11705	14004	Continuing	Not Applicable

FY 1982 increase resulted form Army reprograming to allow execution of the planned program. FY 1982 funding increase supports engineering development for Fiber Optics Tranamission System (Long Haul). FY 1983 decrease is due to pro rata application of general Congressional reductions to the RDTE,A appropriation. FY 1984 funding decrease is a result of reprograming to higher priority Army programs and a revision of the anticipated inflation in the proposed Army RDTE program.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Program Element #62701A (Communications — Electronics) and Program Element #63707A (Communications Development) provide Exploratory and Advanced Developments that are continued into Engineering Development by this program. This program supports Program Element #63746A (Single-Channel Ground and Airborne Radio Subsystem (SINCGARS-V)) for ancillary equipment/components such as antenna, amplifiers, etc. This program does not duplicate other DOD efforts. Close liaison is maintained with other program managers to ensure duplication does not occur.

F. (U) WORK PERFORMED BY: During FY 1982, ITT, Nutley, NJ, was awarded the contract for engineering development of the Fiber Optics Tranamission System (Long Haul). First increment was awarded for $4,750,000. The second increment will be awarded in FY 1983 for a total of $6,100,000. In FY 1982, MITRE Corporation, Bedford, MA, was contracted for a $307,000 level of effort to provide systems engineering support for the Long Haul Fiber Optics Tranamission Systems. This effort will continue into FY 1983 for an additional $625,000. A contract for technical services was awarded in FY 1982 to Analytics, Shrewsbury, NJ, in support of Project Manager Operations; i.e., transition plans, baseline cost estimates, and Integrated Logistics Support Plans. Additional support contracts were also awarded in FY 1982 to Analytical Systems Engineering Corporation, Arlington, VA. Total level of effort awarded in FY 1982 for support contracts was $642,000. These efforts will continue into FY 1983 for an additional $586,000. In-House developing organizations supporting this program element are the Center for Communications Systems (CENCOMS), Fort Monmouth, NJ, and US Army Electronics Research and Development Command, Adelphi, MD.

Program Element: **#64701A** Title: **Communications Engineering Development**

DOD Mission Area: **#345 — Tactical Communications** Budget Activity: **#4 — Tactical Programs**

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D487 — Tactical Multichannel Communications:** The objective of this project is to develop mobile configuration assemblages of multichannel tactical communications equipment/systems to meet the requirements of the field Army. The approaches used will vary in detail from one type of assemblage/subtask to another, but in general they represent the latest state-of-the-art for which design application for corps and Army area communication requirements can best be satisfied. The assemblages provide maximum advantages for weight, mobility, reliability, cost, and operational utility for the specific application. Ongoing efforts for specific assemblages are in various stages of development within the full-scale development phase. The nature of this project is continuing in that the Army-approved Army Tactical Communications System (ATACS) plan identifies continuing development/enhancement of needed mobile tactical multichannel communications systems. Programs under this project also include developments and testing of hardware required to satisfy NATO interoperability requirements, millimeter wave command post and mobile applications, High Frequency Communications Systems, Mobile Intercept Resistant Radios, and tactical antenna systems which will be initiated in the 1980-1990 timeframe. Through this task, the Army is provided with a cost-effective means of quick-reaction fixes for high-priority tactical communication needs. FY 1982 accomplishments were: Continued MITRE Corporation contractual support effort for Fiber Optics Program. Completed proposal evaluation for Long-Haul Fiber Optics Transmission System and awarded first increment of engineering development contract. Prepared Procurement Data Package for prototype equipment on SB-3614 Tandem/Autovon Product Improvement. Continued contractual engineering support efforts in support of Project Manager Operations. FY 1983 program is: Continued preparation of procurement data package for SB-3614 Product Improvement and award first increment of research and development prototype contract. Fiber Optics design plan approved. Award second increment of Fiber Optics (Long Haul) engineering development contract. Initiate depot effort at Tobyhanna Army Depot for Fiber Optics Shelter modifications. Continued MITRE support for Fiber Optics. The FY 1984 planned program is: Continue Fiber Optics (Long Haul) engineering development contract and fabricate prototype hardware. Complete Prototype Qualification Test for Fiber Optics and initiate DT/OT II. Continue miscellaneous support contracts for project manager operations. This is a continuing project.

2. **(U) D488 — Tactical Net Radio Communications:** The objective of this project is to develop Tactical Net Radio components which are essential to maintain combat communication readiness of tactical forces. FY 1982 accomplishments were: Prepared Technical Data Package for OE-303 Antenna solicitation for production; continued engineering support and Test of OE-314; continued engineering support leading to engineering development contract award for Survivable Low Profile Antenna (SLPA); completed fabrication of Steerable Null Antenna Processor-I (SNAP-I) models; initiated SNAP-I DT/OT; developed additional antennas to meet Special Forces Burst Communication System (SFBCS) Required Operational Capability (ROC) requirements; developed improvements to G-76 Hand-Cranked Generator; corrected field-identified deficiencies of G-77 Hand-Cranked Generator; submitted Product Improvement for Improved High Frequency Radios (IHFR); initiated Engineering Development contract for Short-Term A/J Radio Program. The program for FY 1983 is: Award second increment of Short-Term A/J Radio Program contract; procure digital communications terminals for Center for Communication Systems (CENCOMS) comparison and performance analysis; procure additional antennas for Special Forces Burst Communications SFBCS Base Station; initiate Product Improvement for G-76 Hand-Cranked Generator; provide engineering support OG-174

Program Element: #64701A

Title: Communications Engineering Development

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

(Vehicular Applique for PRC-68); prepare Technical Data Package for production award of OE-314 (Log Periodic Antenna), complete OT-II for Steerable Null Antenna Processor (SNAP-II); evaluate First Article Test Reports for AN/PRC-113; and award engineering development contract for Broadband Vehicular Antenna. In FY 1984 the program is: start and complete DT/OT II for Broadband Vehicular Antennas; initiate engineering development program for High-Power Broadband Antenna; Test antennas for SFBCS Base Station; complete DT/OT II on Improved High Frequency Radio Product Improvement; prepare specification and data packages for Quick Erect Antenna Mast (QEAM); evaluate proposals and award ED contract for QEAM.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64702A** *Title:* **Joint Tactical Information Distribution System (JTIDS)**

DOD Mission Area: **#343 — Theater Communications** Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): *($ In Thousands)*

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	12340	20715	18096	20270	29165	116032
	QUANTITIES						27*
D451	Army Support of JTIDS	12340	20715	18096	20270	29165	116032

*Includes 22 terminals being funded by, and purchased in support of, other programs: 20 terminals for Program Element #63713 (Army Data Distribution System), Project #D370 (PLRS/JTIDS Hybrid); and 2 terminals for Program Element #64323 (High Technology Light Division), Project #D268 (AWACS Interface).

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Combat experiences in Southeast Asia and lessons learned from the 1973 Mideast War revealed that existing US military communications systems have a limited capability to operate effectively in intense jamming environments. Without communications, the effectiveness of multimillion-dollar weapon systems, as well as timeliness of needed information, is degraded. As a result, communication links are a natural target for enemy electronic countermeasures, particularly when disruption of communications for only a short time could yield an immediate advantage to the enemy. The Joint Tactical Information Distribution System (JTIDS) is a tri-Service program to develop and acquire an integrated tactical communication, navigation, and identification system which is secure and jam resistant. The Army's specific program, structured to capitalize on prior and ongoing Air Force/Navy JTIDS efforts, supports development of a JTIDS architecture for the Army ground environment. This approach also provides interoperability within joint and NATO environments, essential to successful air defense and air-ground operations. The JTIDS capability significantly enhances Army battlefield identification of friendly forces, and thus reduces possible fratricide. Army JTIDS efforts are directly related to the Army Data Distribution System (ADDS), or the Position Location Reporting System (PLRS)/JTIDS Hybrid (PJH) program, being developed under Program Element #63713A, Project #D370.

Program Element: #64702A Title: Joint Tactical Information Distribution System (JTIDS)

DOD Mission Area: #343 — Theater Communications Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	12340	20715	18096	49435	116032
Funds (as shown in FY 1983 submission)	15854	14556	12472	Continuing	Not Applicable

Reduction of $3514 thousand in FY 1982 funding level is a result of reprograming to higher priority programs. The funding increase of $6159 thousand in FY 1983 is the net result of: a $41 thousand decrease due to a pro rata application of general Congressional reductions to the RDTE,A appropriation; and a $6200 thousand increase due to reprograming of funds for the JTIDS program. The funding increase of $5624 thousand in FY 1984 is the net result of: a $318 thousand reduction which resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE program; a $12 thousand increase from revised civilian pay pricing indices; and a $5930 thousand increase due to revised cost estimates prepared and validated to support an ADDS (including JTIDS) Army Systems Acquisition Review Council (ASARC) meeting on 1 September 1982.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army:						
Funds (current requirements)	12700	- 0 -	- 0 -	- 0 -	- 0 -	12700
Quantities (current requirements)	4	- 0 -	- 0 -	- 0 -	- 0 -	4

The Army approved an urgent requirement on 14 April 1982 for a limited number of Adaptable Surface Interface Terminals (ASIT), AN/TCS-107, to provide a direct data link between the E-3A Airborne Warning and Control System (AWACS) and the AN/TSQ-73 (Missile Minder) system in support of the Rapid Deployment Force (RDF). An FY 1982 Congressional reprograming was approved in October 1982.

Program Element: #64702A | Title: Joint Tactical Information Distribution System (JTIDS)

DOD Mission Area: #343 — Theater Communications | Budget Activity: #4 — Tactical Programs

E. (U) RELATED ACTIVITIES: JTIDS is a joint Air Force-Army-Navy development with the Air Force acting as Executive Service under Program Element (PE) #64754F (JTIDS). PE #63713A (Communications Development), Project #D137 (JTIDS), moved to PE #64702A (JTIDS), Project #D451 (Army Support of JTIDS), in FY 1982. PE #64323A (High Technology Light Division), Project #D268 (AWACS Interface) is a related activity. PE #64727A (Command and Control), Project #DC98 (Position Location Reporting System (PLRS)), and PE #63713A (Army Data Distribution System (ADDS)), Project #D370 (PLRS/JTIDS Hybrid), are integrally related programs. The ADDS is intended to satisfy an urgent Army requirement for secure jam-resistant battlefield data distribution among maneuver control, fire support, air defense, electronic warfare/intelligence, and combat service support systems being fielded in the 1980s. ADDS consists of a mix of Enhanced PLRS User Units (EPUUs) and the JTIDS Class 2 terminal. The PLRS, Army participation in the JTIDS Program, and ADDS are centrally managed by one Army project manager under Army charter. Through this central management, the Army and Department of Defense insure that no unnecessary duplication of efforts occur.

F. (U) WORK PERFORMED BY: Management by Project Manager, Position Location Reporting System/Tactical Information Distribution System (PLRS/TIDS), Ft. Monmouth, NJ. In-house developing agencies are the US Army Communications-Electronics Command (USACECOM), Ft. Monmouth, NJ, and Electromagnetic Compatibility Analysis Center (ECAC), Annapolis, MD. Contractual efforts are provided by MITRE Corporation, Bedford, MA; The Singer Company (Kearfott Division), Little Falls, NJ; Rockwell International Corporation, Cedar Rapids, IA; Hughes Aircraft Company (Ground Systems Group), Fullerton, CA; and IBM (Federal Systems Division), Oswego, NY.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D451 — Army Support of JTIDS**

a. (U) Project Description: JTIDS is a tri-Service development and acquisition program to provide a high-capacity, jam-resistant, secure, digital communications system with navigation and identification capabilities. The Army's specific program, structured to capitalize on prior and ongoing Air Force/Navy JTIDS efforts, supports development of a JTIDS architecture for the Army ground environment. The primary Army development objective is to obtain sufficient Class 2 JTIDS terminals to support development, testing, and deployment of the PLRS/JTIDS Hybrid (PJH) system. If integration and testing of that program is successful, Army requirements will be satisfied for digital data distribution between automated battlefield systems using tactical computers. JTIDS Class 2 terminals in the PJH will provide data communications support for both existing and developing automated systems in the five functional areas of maneuver control, fire support, air defense, intelligence/electronic warfare, and combat service support. The Class 2 tactical terminals will enable these highly sophisticated and effective weapons and command and control systems, fielded in the 1990s and beyond, to operate at full potential.

Program Element: #64702A | Title: Joint Tactical Information Distribution System (JTIDS)

DOD Mission Area: #343 — Theater Communications | Budget Activity: #4 — Tactical Programs

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: Continued Joint Full-Scale Development (FSD) of the JTIDS Class 2 terminal. Specifically, Preliminary and Critical Design Reviews were completed. The Class 2 terminal's capacity was increased with the implementation of the PACKED-4 enhanced message structure. Also completed was the initial Joint Network Management Model development, and the configuration of the Army Adaptable Surface Interface Terminal (ASIT) was determined. Implemented an updated version of the Tactical Digital Information Link-JTIDS (TADIL-J) software. Demonstrated the E-3A Airborne Warning and Control System (AWACS) interoperability with the Army AN/TSQ-73 (Missile Minder) System via the JTIDS ASIT during Bold Eagle-82.

(2) (U) FY 1983 Program: Continue Joint FSD of the JTIDS Class 2 terminal. Deliver five FSD terminals to the PJH (ADDS) Phase 3/4 Testbed. Initiate contract for development of a JTIDS/ADDS systems exerciser. Initiate an Over-The-Air-Rekeying (OTAR) study for the Class 2 terminal applications in a battlefield environment. Initiate development of the Army Tactical Data Link (ATDL-1) message standard for ASITs to allow the Air Defense Brigade Operations Center to interface with the Battalion Operations Center. Continue Electromagnetic Compatibility studies. Continue Joint Network Management Model development used to evaluate net management techniques. Initiate contract for the Army Class 2 terminal Technical Manuals (SPAs).

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: Continue FSD of the Class 2 terminal to include initial test and evaluation. Participate in a joint effort with the USAF to move the JTIDS message standard from the Interim JTIDS Message Specification (IJMS) to the Tactical Data Information Link-Joint (TADIL-J). Continue development of Test Program Sets (TPSs), SPAs, integrated logistic support packages, the OTAR study, and net management techniques. Support the PJH testbed.

(4) (U) Program to Completion: Complete FSD of the Class 2 terminal. Related and supporting follow-on activities: Evaluate application of technology insertion programs such as Very High Speed Integrated Circuitry (VHSIC) for the Class 2 terminal; terminal integration and test of TADIL-J; complete development of OTAR; complete additional JTIDS interfaces for PJH as may be required; provide JTIDS support during later PJH testbed phases; complete TPSs, SPAs, integrated logistics support packages and net management technique studies; participate in Joint JTIDS development/operational testing (DT/OT) and exercises/demonstrations within and outside the US.

Program Element: #64702A

Title: Joint Tactical Information Distribution System (JTIDS)

DOD Mission Area: #343 — Theater Communications

Budget Activity: #4 — Tactical Programs

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Joint Production Decision	4Q FY 1985	2Q FY 1986

A Joint Production Decision will replace the Defense Systems Acquisition Review Council (DSARC) III that was scheduled for the 2Q FY 1986 and has been accelerated by two quarters.

Program Element: #64702A Title: Joint Tactical Information Distribution System (JTIDS)

DOD Mission Area: #343 — Theater Communications Budget Activity: #4 — Tactical Programs

I. (U) **TEST AND EVALUATION DATA:** The full-scale development and test of the Class 2 JTIDS terminal is the Army's principal interest in the JTIDS program. This terminal will be used with the Position Location Reporting System (PLRS) to form the PLRS-JTIDS Hybrid (PJH), also called the Army Data Distribution System (ADDS). A JTIDS Joint Test Force (JTF) has been established to manage joint Service Development Test and Evaluation (DT&E)/Initial Operational Test and Evaluation (IOT&E). The JTF consists of personnel who represent the interests of the development and test communities in each DOD component. Army participation in the JTF is supported as appropriate by representatives of using, supporting, training, and testing commands. Army program management for this USAF lead program is performed by the Project Manager, Position Location Reporting System/ Tactical Information Distribution System (PLRS/TIDS), Ft. Monmouth, NJ, through a Deputy Project Manager—Army assigned to the Air Force program office, Hanscom Air Force Base, Bedford, MA. The primary development contractors are The Singer Company (Kearfott Division), Little Falls, NJ, and Rockwell-International Corporation, Cedar Rapids, IA.

1. (U) **Development Test and Evaluation:**

a. (U) The US Army Test and Evaluation Command (TECOM) at Aberdeen Proving Ground, MD, serves as the Responsible Test Organization (RTO) for Army-unique development test and evaluation (DT&E). DT&E will assure that engineering design and development are complete and that design risks are minimized. Test plans will be geared to address design maturity.

b. (U) During the JTIDS Program, several distinct periods of test and evaluation (T&E) have been performed. The first JTIDS T&E period was a basic concept demonstration and validation of the large Class I Time Division Multiple Access (TDMA) terminal (AN/ARC-181) prior to review of the JTIDS program by DSARC principals in April 1978. Early DT&E provided data that addressed the following issues:

(1) (U) Communications, Navigation, and Identification (CNI) performance of terminals using different waveform structures.

(2) (U) AN/ARC-181 CNI performance under multipath and jamming conditions.

(3) (U) TDMA frequency compatibility with presently planned Air Traffic Control (ATC) systems in the 960-1215 MHz band.

(4) (U) Net management procedures

(5) (U) E-3A (AWACS) and AN/ARC-181 physical and electrical interface.

(6) (U) Logistic supportability and reliability, availability, and maintainability (RAM).

Program Element: #64702A

Title: Joint Tactical Information Distribution System (JTIDS)

DOD Mission Area: #343 — Theater Communications

Budget Activity: #4 — Tactical Programs

c. (U) The following tests were conducted to support Army requirements:

(1) (U) Foliage Propagation Test. The Army completed tests on both the Position Location Reporting System (PLRS) and the JTIDS in ground foliage in November 1979. The systems were tested from the perspective of the PLRS/JTIDS Hybrid (PJH) program, and obtained propagation performance data over forested paths and mountainous terrain using different antenna heights and power levels. The tests validate prior analytical data and indicate that dense forest paths have the expected effect on useable path length. System performance and connectivity are enhanced through the use of the inherent automatic relay capability of the hardware and multiple routing of traffic.

(2) (U) JTIDS-Interactive Display Terminal (IDT) demonstration. In November-December 1980, the Army conducted a successful demonstration showing the advantage of using JTIDS to transfer air surveillance radar data to Short-Range Air Defense (SHORAD) elements. Testing was conducted at Eglin Air Force Base, FL. Tracking data were transmitted from the Combat Reporting Center (CRC) at Hurlburt Field through an AN/TCS-107 Adaptable Surface Interface Terminal (ASIT) to a simulated SHORAD element. There the data were received on an AN/URQ-28 (Class 2 TDMA Terminal-Advanced Development Model), and the resulting tracks were displayed on the handheld IDT. Position messages were also transmitted from a JTIDS pod-equipped F-4E aircraft directly to the SHORAD element and displayed as friendly tracks on the IDT.

(3) (U) Bold Eagle 81 and 82. In October 1981 and October 1982, the JTIDS capability to operate in links from the E-3A to AN/TSQ-73 Brigade and Battalion Operation Centers, through an AN/TCS-107 (ASIT) interface, was demonstrated during Exercises Bold Eagle 81 and 82 at Eglin Air Force Base, FL. Testing showed that E-3A radar data can be successfully transferred directly to Army Air Defense units via JTIDS data links. The data were transferred to HAWK batteries to effectively target incoming aircraft when the CRC was simulated as inoperable.

d. (U) Near-term JTIDS T&E work will be primarily in support of the Army PLRS/JTIDS Hybrid (PJH) testbed using advanced development models until engineering development models are available in May 1983.

e. (U) Future JTIDS DT&E testing will comprise tests to expand the TDMA data base and support the following milestones:

(1) (U) A Class 2 TDMA Terminal Joint Production Decision in 1985. (Joint DT&E/IOT&E for the Class 2 EDM terminals, under USAF lead, will be accomplished during 1984 and 1985 at Eglin Air Force Base, FL. The T&Es will be conducted to determine how well the Class 2 system enhances the operational capabilities of the tactical forces. The DT&E phase will evaluate basic terminal capabilities against specific values.)

(2) (U) PJH development completion in 1987. (PJH system DT&E is currently scheduled in FY 1987 and will be managed by USATECOM.)

Program Element: #64702A | Title: Joint Tactical Information Distribution System (JTIDS)

DOD Mission Area: #343 — Theater Communications | Budget Activity: #4 — Tactical Programs

2. (U) Operational Test and Evaluation: The US Army Operational Test and Evaluation Agency (OTEA) at Falls Church, VA, serves as the Responsible Test Organization (RTO) for Army-unique OT&E. OT&E of JTIDS will be conducted periodically during the 1984-1987 timeframe. The tests will focus on both interoperability and the enhancement of joint mission effectiveness for Army users equipped with JTIDS. Army devices involved are the AN/TSQ-73, SHORAD C2 system, TACFIRE, Maneuver Control System, and various systems of the Intelligence/Electronic Warfare community. Army OT&E provides for the operational verification of the PJH System with the Class 2 TDMA terminals. (Corrections and improvements resulting from this testing will be incorporated into PJH and Class 2 terminal production programs.) Future JTIDS OT&E will support the following milestones:

a. (U) A Class 2 TDMA Terminal Joint Production Decision in 1985. (Joint DT&E/IOT&E for the Class 2 EDM terminals, under USAF lead, will be accomplished during 1984 and 1985 at Eglin Air Force Base, FL. The IOT&E phase will evaluate terminal capabilities in tactical operations and scenarios. In addition, Air Force and Army interoperability objectives will be evaluated.)

b. (U) PJH development completion in 1987. (The PJH system will be deployed to a FORSCOM unit in FY 1987 for operational testing (OT II) by a division force. Air defense and fire support scenarios will be conducted to verify the ability of the PJH system to satisfy Communications, Navigation, and Identification (CNI) requirements.

3. (U) System Characteristics:

		Operational/Technical Characteristics	Objectives	Demonstrated Performance
(a)	(U)	**Operational**		
	(1) (U)	Jam Resistance		To be determined in FSD testing
	(2) (U)	Time of Arrival Ranging Accuracy (@150 NMI)		
(b)	(U)	**Technical**		
	(1) (U)	Coded Message Error Probability (For 200-bit Message)	1x10-2	To be determined in FSD testing
	(2) (U)	Coded Data Rate (1 net)	28.8 Kbps	

FY 1964 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64706A

Title: Modular Integrated Communication and Navigation System (MICNS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1962 Actual	FY 1963 Estimate	FY 1964 Estimate	FY 1965 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	18179	14712	9200	4196	8497	96354
D207	Modular Integrated Communications and Navigation System (MICNS)	18179	14712	9200	4196	8497	96354

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: US forces face highly mobile and heavily mechanized forces that will make maximum use of Electronic Countermeasures (ECM) to render US surveillance, target acquisition, and strike systems ineffective. The MICNS project is the only DOD project intended to meet the ECM threat and achieve essential interoperability through the development of modular antijam data link components that can be configured to satisfy a wide range of the Services' command and video requirements. The initial configurations will meet the Electronic Counter-Countermeasures (ECCM) needs of the Army's Remotely Piloted Vehicle System (RPV). The MICNS will improve US forces' capability for early warning alert, target acquisition, and target strike in the face of intensive opposing forces' electronic countermeasures at an affordable cost by eliminating duplicative development and sharing common logistics. The MICNS uses an architecture that can be enhanced in response to an escalated threat in the 1990s.

C. (U) COMPARISON WITH FY 1963 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1962	FY 1963	FY 1964	Additional to Completion	Total Estimated Cost
RDTE					
Funds (Current requirements)	18179	14712	9200	12693	96354
Funds (as shown in FY 1963 submission)	17589	14754	7637	4902	86107

Program Element: #64706A

Title: Modular Integrated Communication and Navigation System (MICNS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

FY 1982 increase was to correct design problems. The decrease in FY 1983 is a pro rata application of a general Congressional reduction to the RDTE,A appropriation. Increases in FY 1984 and additional-to-completion reflect Army RPV decision of 30 September 1982 to fully fund the MICNS FSED program to minimize risk to the RPV deployment schedule. The increase was necessary to provide timely deliveries and support of the hardware and system support package to the RPV prime contractor, and to correct design problems revealed during system acceptance testing.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Prior to April 1975, initial exploratory development efforts of MICNS were jointly funded by the Army under Program Element #62703A, Project DH93, and Defense Research Projects Agency, Program Element #62702E. This activity verified the basic ECCM concepts needed to develop a system suitable for tactical intelligence, surveillance, and target acquisition systems. In April 1975, an advanced development program commenced with funding provided in Program Element #63725A (Remotely Piloted Vehicles), Project #DK61, which demonstrated the feasibility of building an Integrated Communications and Navigational System (ICNS) that could meet the jamming threat and stringent size, weight, and power requirements of miniature remotely piloted vehicles. The effort was also funded from Program Element #63736A (Standoff Target Acquisition System), Project #D171, to demonstrate the feasibility of sharing common data link components with the RPV system. Testing of the advanced development models at Fort Huachuca in early 1978 successfully demonstrated the system concept. The testing was conducted under Program Element #63725A (RPV). Advanced development was completed in FY 1978, and the program moved into Engineering Development (ED) with the objective of building common data link modules to meet the requirements of two Army programs and two Air Force programs. Prior to FY 1982, the MICNS ED program was funded from Program Elements #64748A (SOTAS), #64730A (RPV), and #64742F (PLSS).

F. (U) WORK PERFORMED BY: Responsibility for management of the MICNS project is assigned to the Product Manager, MICNS, US Army Electronics Research and Development Command (ERADCOM), Fort Monmouth, NJ. In-house work is performed by ERADCOM, Ft. Monmouth, NJ, and Adelphi, MD; and the US Army Communications-Electronics Command (CECOM), Fort Monmouth, NJ. Contractors include Harris Corporation, Melbourne, FL, and Systems Planning Corporation, Rosslyn, VA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D207 — Modular Integrated Communications and Navigation System (MICNS): The objective of this project is to eliminate the proliferation of noninteroperable, nonantijam data links by the successful Engineering Development (ED) of modular data link components that can be form-fitted to meet the needs of various users. The program element consists of one active project, MICNS. Feasibility of a common, modular, highly jam-resistant data link for multiple applications was proven under the advanced development program conducted between 1975 and 1978 under the SOTAS and Remotely Piloted Vehicle 6.3 program elements. Prior to FY 1982, Engineering Development of the MICNS was funded under the Army's SOTAS Program Element #64748A and RPV Program Element #64730A and the Air Force PLSS

Program Element: **#64705A**

Title: **Modular Integrated Communication and Navigation System (MICNS)**

DOD Mission Area: **#344 — Tactical Command and Control**

Budget Activity: **#4 — Tactical Programs**

Program Element 64742F. A separate MICNS program element commencing in FY 1982 represents a Department of the Army (DA) decision to elevate the management level of this crucial project to separate program element status in order to afford better management visibility and allow broader application of the equipment to other developing systems faced with similar ECM threats and system needs. By employing a waveform that is compatible with a variety of ECCM provisions, the MICNS will allow the using systems to meet the ECM/jamming threats projected to exist from Initial Operational Capability (IOC) until the end of their life cycle. Validation testing for basic components and ECM techniques was successfully completed on Advanced Development models at Ft Huachuca, AZ, in 1978. Full-Scale Development (FSD) for SOTAS was approved at the SOTAS DSARC in August 1978. RPV participation in the MICNS development was approved by the Department of the Army at the RPV validation In-Process Review in September 1978. The ED contract for MICNS was awarded to Harris Corporation, Melbourne, FL, through a competitive procurement in May 1979. Full-Scale Development continued in FY 1980. A completed SOTAS engineering prototype was demonstrated and tested in July 1980. The RPV engineering prototype was completed, and delivered to the RPV contractor as a system integration and test terminal (SITT). The prototype engineering tests successfully demonstrated the performance and validity of the RPV and SOTAS designs. Design of final hardware was completed in FY 1982, and first units successfully underwent performance testing. The first terminals were delivered to the RPV contractor in October 1982. Hardware qualification will be completed, and delivery of remaining ground data terminals and 12 air data terminals is scheduled for FY 1983. Development of operator manuals will be completed, and the remainder of the DT/OT system support package will be started. Integration of the MICNS hardware into the RPV system will be completed, and first RPV flight using MICNS is scheduled for last quarter FY 1983. FY 1984 planned program hardware deliveries will be completed, and MICNS will enter DT with the RPV system. Completion of DT/OT system support package is scheduled for third quarter FY 1984. Development of the remainder of the system support package for deployment will be initiated. This includes completion of Test Program Sets for Automated Test Equipment. Other Army, Navy, and Air Force applications of the MICNS Antijam datalink components are being investigated.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64706A**

Title: **Radiological Defense Equipment**

DOD Mission Area: **#241 — Battlefield Theater Nuclear Warfare**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	308	838	943	1541	*Continuing*	Not Applicable
D517	Radiac Equipment Engineering Development	308	838	943	1541	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Nuclear burst detection and radiological ground survey equipment is required on the battlefield for the assessment and measurement of hazardous nuclear environments. This type of equipment gives the commander the capability to know where the nuclear fallout zones are and take necessary protective measures or avoid the hazardous areas in the course of the battle. Urgently required aerial and vehicular radiacs are provided which will replace the current generation of handheld instruments. The aerial remotely piloted vehicle and ground vehicular radiacs will reduce both the time required for survey and the radiation hazard to the soldiers making the survey. Radiation histories of individual soldiers and units are provided so that soldiers or units approaching lethal radiation doses can be moved away from the threat environment and thereafter be given prompt medical treatment appropriate to the level of radiation received. This program provides for the engineering development of the radiological survey and dosimetry equipment required by the Army. Current equipment measures fallout (gamma) radiation only; new equipment will have the important additional capability of measuring prompt (from fireball) radiation, and will detect both neutrons and gamma rays. The dynamic range of new devices will be substantially improved. Alarm capabilities to alert the threatened soldier are included in new equipment. Errors made in reading data are significantly reduced by providing for automatic scale selection and digital readout. New equipment will be reduced in weight and size, and will combine the capabilities of the family of current radiac meters into single units. This will reduce the unit and man-carried load.

Program Element: **#64706A** Title: **Radiological Defense Equipment**

DOD Mission Area: **#241 — Battlefield Theater Nuclear Warfare** Budget Activity: **#4 — Tactical Programs**

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	308	838	943	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	308	838	968	Continuing	Not Applicable

The funding decrease of $23 thousand in FY 1984 resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement Army:						
Funds (current requirements)	5800	2400	2500	20200	Continuing	Not Applicable
Quantities (current requirements)				(Numerous procurements of a variety of instruments)		

The funding increase of $2 million in FY 1982 was a result of reprograming action to support procurement of the reader, CP-696, associated with the individual dosimeter, DT-236. The funding decrease of $23,700 thousand in FY 1984 is a result of program realignment.

E. (U) RELATED ACTIVITIES: This effort is related to Exploratory Development conducted in Program Element (PE) #62703A (Combat Surveillance/Target Acquisition and Identification) and to Advanced Development conducted in PE #63604A (Nuclear Munitions and Radiacs). The effort and direction of this program is not duplicated by other programs within the DOD. A Navy alpha monitoring and survey meter has been adapted for Army use, and the Air Force is participating in the tactical dosimeter program. An installation fallout monitor and alarm system, the AN/GDQ-3, was developed jointly with the Canadian Department of Defense Production, and the DT-236 individual dosimeter is being developed jointly with the United

Program Element: **#64708A** Title: **Radiological Defense Equipment**

DOD Mission Area: **#241 — Battlefield Theater Nuclear Warfare** Budget Activity: **#4 — Tactical Programs**

Kingdom Ministry of Defense. An International Materiel Evaluation (IME) program was established to evaluate a Federal Republic of Germany individual dosimeter similar to the DT-236 to determine which individual dosimeter best meets Army requirements. A vehicular radiation monitor, survey, and alarm radiac system is being developed to be compatible with all armored fighting vehicles. Liaison with other Services is maintained through the Tri-Service Radiac Working Group to preclude duplication.

F. (U) WORK PERFORMED BY: In-house Army efforts are performed by the US Army Electronics Research and Development Command (ERADCOM), Adelphi, MD. Principal contractors are: Rockwell International Corporation, Los Angeles, CA; Xetex Inc, Mountain View, CA; Scintrex Ltd, Toronto, Canada; Nuclear Research Corporation, Warrington, PA; and Dewey Electronics Corporation, Oakland, NJ.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D517 — Radiac Equipment Engineering Development: Current dose-rate meters are relatively inaccurate, do not cover the dynamic range required, do not measure prompt radiation, and do not provide an audio alarm to the threatened soldier. Currently there is no rapid aerial or vehicular survey capability, there is no adequate fallout measurement and alarm system for fixed and semifixed installations, and there is no automated burst detection system. The objective of this program is to develop burst detection and dosimetric devices having the performance parameters required to fight on the modern nuclear battlefield. A family of radiological equipment is being developed to provide aerial, vehicular, and dismounted capabilities to measure both prompt (from fireball) and residual (from fallout) radiation. Individual and tactical dosimeters for measurement of prompt and residual neutron and gamma radiation are being developed on a low-cost basis for individual use. These individual and tactical dosimeters will provide commanders with an immediate knowledge of the recent radiation history of their units and will provide a lifetime radiation history for the individual soldier. The vehicular radiac system will be mounted in armored fighting vehicles and can effectively monitor outside fallout radiation levels from within the vehicle. The vehicular radiac may also be used in a dismounted role. In FY 1982 prototype hardware for the vehicular radiac system (AN/VDR-2) was developed, work on technical manuals and drawings was continued, and development of Large-Scale Integrated Circuit (LSIC) chips was brought to near completion. The FY 1983 program calls for completion of the vehicular radiac hardware development and both development and user testing (DT/OT). The FY 1984 program envisions completion of the vehicular radiac Producibility Engineering Program (PEP) and production decision.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64709A**

Title: **Identification Friend or Foe (IFF) Equipment Development**

DOD Mission Area: **#344 — Tactical Command and Control**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2418	2653	3965	7624	Continuing	Not Applicable
D530	IFF Equipment	2418	2653	3965	7624	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Full-scale development (FSD) models of equipment are needed to satisfy Army air defense and battlefield requirements. Programs include: (1) new applications of and improvements to the existing cooperative Mark XII air defense identification Friend or Foe (IFF) system; (2) development of signal processing techniques and equipment for the noncooperative identification of aircraft by selected weapon forms to enable positive identification of foes and friends with malfunctioning transponders, and (3) a multifunction radar transponder beacon for use by Special Forces in operations.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	2418	2653	3965	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	2418	2660	4793	Continuing	Not Applicable

The funding decrease of $7 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The reduction in FY 1984 funding is due to reprograming to higher priority programs.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

Program Element: #64709A

Title: Identification Friend or Foe (IFF) Equipment Development

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

E. (U) RELATED ACTIVITIES: Advanced Development efforts on NATO Identification System (NIS) Mark XII improvements and noncooperative identification are accomplished under Program Element #63706A (IFF Developments), Project #D243 (IFF Developments). The Air Force and Navy are participants in the joint Service development of the Combat Identification System (CIS), with the overall program being coordinated by the Air Force System Program Office (SPO). This coordinated effort is designed to avoid possible duplication of effort.

F. (U) WORK PERFORMED BY: Army IFF activities are managed by the Combat Surveillance and Target Acquisition Laboratory in Fort Monmouth, NJ, under the US Army Electronics Research and Development Command, Adelphi, MD. Application of Mark XII technical improvements is being accomplished by Hazeltine Corporation of Greenlawn, NY. Application to the Scout helicopter is based on the STINGER interrogator (AN/PPX-3) built by Teledyne Electronics of Newbury Park, CA, who are also performing Mark XII technical improvements. Noncooperative IFF for HAWK is being constructed by SCOPE, Inc., of Reston, VA. The multifunction radar transponder beacon (AN/PPN-19) effort is being accomplished by Motorola in Phoenix, AZ.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D530 — IFF Equipment: The existing Mark XII IFF system for air defense is used by all three Services. New weapon systems can use this system by incorporating Mark XII interrogators to cryptographically elicit responses from military aircraft equipped with transponders. Versions of Mark XII interrogators are, therefore, planned for the lightweight Air Defense System (LADS), the Scout helicopter self-protection missile system, and the SHORAD Command and Control (C^2) system. Because the Mark XII is based on 30-year-old technology, improvements both to individual equipment and to the systems are being sought to enable the Mark XII to perform its function until the time when it will be supplanted by the next-generation system (Mark XV, part of the NATO Identification System). Noncooperative IFF techniques are also being pursued. These offer the advantage of providing positive identification of hostiles as well as friends, permitting engagement at, or close to, maximum weapon ranges. The most advanced techniques are in the area of aircraft identification using radar signature analysis, with systems for HAWK and PATRIOT likely to be the first to reach engineering development. Finally, a multifunction radar transponder beacon (AN/PPN-19) is being sought by Special Forces units, to facilitate their identification by Air Force and Navy support aircraft. It is anticipated that, for this application, an existing commercial beacon can be modified to perform satisfactorily. In FY 1982, contracts were awarded to increase jamming resistance and replace obsolescent circuitry in the AN/TPX-46 and AN/PPX-3 Mark XII interrogator sets. In FY 1983, a contract will be awarded for full-scale development models of hostile aircraft identification equipment (HAIDE). Also, award a contract to modify certain AN/APX-100 transponders for data bus compatibility and complete testing of transponder beacon AN/PPN-19. Award contract to provide modes 1, 3 and 3 capability to SGT YORK interrogator. In FY 1984, complete fabrication and laboratory testing of Mark XII circuit improvements and initiate Development Testing/Operational Testing (DT/OT) II. Continue ED contract for noncooperative processors for HAWK. Award of hardware contracts account for the significant increase in FY 1984 dollar requirements.

Program Element: #64709A

Title: Identification Friend or Foe (IFF) Equipment Development

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64710A

Title: Night Vision Devices

DOD Mission Area: #217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5476	3916	5368	13289	Continuing	Not Applicable
DL70	Night Vision Devices	5476	3916	5368	13289	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The objective of this program is to perform Engineering Development and obtain Type Classification of Night Vision Devices which, while not specifically dedicated as parts of a major weapon system, are needed by many diverse elements of the field Army to perform military functions at night and during periods of limited visibility with efficiency approaching that of daylight. These devices provide for target acquisition and task accomplishment and enhanced survivability on the obscured, 24-hour-a-day battlefield. Exploitation of technological advances will permit fielding of night vision devices to meet this critical need. The program is directed to minimize life cycle costs through simplified logistics by making maximum use of common sensors in the night sights of as many weapon systems as possible, and by incorporating technology advances in a fashion that is compatible with deployed devices.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	5476	3916	5368	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	5326	4931	5777	Continuing	Not Applicable

The increase in FY 1982 ($150 thousand) was due to a slight increase in spare part requirements in order to complete DT/OT II and complete Type Classification action for the AN/AVS-6, Aviator's Night Vision Imaging System. The decrease in FY 1983 ($1015 thousand) was due to reprograming to the 105mm gun enhancement. Decrease in FY 1984 ($409 thousand) was a result of a revision of the anticipated inflation in the proposed Army RDTE budget.

Program Element: **#64710A** Title: **Night Vision Devices**

DOD Mission Area: **#217 — Land Warfare Surveillance and Reconnaissance** Budget Activity: **#4 — Tactical Programs**

D. (U) OTHER APPROPRIATED FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The United States Navy, Marine Corps, and Air Force utilize the same sensors and/or end item equipment as the Army. The Army has configuration management responsibility for these sensors, which are being utilized by NATO allies as well. The efforts of the Services and our allies are closely coordinated, and duplication thus avoided. Advances realized in Program Element 63710A, Night Vision Advanced Development, are utilized.

F. (U) WORK PERFORMED BY: In-house work is performed by the United States Army Electronics Research and Development Command, Night Vision and Electro-Optics Laboratory, Fort Belvoir, VA. Current major contractor is Baird Corporation, Bedford, MA. Contractors for sensor development are; ITT, Roanoke, VA; Litton Systems, Inc., Tempe AZ.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: DL70 — Night Vision Devices: The purpose of this project is to develop a night vision capability which is needed and not covered by other overall weapon system developments. In FY 1982, the AN/AVS-6, Aviator's Night Vision Imaging System, was type classified standard and the production effort initiated. Engineering Development for the AN/PVS-7, Night Vision Goggle, utilizing third-generation technology was initiated. This device will make possible the fielding of additional night vision goggles for the individual soldier in the numbers required at a cost which can be afforded by the Army, in that a single sensor will be employed rather than the present two sensors utilized in the second-generation goggles. In FY 1983 DT/OT II on the AN/PVS-7, Night Vision Goggle, will be conducted. Contractual efforts for the Engineering Development on the Advanced Driver's Viewer will be initiated in late FY 1983. In FY 1984, type classification of the AN/PVS-7, Night Vision Goggle, will be obtained and initial production contracts awarded. The Engineering Development of the Advanced Driver's Viewer will continue. The Thermal Weapon Sight scheduled to begin Engineering Development (ED) will undergo extensive testing in FY 1984 and go into ED in FY 1985.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64711A

Title: Aircraft Survivability Equipment (ASE)

DOD Mission Area: #371 — Self-Protection

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	15374	20277	18308	27535	Continuing	Not Applicable
D665	Aircraft Survivability Equip	15374	20277	18308	27535	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the survivability equipment needed to meet tactical and Special Electronic Mission Aircraft (SEMA) requirements to increase combat effectiveness by reducing or eliminating the ability of threat air defense systems to detect, hit, damage, or destroy Army aircraft. Increased survivability is accomplished through the development, test, and type classification for production and fielding of Aircraft Survivability Equipment (ASE). This program addresses infrared, radar, laser, optical/electro-optical directed air defense threats and is time-phased to be a logical follow-on to advanced development from PE #63711A (Aircraft Survivability Equipment). Continual adjustments are made to this program to meet the changing nature of technology, and the program responds to substantiated user requirements based on documented threat, and the Required Operational Capability (ROC) for Aircraft Survivability Equipment (ASE) for both current and developmental Army aircraft.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	15374	20277	18308	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	14406	20335	17019	Continuing	Not Applicable

FY 1982 increase reflects a restructuring of the D665 program to reflect the higher priority placed on ASE by the Army and OSD to escalate survivability programs. The funding decrease of $58 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The FY 1984 increase of $1289 thousand is due to the higher Army priority placed on the development on the Radar interferometer for application to scout and attack aircraft. The change includes a reduction of $645 thousand resulting primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

Program Element: **#64711A** Title: **Aircraft Survivability Equipment (ASE)**

DOD Mission Area: **#371 — Self-Protection** Budget Activity: **#4 — Tactical Programs**

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Army:						
Funds (current requirements)	96236	37200	117100	107900	Continuing	Not Applicable
Quantities (current requirements)	N/A	N/A	N/A	N/A	N/A	Not Applicable

The Aircraft Survivability Equipment (ASE) program provides a wide range of ASE to eleven separate aircraft modification lines and two aircraft production programs. It is therefore impossible to provide meaningful quantitative data in the limited format required. The funding profile reflects the increased amount of ASE being fielded and the inherent complexity of the new technology.

E. (U) RELATED ACTIVITIES: This program is conducted in conjunction with PE #63711A (Aircraft Survivability Equipment), also managed by the Army Project Manager for Aircraft Survivability Equipment (PM-ASE), and PE #63215A (Joint Survivability Investigations), for which the PM-ASE is the Senior Army Representative. In 1977, the Joint Logistics Commanders signed a Memorandum of Agreement (MOA) outlining responsibilities for tri-Service development and production of the following items of equipment for helicopters and selected fixed-wing aircraft: (1)Army: Radar and laser warning receivers, radar jammers, infrared (IR) jammers and pulse doppler missile warning detectors for selected helicopters and low/slow fixed-wing aircraft; (2) Navy: IR jammers for large helicopters, continuous wave (CW) radar jammers for Navy aircraft and Army special electronic mission aircraft (SEMA) and ultraviolet missile warning detectors for selected helicopters and fixed-wing aircraft; and (3) Air Force: IR missile warning detectors for fixed-wing and selected large helicopters. International coordination is achieved through North Atlantic Treaty Organization (NATO) Army Armaments Group (NAAG) and Quadripartite Working Groups. There is no unnecessary duplication of effort within the Army or the Department of Defense.

F. (U) WORK PERFORMED BY: US Army Aviation Research and Development Command (AVRADCOM), St. Louis, MO; US Army Electronics Research and Development Command (ERADCOM), Ft. Monmouth, NJ; Electronic Warfare Laboratory, Ft. Monmouth, NJ; US Army Armament Research and Development Command (ARRADCOM), Dover, NJ. Contractors: Sanders Associates, Inc., Nashua, NH; ITT Corporation, Nutley, NJ; Perkin Elmer, Danbury, CN; Sikorsky Aircraft Company, Stratford, CT; Science Applications Inc., Huntsville, AL; Hughes Helicopters Inc., Culver City, CA; Northrop, Rolling Meadows, IL; Dalmo-Victor, Belmont, CA.

Program Element: #64711A

Title: Aircraft Survivability Equipment (ASE)

DOD Mission Area: #371 — Self-Protection

Budget Activity: #4 — Tactical Programs

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D665 — Aircraft Survivability Equipment:**

a. **(U) Project Description:** The objective of this project is the qualification for production and type classification of passive and active countermeasure equipment for the increased combat effectiveness of Army Aircraft in a hostile air defense environment composed of radar, infrared, optical/electro-optical and laser directed weapon systems. This equipment has application to Special Electronic Mission Aircraft (SEMA) and all rotary-wing aircraft.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** The FY 1982 program continued the engineering development for the AVR-2 laser warning receiver (OT II completes 3Q FY 1983); the ALQ-156 Missile Detector application to Special Electronic Mission Aircraft (SEMA); the Hover IR Suppressor for the UH-60 Black Hawk Helicopter; and the joint development with the Navy of the ALQ-162 Continuous Wave Radar Jammer. Engineering development was initiated for the airborne intercepter (AI) Modular upgrade to the ALQ-136 Radar Jammer; the millimeter wave and digital modular upgrades of the APR-39 Radar Warning Receiver; the ALQ-144 Infrared Jammer Modular improvements; and the Low Air Speed product improvement of the ALQ-147A(V). The Nitrogen Inerting Unit for Fuel Fire Suppression was applied to the AH-64.

(2) **(U) FY 1983 Program:** During FY 1983, completion of development of the AVR-2 Laser Warning Receiver; the ALQ-156 Missile Detector for Special Electronic Mission Aircraft (SEMA) application; and low airspeed improvement to the ALQ-147A Infrared Jammer will be accomplished. Development will continue on the ALQ-162 Continuous Wave (CW) Radar Jammer; the AI Modular for the ALQ-136 Radar Jammer; the APR-39 Radar Warning Receiver and Modular upgrades; and the Hover IR Suppressor for the UH-60 Black Hawk Helicopter. Engineering development will be initiated for a Radar Interferometer for the AHIP and AH-64 Aircraft.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** During FY 1984, ALQ-162 CW Radar Jammer will be completed and threat-related software updated; OT II of the UH-60 Black Hawk IR Suppressor will be completed; upgrade to the ALQ-136 Radar Jammer will be continued and development of the monopulse and digital RF memory submodules initiated. These modular upgrades apply to both attack and Special Electronic Mission Aircraft (SEMA). Development of the modular upgrades to the APR-39 Radar Warning Receiver and the radar frequency (RF) interferometer for scout and attack helicopters will continue; development will be completed on the ALQ-156 missile detector application to Special Electronic Mission Aircraft (SEMA).

Program Element: #64711A

Title: Aircraft Survivability Equipment (ASE)

DOD Mission Area: #371 — Self-Protection

Budget Activity: #4 — Tactical Programs

(4) (U) Program to Completion: This is a continuing program.

c. (U) Major Milestones: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64712A

Title: Army Command and Control System Systems Engineering

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	8577	13868	10509	24782	Continuing	Not Applicable
D323	System Engineering for Tactical C³ Systems	6428	11579	9509	17492	Continuing	Not Applicable
D324	USA/NATO Tactical C³ Systems Interoperability	2149	2289	1000	7290	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Tactical commanders have a requirement to know the battlefield situation on a continuing near-realtime basis and to exercise authority and direction of their resources in a timely fashion. Only a systems-oriented approach offers hope in finding a cost-effective response to this challenge. The design and development of the Army command, control, and communications facilities must be accomplished on a total systems basis wherein the functions associated with each system element are determined with a complete understanding of the role that element plays in the overall Army C³ system. Project D323 addresses these requirements for intra-Army systems engineering and interoperability. A "top down" specification approach is being used so that the design and development of Army Command, Control, and Communication (C³) facilities can be accomplished on a total systems basis wherein the functions associated with each system element are determined with a complete understanding of the role that element plays in the overall Army C³ system. Project D324 has been established to meet the requirements that US Army tactical data systems be compatible and be able to interoperate with systems of other NATO nations. The intra-Army program is both influenced by and influences the design, implementation, and testing of US Army systems with NATO interoperability requirements.

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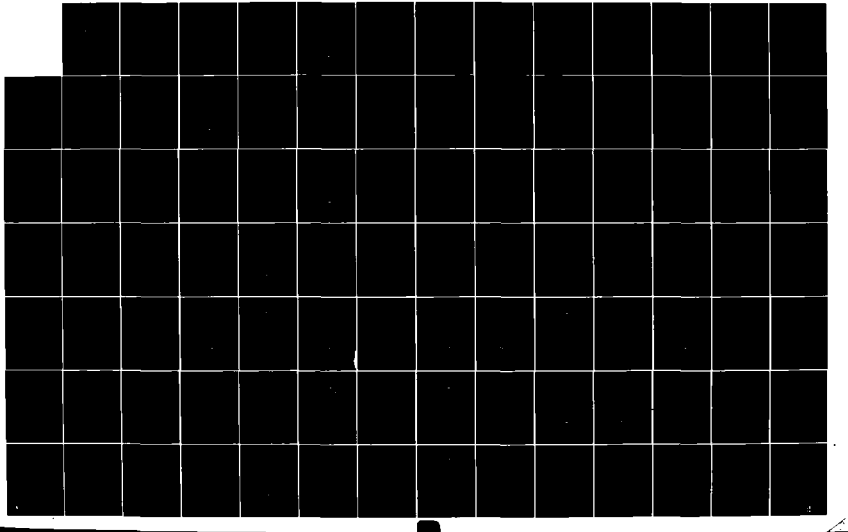

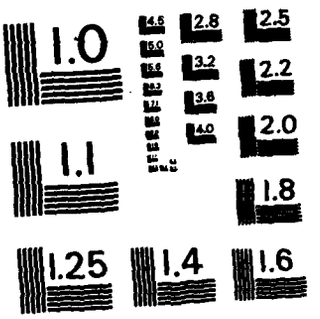

Program Element: #64712A

Title: Army Command and Control System Systems Engineering

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	8577	13868	10509	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	8110	14900	23021	Continuing	Not Applicable

Additions in FY 1982 dollars were provided to meet additional program requirements, and decreases in FY 1984 are due to reallocation to higher Army priorities and changes in the inflation index. The funding decrease in FY 1983 is due to pro rata application of Congressional reductions in the RDTE,A appropriation and reprograming of funds for 105mm Gun Enhancement.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This program is related to the Joint Interoperability of Tactical Command and Control Systems (JINTACCS) program (64779A). JINTACCS efforts drive towards joint interoperability (interoperability across Service lines), while this program moves towards Army interoperability (interoperability within the Army), thus complementing JINTACCS by building on their standards to cover Army-unique requirements. The Communications Electronics Command (CECOM) Center for Systems Engineering and Integration (CENSEI) has developed a management plan that describes the responsibilities for accomplishing specific actions under each of these programs. This plan provides the necessary guidance to Army agencies to preclude duplication of effort.

F. (U) WORK PERFORMED BY: Contractors: BDM Corp, McLean, VA, and Norfolk, VA; MITRE Corp, McLean, VA; others to be determined. In-house organization: US Army Communications-Electronics Command (CECOM) elements, Fort Monmouth, NJ; Electronics Research and Development Command (ERADCOM), Adelphi, MD; US Army Missile Command (MICOM), Huntsville, AL; US Army Test and Evaluation Command (TECOM), Ft Huachuca, AZ; US Army Aviation Research and Development Command (AVRADCOM), St Louis, MO; US Army Materiel Systems Analysis Activity (AMSAA), Aberdeen Proving Ground, MD; et al.

Program Element: #64712A

Title: Army Command and Control System Systems Engineering

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

Q. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D323 — Systems Engineering for Army Tactical Command, Control, and Communications (C^3) Systems:** This project is intended to provide a cohesive Tactical C^3 system design that provides tactical commanders the tools they need to be operationally successful in battlefield situations. The project develops plans, procedures, standards, and specifications for Air Defense, Fire Support, Combat Service Support, Intelligence/Electronic Warfare, Maneuver Control, and Communications systems at Corps, Division, Brigade, Regiment, and Battery command and control locations. FY 1982 accomplishments: Completed functional analyses for Fire Support, Maneuver, Air Defense and Intelligence/Electronic Warfare (Intel/EW) functional areas and for seven operational subsystems. Completed interface specifications and established a Configuration Control Board. Initiated five subsystem interface specifications. Initiated comprehensive analysis of new equipment fielding strategy. Completed a Systems Concept Type A specification and other analyses for the PLRS/JTIDS Hybrid. Provided frequency engineering analyses for Army systems to obtain required accommodations and reviewed International Radio Consultant Committee documents to establish US position for international radio regulation meetings. FY 1983 program: Complete baseline portion of system-level specification, functional segment specifications and operational subsystem specifications. Complete interface specifications, including interfaces between PLRS/JTIDS Hybrid and the control systems for the 5 Functional Area Control Elements. Initiate hardware/software development for TCS/TCT interfaces with selected systems to support CCS2 architecture. Continue frequency engineering analyses. Complete initial fielding integration plan for communications through early transitions. Complete test design plans and independent evaluations for ACCS interfaces. FY 1984 planned program: Complete objectives and first transition portions of Top Level Tactical C^3 Specification and all functional segment specifications. Complete baseline portion of remaining specifications. Complete specifications for top-level control element to control element interfaces and numerous other interfaces. Continue Army frequency engineering analysis. Fielding integration analyses will expand into later communications transitions and broaden its scope into C^3 systems.

2. **(U) D324 — USA/NATO Tactical C^3 Systems Interoperability:** This project is intended to achieve interoperability between US Army tactical C^3 systems and the tactical C^3 systems of our allies to maximize the operational effectiveness of NATO combined forces. FY 1982 Accomplishments: Coordination drafts of analyses for the Fire Support, Intelligence/Electronic Warfare, Air Defense and Tactical Communications/Data Distribution sections of the NATO Rationalization, Standardization, and Interoperability (RSI) Plan for Army Tactical Command, Control, and Communications (C^3) Systems Acquisition were completed. The plan is initiative-oriented and is organized in accordance with the functional segments of the Army Command, Control Subordinate System Architecture. Analyses within each section address the functional/operational capabilities of each of the NATO Allied Forces Central (AFCENT) Region Armies. For each functional segment, specific areas are addressed which include satisfaction of interoperability requirements/objectives, NATO standardization, cooperative development/production opportunities, and the NATO mechanism used to develop standardization agreements. Implementation of bilateral agreements between the US and Germany (GE), as well as the US and United Kingdom (UK), resulted in the completion of an interface management plan for the US TCS — UK WAVELL maneuver control system interface, near completion of

Program Element: #64712A

Title: Army Command and Control System Systems Engineering

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

necessary hardware and software for the US TCT — GE HEROS maneuver control system interface, and successful functional demonstration of the US TACFIRE — GE ADLER artillery fire support system interface. Preliminary planning for the US TACFIRE — UK BATES artillery fire support system interface was completed. Software development for the US Battalion TACFIRE implementation of the NATO standard for interoperability of artillery fire support data communications was initiated. FY 1983 Program: Finalize RSI Plan sections and develop plan for implementation of specific interoperability objectives, standardization agreements, and cooperative development/production opportunities. Complete development/testing of communications hardware/software for US TCT/GE HEROS maneuver control system interface. Complete development/testing of communications hardware/software for US TCS — UK WAVELL maneuver control system interface. Complete development/testing of the US Battalion TACFIRE implementation of the NATO standard for interoperability of artillery fire support data communications. Complete the US TACFIRE — UK BATES artillery fire support system interface management plan. FY 1984 Planned Program: Update RSI Plan sections and coordinate implementation plan at DARCOM, TRADOC, DA, JCS, and DOD Levels. Develop operational interface specification for US TAC — GE HEROS and US TCS — UK WAVELL maneuver control systems. Initiate development of software to implement NATO standard on artillery fire support ADP systems in US Division Artillery TACFIRE, Corps TACFIRE, Battery Computer System, and LANCE Fire Direction Systems.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64713A

Title: Combat Feeding, Clothing, and Equipment

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2358	2568	4296	6078	Continuing	Not Applicable
DL40	Clothing and Equipment	1610	2361	3594	4950	Continuing	Not Applicable
D548	Military Subsistence System	748	207	702	1128	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Success on the battlefield depends upon the individual soldier's physical effectiveness and survivability. This program provides for the improvement of that part of the combat support system which provides for the basic needs of the individual soldier: clothing, shelter, chemical, biological, ballistic, camouflage protection, food, and food service systems. It includes the development and improvement of special items of individual clothing, equipment, and rations required for soldiers on the integrated battlefield in extremes of terrain and climate, and for protection of ground combat vehicle crewmen against ballistic, chemical, acoustic, and flame hazards; the improvement of fabric field shelters, field service equipment, field printing equipment, and field food service equipment. The military subsistence effort contributes to enhanced combat effectiveness by reducing the logistical burden required to maintain a combat food service system; e.g., combat field feeding system. Food service developments in this and related program elements provide for more efficient and cost-effective provision of this vital element of life support systems for the Joint Services under conditions of peacetime training, emergency deployment, and combat. This request provides for Army, Navy, Air Force, Marine Corps and Defense Logistics Agency food service research requirements as part of the Department of Defense (DOD) Food Research, Development, Testing, and Engineering (RDT&Eng) Program managed by the Army as Executive Agent.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	2358	2568	4296	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	2591	2574	5276	Continuing	Not Applicable

Program Element: #64713A | Title: Combat Feeding, Clothing, and Equipment

DOD Mission Area: #215 — Land Warfare Support | Budget Activity: #4 — Tactical Programs

The funding decrease of $173 thousand in FY 1982 is a result of reprograming to higher priority Army programs. The funding decrease of $6 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The funding decrease of $885 thousand in FY 1984 is a result of reduction in scope of efforts from prior plans in order to fund higher priority Army requirements. The remaining FY 1984 reduction of $95 thousand resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Each of the military services performs work to develop its Service-peculiar items of clothing and equipment; however, to preclude duplication of effort, close coordination is maintained through tri-Service working groups, and many of the items developed under this program are used by all the military services. Related work in clothing and equipment is conducted in Program Element #62723A, (Clothing, Equipment, and Shelter Technology); Project #AH98 (Clothing and Equipment Technology), and Program Element #63747A (Soldier Support/Survivability), Project #D669 (Clothing and Equipment). In the food program, duplication of effort among the Services does not occur since the Army performs all food research/development for the Armed Forces and the Defense Logistics Agency. The food program is conducted under the Joint DOD Food Research, Development, Testing, and Engineering Program, for which the Army has overall responsibility to include funding. To preclude duplication of effort with other Government agencies, coordination is maintained through joint working groups. Related programs include Program Element #62724A (Joint Services Food Systems Technology), Project #AH99 (Joint Services Food/Nutrition Technology), and Program Element #63747A (Soldier Support/Survivability), Project #D610 (Food Advanced Development). Basic research for clothing and equipment and food programs is conducted in Program Element #61102A (Defense Research Sciences), Project #AH52 (Equipment for the Soldier).

F. (U) WORK PERFORMED BY: In-house work is performed by US Army Natick Research and Development Laboratories, Natick, MA; US Army Human Engineering Laboratory, Aberdeen Proving Ground, MD; and US Department of Agriculture, Stored Products and Insects Research and Development Laboratory, Savannah, GA. Current contractors include the Roanwell Corp, New York, NY, and Ro-Search Inc, Waynesville, NC.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DL40 — Clothing and Equipment:** This program provides for the introduction of new protection capabilities as well as the correction of known deficiencies in items of individual clothing and equipment, and allows the completion of Engineering Development on items moving from the Advanced Development program. The improvements planned under this project will incorporate the latest developments in material and equipment design and are expected to significantly increase individual combat efficiency under diverse geographical and climatological battlefield conditions. Progress in FY 1982 included completion of the development of handwear for petroleum, oil, and lubricant handlers in cold weather. Completed the design of the improved insulated canteen for use in cold regions and evaluated prototype items; initiated contract action of the helmet-compatible communications/aural protective system and established test plans for the system; and received approval of the acquisition strategy of the combat

Program Element: #64713A | Title: Combat Feeding, Clothing, and Equipment

DOD Mission Area: #215 — Land Warfare Support | Budget Activity: #4 — Tactical Programs

boot and procured boots for screening. Accomplishments also include completion of Development Testing of the Tent, Extendible, Modular, Personnel (TEMPER). This tent will replace up to six types of obsolete, pole-supported tents, provide unobstructed floor space, and improve mobility, ventilation, and environmental conditioning. TEMPER accessories, designed to increase the basic tent's effectiveness when operating in extreme climates, were also tested. Design modifications have been initiated which will render the TEMPER most suitable for medical applications. In FY 1983, it is planned to type classify the TEMPER and its accessories; complete the medical modifications of the TEMPER; fabricate lightweight frames for the TEMPER from composite materials; initiate Engineering Development of the Transportable Helicopter Enclosure, which will provide a high-mobility, air beam-supported shelter for maintenance and emergency repair of attack, scout, and utility helicopters; type classify the combat vehicle crewmen's face mask and gloves for aircrewmen's use in extreme cold weather; conduct "Walk-off" on several candidate models of combat boots; initiate Development/Operational Test II on the helmet-compatible communications/aural protective system; continue Engineering Development on aircrew torso body armor, insulated canteen, body armor for explosive ordnance personnel, and the aircrew survival/recovery vest and accompanying survival environmental packet. In FY 1984: Test composite frames for TEMPER; design and fabricate modified TEMPER to allow use as a small maintenance facility; design and fabricate prototype TEMPER hardened against chemical warfare agents; procure Transportable Helicopter Enclosure prototypes and initiate development testing; type classify the helmet-compatible communications/aural protective system; insulated canteen and body armor for explosive ordnance disposal personnel; initiate Development/Operational Test on aircrew torso body armor, survival vest, and environmental packet. Initiate Engineering Development on a microclimate cooling system for ground vehicle crewmen; lightweight highly tactile chemical protective handwear; cold weather undershirt; a new combat nuclear, biological, chemical suit; and a vest for cold weather operations. Also, conduct a special nondevelopmental item program to adopt lightweight inconspicuous body armor.

2. (U) **D548 — Military Subsistence Systems:** This program provides for the Engineering Development of operational rations and food service equipment. The project is essential since this is the final stage of development and results in rations, equipment, and systems directly affecting the soldier's effectiveness and survivability. The FY [illegible] primary project objectives were to initiate Engineering Development on the Air Force field feeding system and continue insect-resistance testing of protective packaging materials for the Meal-Ready-to-Eat (MRE) individual combat ration. Accomplishments in FY 1982 included completion of the design of the Air Force New Harvest Eagle Food Service System; risk analysis/testing of insect penetration of the current MRE packaging using a simulated warehouse of heavy infestation; initiated other tests on the insect resistance of the MRE in uncontrolled storage locations; completed development of improved field refrigeration for the Marine Corps designed to meet International Standards Organization dimensional and performance criteria; and provided equipment evaluations for all Services to assure use of current, energy-efficient food service equipment. In FY 1983, it is planned to complete the two-year test on the risk of insects penetrating the MRE package using simulated warehouse and uncontrolled storage locations; evaluate the protective features of alternative packaging materials and design; select cost-effective packaging design that provides maximum assurance against penetration of gnawing insects, based on test results and updated risk analysis; and continue Engineering Development and support first procurement of the Air Force tactical feeding system. The FY 1984 program will continue Engineering Development of Air Force tactical system and insect-resistance testing of protective packaging materials for the MRE individual combat

Program Element: #64713A

Title: Combat Feeding, Clothing, and Equipment

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

ration. Engineering development of equipment for the Combat Field Feeding System for the Army and for the Ground-Launched Cruise Missile for the Air Force will be initiated.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64714A — Title: Tactical Electric Power Sources

DOD Mission Area: #215 — Land Warfare Support — Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2811	1800	9782	16106	Continuing	Not Applicable
D194	Engine-Driven Generators	- 0 -	- 0 -	4164	7531	Continuing	Not Applicable
D196	Silent Power Generating Sources	2811	1800	5618	8575	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Army requires new and advanced tactical electric power generation and associated power conditioning and control equipment to meet general-purpose, special-purpose, or precision power applications that cannot be satisfied by existing items in the inventory. Current engine-driven generators, particularly in the power range of 0.5 kilowatt (kW) to 10kW, are noisy, have easily detected heat (infrared) signatures, are heavy and bulky, require excessive maintenance, and are not fuel efficient. This program will provide the Army with improved tactical power generation equipment. Improvements in the tactical suitability of power generation equipment include increased mobility resulting from weight and size reduction, and advanced battlefield survivability from reductions in generator set noise levels and heat signatures. Because of the pervasiveness of tactical generator sets on the modern battlefield, these improvements have direct impact on the combat effectiveness and survivability of such key systems as command, control and communications. Important logistical improvements include reduction in fuel consumption, providing a nonfossil-fuel/multifuel capability, increasing the commonality of components and standardization to reduce the number of different types of generators.

C. (U) COMPARISON WITH FY 1993 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1992	FY 1993	FY 1994	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	2811	1800	9782	Continuing	Not Applicable
Funds (as shown in FY 1993 submission)	1598	1805	5982	Continuing	Not Applicable

Program Element: #64714A Title: Tactical Electric Power Sources

DOD Mission Area: #215 — Land Warfare Support Budget Activity: #4 — Tactical Programs

The $1278 thousand increase in FY 1982 reflects higher actual project costs than previously estimated including the fabrication of an additional prototype 1.5kW Methanol Fuel Cell for expanded operational testing (OT II). The decrease of $5 thousand in FY 1983 is the result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The increase of $3820 thousand in FY 1984 funds reflects the start of new initiatives to reduce noise and heat signatures of critical electric power generator sets larger than 10kW, to develop expedient methods for reducing noise and heat signatures of 0.5kW-10kW sets now in use, and to begin full-scale development of the 0.5kW thermoelectric silent lightweight electric power unit.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: In order to prevent a duplication of effort, the Army maintains continuing coordination with other Services through the Department of Defense Project Manager for Mobile Electric Power, structured with the Army as the lead Service; and with other agencies such as the Department of Energy. Related basic research is conducted in Program Element #61102A, Project #AH47 (Electronic Devices Research), and Project #AH51 (Combat Support). Exploratory development is conducted in Program Element #62733A (Mobility Equipment Technology). Advanced development is conducted in Program Element #63702A (Electric Power Sources).

F. (U) WORK PERFORMED BY: In-house effort and contract monitoring are performed by the US Army Mobility Equipment Research and Development Command, Fort Belvoir, VA. The existing primary contractor is United Technologies Corporation (UTC) of South Windsor, CT.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D194 — Engine-Driven Generators (NEW START):** The purpose of this project is to develop improved engine-driven mobile tactical electric power sources with the emphasis on reducing noise and heat signatures, increasing fuel efficiency, and improving reliability. It includes the full-scale development of gasoline, diesel, gas turbine, stirling, and other advanced combustion engine-driven generator sets and power conditioners. In FY 1983, the engineering design of an advanced technology 30kW diesel engine-driven generator set will be completed and prototype fabrication initiated. This item will have significantly reduced noise (inaudible at 300 meters versus 1,000 meters), heat signature (by at least 50%), and no increase in weight compared to the 30kW diesel engine-driven (DED) generator set currently in use. Also in FY 1983, a prototype commercially developed low noise 5kW stirling engine-driven (SED) generator set is being evaluated for adaptation to tactical use. The Army intends to reprogram the FY 1983 funding necessary for these high-priority initiatives. In FY 1984, product improvements to achieve maximum near-term reductions of noise and heat signatures of 0.5 to 10kW generators currently in use will begin full-scale development. In addition, prototype 5kW (SED) generator sets suitable for military use will be fabricated for follow-on testing. Fabrication of the advanced technology 30kW DED generator set prototypes will be completed in 1984 and readied for testing in FY 1985.

Program Element: #64714A

Title: Tactical Electric Power Sources

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

2. (U) D196 — Silent Power Generating Sources: This project includes the full-scale development of advanced silent-power generation technologies such as the methanol fuel cell, the thermoelectric generator set, and the free piston stirling engine generator set to meet the Army's 0.5-10kW Silent Lightweight Electric Energy Plants (SLEEP) requirement. The full-scale development of these technologies will provide 0.5-10kW tactical power supplies with maximum fuel efficiency and minimum detectability (essentially inaudible) to meet current and future battlefield needs. In FY 1982, full-scale development of the 1.5kW methanol fuel cell silent-power unit continued with the fabrication of prototypes. Prototype fabrication is expected to be completed in FY 1983 and Development Test II (DT II) initiated. In FY 1984, DT II and Operational Test II (OT II) of the 1.5kW MFC silent-power unit will be completed and the product reviewed for acceptance (type classified) as a standard Army item. Full-scale development of the 0.5kW thermoelectric silent generator set will begin in FY 1984 with the design and development of prototypes for DT II/OT II in FY 1985.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64717A

Title: General Combat Support

DOD Mission Area: #213 — Land Combat Engineer Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5303	5952	9662	15110	Continuing	Not Applicable
DH01	Combat Engineer Equipment	1036	1040	2197	4337	Continuing	Not Applicable
DL17	Camouflage/Deception (Non-Electronic)	- 0 -	- 0 -	- 0 -	1922	Continuing	Not Applicable
DL39	General Support Equipment	1861	2514	4451	3406	Continuing	Not Applicable
DL41	Fuels Handling Equipment Systems	- 0 -	- 0 -	668	2425	Continuing	Not Applicable
D429	Tactical Rigid-Wall Shelters	1257	1112	1158	1505	Continuing	Not Applicable
D632	Combat Medical Materiel	1149	1286	1388	1515	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Army requires new and advanced combat support and combat service support equipment to provide responsive logistics resupply and increased ground mobility to the current and future battlefield. The effectiveness and survivability of the combat forces in a hostile situation are highly dependent on the supply of vital cargo. Fuel, ammunition, food, and medical supplies must be delivered to field units quickly and in the required quantities. Hardened shelters are required for a currently unavailable level of survivability for personnel and comand/control/communications equipment in the presence of nuclear overpressure, thermal pulse, chemical agents, ballistic fragmentation, and electromagnetic interference (EMI). Primary objectives of this program element are to provide materiel that will increase the Army's tactical mobility, increase battlefield survivability, and reduce the logistics burden. New tactical bridging will improve capabilities for crossing rivers and natural barriers. New water purification equipment will insure adequate supplies of potable water from any source. Equipment capable of offloading, transporting, and handling containerized cargo and bulk fuels is required. A family of general-purpose and hardened rigid-wall shelters that will provide increased capability under worldwide climatic extremes through modular design, achieve significant cost savings by minimizing numbers/types of shelters, conform to international standards and increase survivability of personnel and equipment from nuclear, chemical, ballistic and EMI threats is planned. New and improved field casualty treatment systems are vital to maintaining combat effectiveness.

Program Element: #64717A

Title: General Combat Support

DOD Mission Area: #213 — Land Combat Engineer Support

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	5303	5952	9862	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	8001	5967	11600	Continuing	Not Applicable

The decrease of $2698 thousand in FY 1982 was the result of reprograming of funds to higher priority Army requirements. The decrease of $15 thousand in FY 1983 is the result of pro rata application of general Congressional reductions to the RDTE,A appropriation. Decrease of $1302 thousand in FY 1984 is due to a decrease in the scope of effort planned in DH01 and DL41 partially offset by increased effort in DL39 for accelerated development of water purification systems. The remaining FY 1984 reduction of $436 thousand resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army [1]						
Water Purification Unit 3000 gal/hr						
Funds (current requirements)	- 0 -	- 0 -	- 0 -	65000	404400	469400
Quantities (current requirements)	- 0 -	- 0 -	- 0 -	96	570	666 [1]

Program Element: #64717A

Title: General Combat Support

DOD Mission Area: #213 — Land Combat Engineer Support

Budget Activity: #4 — Tactical Programs

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Hi-Speed Mini-Sterilizer Funds (current requirements)	- 0 -	3200	1792	- 0 -	- 0 -	4992 [1]
Quantities (current requirements)	- 0 -	1,000	560	- 0 -	- 0 -	1560 [1]
High-Capacity Radiograph System Funds (current requirements)	- 0 -	- 0 -	- 0 -	6632	26543	33090 [1]
Quantities (current requirements)	- 0 -	- 0 -	- 0 -	156	233	389 [1]
Low-Capacity Radiograph System Funds (current requirements)	- 0 -	- 0 -	- 0 -	5375	21414	26789 [1]
Quantities (current requirements)	- 0 -	- 0 -	- 0 -	125	198	323 [1]

[1] Since the 1983 submission, total requirements have been determined and the planned procurement restructured to provide the most cost effective acquisition programs.

E. (U) RELATED ACTIVITIES: Close coordination is maintained with other Services to avoid duplication, and to provide program guidance, through the Joint Committee on Tactical Shelters, the Defense Medical Materiel Board, the Joint Container Steering Group, the DOD Executive Agent for Land-Based Water Resources, and the Program Advisory Group for Bulk Petroleum Fuels Distribution. The projects of this program element contain items and systems that have progressed to Full-Scale Development from related Advanced Development Program Elements #63726A (Combat Support Equipment) and #63732A (Combat Medical Materiel). Related exploratory development program elements include #62723A (Clothing, Equipment, and Shelter Technology); #62733A (Mobility Equipment Technology); and #62772A (Combat Casualty Treatment Technology).

Program Element: **#64717A** Title: **General Combat Support**

DOD Mission Area: **#213 — Land Combat Engineer Support** Budget Activity: **#4 — Tactical Programs**

F. (U) WORK PERFORMED BY: In-house work is performed at the US Army Mobility Equipment Research and Development Command, Fort Belvoir, VA; US Army Natick Research and Development Laboratories, Natick, MA; and the US Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, MD. Current contractors include Raytheon Corporation, Bedford, MA; Goodyear Aerospace, Litchfield Park, AR; Gichner Mobile Systems, Old Forge, PA; Craig Systems, Lawrence, MA; Dynamic Sciences Industries, Fairfax, VA; Seagold Industries, New Brunswick, Canada; Barnes Engineering Co/General X-Ray Corporation, Stamford, CT; and Porta-Ray, Inc., Deer Park, NY.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DH01 — Combat Engineer Equipment:** This project includes the development of the Light Assault Bridge which will provide the Light forces with the capacity for rapidly crossing gaps under fire. The Light Assault Bridge will be compatible with the rapid tactical airlift requirements of the light forces and will meet the urgent light force need for ensuring mobility on the battlefield. In FY 1982, prototype design was completed and long-leadtime components ordered. In FY 1983, fabrication of two prototypes will be initiated. Development Test II/Operational Test II (DT II/OT II) will begin in FY 1984. Fabrication of the third prototype will begin in FY 1984.

2. **(U) DL39 — General Support Equipment:** This project includes the development of water purification equipment which will provide potable water from any source including brackish and sea water. The equipment is urgently needed to support the Rapid Deployment Joint Task Force and operations in arid regions. Through FY 1982, design of the 3000-gallon-per-hour (gph) Reverse Osmosis Water Purification Unit (ROWPU) was finalized; development will continue in FY 1983 with DT II/OT II targeted to begin in FY 1984. Development of manuals and training materials will also begin in FY 1984.

3. **(U) DL41 — Fuels Handling Equipment Systems:** This project includes development of rapidly deployable equipment to quickly distribute fuel from bulk sources or serve as a branch line from pipelines. The Petroleum Hoseline System will move from Advanced Development into Full-Scale Development in FY 1984. DT II/OT II will be initiated. The Integrated Logistics Support (ILS) package will be updated and a Producibility Engineering Program inaugurated in FY 1984.

4. **(U) D429—Tactical Rigid-Wall Shelters:** This project accommodates development of a family of general-purpose medical and administrative shelters, conforming to International Organization for Standards (ISO) criteria, which provide protection against battlefield threats (chemical, ballistic, and EMI). Through FY 1982, Full-Scale Development of the general-purpose, one-side expandable shelter, development testing of the two-side expandable and nonexpandable shelters, and engineering design testing of a prototype mobilizer for shelter towing were completed. Training for operational testing and preparation of the Technical Data Package for the general-purpose, nonexpandable and two-side expandable shelters were initiated. In FY 1983, DT II/OT II of the general-purpose, two-side expandable and nonexpandable shelters will be completed, and preparation of the

Program Element: **#64717A** Title: **General Combat Support**

DOD Mission Area: **#213 — Land Combat Engineer Support** Budget Activity: **#4 — Tactical Programs**

Technical Data Package continued. In FY 1984, Full-Scale Development will be initiated on the hardened nonexpandable shelter incorporating chemical agent and EMI protection. Full-Scale Development of the two-side expandable and nonexpandable shelters will be completed, and they will move to production.

5. (U) **D632 — Combat Medical Materiel:** This project accommodates development of field medical materiel to improve casualty treatment systems and enhance combat effectiveness through improved survivability. In FY 1982, the aidman's bag was redesigned and type classified. The environmental protective container for freezable military medical articles in the arctic environment is ready for type classification. A mobile field litter underwent user operational tests by the High Technology Test Bed. DT II was completed on the field sterilization system, and OT II will be undertaken in FY 1983. OT II will be completed on the High-Capacity X-Ray System, and the Field Combat Optometry Set has been type classified. In FY 1984, the field sterilization system and mobile field litter will be type classified. Work will continue on redesign of the patient holding and evacuation bags and protective containers for fragile medical supplies/equipment.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64718A

Title: Physical Security

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5761	5085	5998	7692	Continuing	Not Applicable
	QUANTITIES						(Not feasible to list)
DL82	Physical Security	5761	5085	5998	7692	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: There is a need to provide the Department of Defense (DOD) with standardized physical security equipment to protect its resources against terrorism, sabotage, espionage, and theft. The objective of this program element is to conduct engineering development of physical security equipment used to provide protection for critical areas, sensitive installations, mobile resources, and the rear area of deployed forces. The need is to use physical security equipment to enhance all DOD security to the maximum extent possible and decrease manpower (guard) requirements to a minimum.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	5761	5085	5998	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	5761	5099	6157	Continuing	Not Applicable

The funding decrease of $14 thousand in FY 1983 is the result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The funding decrease of $159 thousand in FY 1984 is the result of revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

Program Element: #64718A Title: Physical Security

DOD Mission Area: #215 — Land Warfare Support Budget Activity: #4 — Tactical Programs

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army:						
Funds (current requirements)	6500	3800	2500	4200	Continuing	Not Applicable

The above funds include $1 million per year for the Capital Chance program.

E. (U) RELATED ACTIVITIES: The exploratory development for physical security equipment is conducted under PE #62733A, Project AH20 (Mobility Equipment Technology), and Defense Nuclear Agency Task B99QAXRF/Technology Development. The advanced development for physical security equipment is conducted under Program Element #63705 (Physical Security). The Interim Facility Intrusion Detection System (FIDS) and certain selected advanced FIDS components are being developed under PE #63705A to provide interior intrusion detection systems to all Department of Defense (DOD) elements. Related are the Army's Remotely Monitored Battlefield Sensor System (REMBASS) tactical sensor program and the Air Force's Base and Installation Security System (BISS) exterior physical security program. Close coordination with REMBASS, BISS, and the Navy is being accomplished to assure utilization of related technologies and developments and to prevent duplication of effort. Coordination is accomplished by memberships of joint working groups and by attendance at other Service and department meetings. The DOD Physical Security Equipment Action Group monitors and coordinates the development and acquisition of physical security equipment by all Services. The Department of the Army single point of contact is the Product Manager for Physical Security Equipment (PMPSE), who monitors and coordinates the development, acquisition, integrated logistic support, and installation of physical security systems, thus insuring no duplication of effort.

F. (U) WORK PERFORMED BY: The US Army Mobility Equipment Research and Development Command (MERADCOM), Fort Belvoir, VA, is assigned responsibility for Physical Security Research, Development, Test, and Evaluation. Other Government agencies currently involved are the US Army Test and Evaluation Command, Aberdeen, MD, Department of Energy (Sandia Laboratories), Albuquerque, NM, and the Combat Surveillance and Target Acquisition Laboratory, Fort Monmouth, NJ. Major contractors are EG&G Inc., Wellesley, MA, Diversified Data Corp., Springfield, VA, and Southwest Research, San Antonio, TX.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: DL82 — Physical Security: The purpose of this project is to conduct engineering development of physical security equipment to provide protection for critical areas, installations, and the rear area of deployed forces and decrease manpower (guard) requirements to a minimum. In FY 1982 the development of the Interim Facility Intrusion Detection System (FIDS) was transferred

Program Element: #64718A Title: Physical Security

DOD Mission Area: #215 — Land Warfare Support Budget Activity: #4 — Tactical Programs

to EG&G, Inc. In response to Under Secretary of Defense for Research and Engineering memorandum, subject: Tri-Service Testing of FIDS, 4 March 1982, test planning meetings for multi-Service testing of the Interim FIDS at Eglin AFB, FL, were conducted. Contracts for the engineering development of the covert duress sensor and tagged material detector were awarded. Contracts were awarded for completion of technical and logistical support data, software modification, and technical assistance in the integration of FIDS with other DOD Physical Security components. In FY 1983 multi-Service testing of the Interim FIDS will be completed. DT II/OT II will be initiated on the Tagged Material Detector (TMD) and Covert Duress Sensor (CDS). Engineering development will be initiated on the RF Motion Sensor. Engineering development will begin for other advanced FIDS Command, Control and Display Subsystems (CCDSs). In FY 1984, DT II/OT II on the TMD and CDS will be completed. An In-Process Review (IPR) will be held for the Interim FIDS and the system will be type classified. Engineering development will be initiated for the deterrent subsystems, RF Motion Sensor, RF data link, and other advanced FIDS components that have successfully completed advanced development. Engineering development will continue on the CCDSs.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64722A

Title: Education and Training Systems

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	- 0 -	12266	10565	Continuing	Not Applicable
D750	Education and Training System	- 0 -	- 0 -	12266	10565	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The House Armed Services Committee in 1981 requested that the Services apply more research and development funds to tri-Service developmental and demonstration projects. Further, Report 97-943 of the House Appropriations Bill states the Committee's wish to establish this activity as an item of special interest (along with PE #64709N) in the area of manpower training and education research for the purposes of reprograming. This tri-Service engineering development program responds to that request and provides demonstrations or prototype training methods and devices that will insure that military personnel in the field can perform their jobs, such as equipment maintenance, in a proficient manner. During the next decade, the increasing density and sophistication of new equipment and the decreasing supply of people will require new, more effective methods to ensure the effectiveness of military job performance. The 1981 Defense Science Board Summer Study on the Technology Base concluded that the microprocessor-based personal learning aids represent one of the 17 technologies that can make an order-of-magnitude difference in combat effectiveness. This theme was further reemphasized by the 1982 Defense Science Board Summer Study on Training and Training Technology, which recommended immediate increased investment in R&D on computer-based instruction, simulation, and training in units. The objective of this program element is to provide demonstrations of prototypes of jointly needed Army, Navy, and Air Force prototype portable computer-based training and job-aiding devices that will meet some of the Services' most pressing training problems. This program element is intended to capitalize on current and near-future state-of-the-art in personal electronics and in particular to draw heavily from available products of prior industrial development.

Program Element: #64722A Title: Education and Training Systems

DOD Mission Area: #215 — Land Warfare Support Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	- 0 -	- 0 -	12266	Continuing	TBD
Funds (as shown in FY 1983 submission)	- 0 -	995	4723	Continuing	TBD

The without prejudice funding decrease of $995 thousand in FY 1983 is a result of Congressional direction in the FY 1983 Appropriations Act. The funding increase of $7543 thousand in FY 1984 is the result of a combination of an OSD program budget decision to increase funding for the program by $8 million and a downward revision of the anticipated inflation factor in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This tri-Service research and development program is one of two program elements aimed at demonstrating maturing technology-base programs. Due to insufficient funds in FY 1983 to meet the Defense Science Board recommended emphasis, $1 million was provided to this task from PE #64709N. Duplication within the Army is avoided by annual Tech Base Reviews chaired by the Director of Army Research and within the Department of Defense by annual Apportionment Reviews chaired by a representative of the Office of the Undersecretary of Defense for Research and Engineering. In addition, effective coordination of this tri-Service program is assured through a joint-Service Steering Committee that monitors the activities and selects promising engineering development demonstrations to be pursued. Memoranda of Understanding (MOU) between the Army Research Institute and organizations participating in this program help further to coordinate this program. These organizations include: the Naval Training Equipment Center (NTEC), the Air Force Human Research Lab (AFHRL), the Navy Personnel R&D Center (NPRDC), and the Army PM for Training Devices (PM-TRADE), Portable Electronic Aids for Maintenance (PEAM) R&D Program Advisory Group, and a PEAM User's Conference specific to the development of PEAM.

F. (U) WORK PERFORMED BY: In House: The Army developing agency responsible for this effort is the US Army Research Institute for the Behavioral and Social Sciences, Alexandria, VA. They are supported by the Naval Training Equipment Center, Orlando, FL, the Air Force Human Resources Laboratory, Lowry AFB, CO, and the US Army Project Manager for Training Devices, Orlando, FL. Also supporting this element as contractors are Texas Instruments, Dallas, TX, McDonnell-Douglas Astronautics, St. Louis, MO, and Cubic Corporation, San Diego, CA.

Program Element: #64722A

Title: Education and Training Systems

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D750 — Education and Training Systems (NEW START)**

a. **(U) Project Description:** This is a single-project Program Element for development of critical training and education applications which will benefit two or more of the services. Project work during this initial year of funding includes development of a Portable Electronic Aid for Maintenance (PEAM) and a Tri-Service Instructional Application Delivery System (TRIADS). These efforts emphasize joint service use of common interface standards, display protocol, human interaction and operating system conventions, and are designed to result in more effective training in units, less reliance on institutional training, reduced requirements for training support personnel, and more effective military job performance. Future tasks will focus on demonstration projects related to advanced training and instructional support systems for operators and maintainers.

(1) **(U) FY 1982 Accomplishments:** Not Applicable.

(2) **(U) FY 1983 Program:** Not Applicable.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** The PEAM and TRIADS tasks, begun under Navy-Tri-Service Program Element 64709N will be continued in FY 1984 under project D750. The PEAM task comprises development of portable delivery systems for electronic presentation of maintenance information to military field technicians, and development of a supporting maintenance information authoring and management system. PEAM will minimize technical training requirements by providing better, more complete and more usable technical information at the actual location of maintenance performance; will assist in circumventing technical reading problems through use of speech synthesis and recognition; and will improve combat readiness by providing specific, on-the-spot guidance for the individual technician. This will lead to increased equipment availability. The TRIADS task encompasses the integration of software and hardware for computer-based instruction separately developed by the Army, Navy and Air Force. This effort will result in a capability for more efficient and effective production, delivery, and management of computer-based courseware and training materials for a variety of instructional/training objectives, usable by all the services. Subject to the availability of funds, additional tasks selected by the Joint Service R&D Steering Committee in FY 1983 will begin in FY 1984. Candidate tasks already identified include the following engineering developments:

A maintenance resource control system for managing and conducting intermediate and organizational level maintenance training and performance in units.

Program Element: **#64722A** Title: **Education and Training Systems**

DOD Mission Area: **#215 — Land Warfare Support** Budget Activity: **#4 — Tactical Programs**

Portable, low-cost devices for critical part-task training of maintenance personnel in units.
Microprocessor-based devices for training and exercising electronics troubleshooting skills, incorporating state-of-the-art interactive techniques.
A family of scaled-down versions of F-16 maintenance trainers interfacing with TRIADS, PEAM and other systems as appropriate.
A tabletop tactical awareness trainer. Computer-Generated Imagery (GCI) microchip-based displays with cost and size suitable for general use in noninstitutional training.

(4) **(U) Program to Completion:** This is a continuing program.

c. **(U) Major Milestones:** Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64724A

Title: Chemical/Biological Detection, Warning and Training Materiel

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4427	6205	8384	12250	Continuing	Not Applicable
DF45	Biological Detection, Identification, Warning, and Sampling Materiel	2498	391	- 0 -	- 0 -	Continuing	Not Applicable
D020	Chemical Detection, Identification, Warning, and Sampling Materiel	1060	5254	7449	11408	Continuing	Not Applicable
D138	Training Systems for Chemical/Biological Defense	869	560	935	842	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Soviet and Warsaw Pact forces have developed and fielded extensive Nuclear, Biological, Chemical (NBC) defense-related equipment. The degree of NBC preparedness maintained by these forces indicates a willingness on their part to engage in NBC warfare. United States (US) forces possess inadequate, aging, and logistically burdensome NBC detection, warning, and identification equipment. The objective of this program element is to support engineering development (ED) through type classification of new or improved chemical/biological detection, warning, identification, and sampling equipment to provide a credible defensive posture against the use of NBC warfare. In addition, this program element provides for training devices for both operation and maintenance and field training exercises in NBC defense operations.

Program Element: #64724A

Title: Chemical/Biological Detection, Warning and Training Material

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	4427	6205	8364	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	14110	6220	18094	Continuing	Not Applicable

A restructuring of chemical-biological defense program elements was made between FY 1983 and FY 1984 submissions. Project #D020 (Chemical Detection, Identification, Warning and Sampling Devices) and Project #D138 (Training Systems for Chemical/Biological Defense) were moved from Program Element #64725A (Chemical/Biological Protective Materiel) to this program element. This places all chemical-biological protective materiel under Program Element #64725A and all detection and warning materiel along with training materiel under Program Element 64724A. This restructuring facilitates better management of chemical-biological program execution. Funds shown above reflect the restructured program. The reduction of $9683 thousand in FY 1982 resulted from extension of advanced development (AD) for the XM21 Scanning Infrared Remote Alarm, Chemical (SCI-REACH), termination of requirements for a Combat Vehicle Alarm and Contamination Monitor, and the type classification of the XM 272 Water Kit directly from AD which canceled the engineering development (ED) requirement. The funding decrease of $15 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. Reduction of $9710 thousand in FY 1984 resulted from extension of AD for the XM21 SCI-REACH under Program Element #63720A, and a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement Army:						
Funds (current requirements)	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Quantities (current requirements)	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -

Program Element: #64724A

Title: Chemical/Biological Detection, Warning and Training Materiel

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

The funding decrease of $6200 thousand in FY 1983 and zeroing of FY 1983 quantity are a result of Congressional direction in the FY 1983 Appropriations Act.

E. (U) RELATED ACTIVITIES: DOD Directive 5160.5 established the joint RDTE program for Chemical/Biological Defense and assigned executive agent responsibility to the Army. The Army is responsible for Basic Research and Exploratory Development and subsequent technology base for all Services. Joint Service requirements for detection and warning equipment are done under this program element while Service-specific requirements are done by the Air Force and Navy. This program element does not duplicate Service-unique work as indicated by review of Program Summaries (DD Form 1634) of the Services and the Joint Development Objectives Guide (JDOG). Precursor work is done under Program Element #61102A (Defense Research Sciences), Project #A71A (Defense Systems Chemical Systems/Chemical Biological Defense); Program Element #62706A (Chemical Defense and General Investigations), Project A553 (Chemical-Biological Defense and General Investigations); and Program Element #63720A (Chemical/Biological Detection, Warning, and Sampling Materiel Concepts), Project #D601 (Chemical Detection, Warning and Sampling Materiel Concepts) and Project #D165 (Biological Detection, Warning, and Sampling Materiel Concepts).

F. (U) WORK PERFORMED BY: In-house efforts are performed by the US Army Chemical Systems Laboratory and Test and Evaluation Command, Aberdeen Proving Ground, MD. Contractors: none.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DF45 — Biological Detection, Identification, Warning, and Sampling Materiel:** Conduct engineering development on detection, identification, warning, and sampling equipment designed to indicate the presence, extent, and type of biological contamination on the NBC battlefield. Development will satisfy deficiencies in the Service defensive posture by fielding new equipment, replacing or supplementing existing equipment, or modifying existing equipment to upgrade its performance or extend its life. FY 1982 accomplishments: All development and operational tests were completed on the XM19/XM2 Biological Detection and Warning System as well as Integrated Logistic Support requirements. Deficiencies noted have been corrected, and hardware fabrication was begun for environment extreme retest. FY 1983 program: Complete ED on the XM19/XM2, type classify, and release for first production. The project completes RDTE in FY 1983.

2. **(U) D020 — Chemical Detection, Identification, Warning, and Sampling Materiel:** Conduct engineering development of new or improved detection, identification, warning, and sampling equipment through type classification. Development will meet or fulfill a known deficiency by fielding new equipment, replacing or supplementing already fielded equipment, or modifying existing equipment in the field to upgrade performance or extend its life. FY 1982 accomplishments: ED was continued on the XM81 Chemical Alarm Simulator, M256 Detector Kit Simulator, and the XM207 Chemical

Program Element: **#64724A** Title: **Chemical/Biological Detection, Warning and Training Materiel**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems** Budget Activity: **#4 — Tactical Programs**

Attack Warning and Transmission System (CAWTS). The XM81 completed engineering design, ED prototype fabrication, engineering testing, and Development and Operational Test II during FY 1982. The simulator is a device that can be added to the M8 and M8A1 Chemical Agent Alarms to allow the umpire in a field exercise to trigger the alarm thus simulating an actual agent attack. The alarms are not degraded by this training capability and must be operated exactly as they would be in actual use. The M256 Kit Simulator is a modified M256 Chemical Agent Detector Kit designed to show positive agent response when activated by troops in a field exercise. The design of the modification, hardware fabrication, and all development and operational testing were completed during FY 1982. The XM207 CAWTS completed the preparation of the technical data package and first production releases in preparation for type classification during early FY 1983. The CAWTS is a hand-fired, star burst/whistle signal designed to alert troops in the open of an impending chemical attack. The Training and Doctrine Command will complete their Independent Evaluation Report prior to type classification. FY 1983 program: ED will be completed including type classification and first production on the XM81 Chemical Alarm Simulator, M256 Detector Kit Simulator, and the XM207 Chemical Agent Warning and Transmission System. FY 1984 program: ED will be initiated on the XM85/XM86 Automatic Liquid Agent Detector (ALAD) pending validation of the AD prototype under Program Element 63720A. ED will also be initiated on the British-developed Contamination Monitor (CAM) after successful International Materiel Evaluation (IME) by the Test and Evaluation Command. ED is required on the CAM to fully characterize logistics concepts and provide technical manuals, data package, and procurement releases for subsequent production.

3. **(U) D138 — Training Systems for Chemical/Biological Defense:** Supports conduct of engineering development on training equipment that will realistically simulate Chemical/Biological attack and residual contamination from artillery, air, and ground dissemination; alarm detection and response; identification and monitoring; and casualty assessment. Developments are supported by the equipment requirement it simulates or a training device requirement. Training equipment should simulate as accurately as possible all threat conditions so that training will enhance soldier survivability. FY 1982 accomplishments: ED was completed on the XM137 Training Simulant Dispenser including type classification and initiation of first production. ED was continued on the XM11 Projectile Airburst Simulator with Development and Operational Test II retest completed after user revision of the Training Device Requirement. ED was initiated on the modification of the standard M5 Disperser for use with thickened-liquid simulant agents; dissemination studies to characterize performance parameters were completed. FY 1983: Complete ED on the XM11 Projectile Airburst Simulator and companion launcher, type classify, and initiate first production. Continue ED on the M5 Disperser including freezing of design modifications, fabrication of test hardware, and engineering design testing. FY 1984: Continue ED on the modified M5 Disperser and initiate ED on new training devices for the XM22 Automatic Chemical Agent Detector and Alarm (ACADA) and the British-developed Contamination Monitor.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64725A**

Title: **Chemical/Biological Protective Materiel**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	22786	19118	19732	12817	Continuing	Not Applicable
DF97	Decontamination Materiel	1046	8214	7570	6065	Continuing	Not Applicable
D017	Collective Protection Materiel	8310	3797	5463	3681	Continuing	Not Applicable
D019	Individual Protective Materiel	7650	1446	2948	2861	Continuing	Not Applicable
D023	Collective Protection Materiel for Armored Vehicles	5780	5661	3751	210	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Soviet Union has long recognized and appreciated the ability of chemical-biological weapons to inflict casualties, degrade combat effectiveness, and disrupt the battlefield. The USSR continues to maintain and improve its formidable capability to conduct chemical-biological warfare operations. Consequently, the US military must have the capability to survive and conduct sustained operations in a chemical-biological warfare environment. Failure to correct user identified deficiencies in chemical-biological defensive materiel would seriously jeopardize the survivability of US forces in the event of a chemical-biological attack. The Army has been assigned Executive Agent responsibility for conducting chemical-biological defense research and development for the Department of Defense. This program element addresses the urgent need to provide all Services with defensive materiel to protect individuals and groups from threat chemical-biological agents. The program element provides for the conduct of Engineering Development for the Army and for the joint requirements of the Army with other Services in respiratory protection materiel; means to decontaminate skin, clothing, equipment, and terrain; collective protection equipment for vans, vehicles, and shelters; and collective protection systems for armored vehicles.

Program Element: **#64725A** Title: **Chemical/Biological Protective Materiel**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems** Budget Activity: **#4 — Tactical Programs**

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (**$** In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	22786	19118	19732	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	24620	20188	27194	Continuing	Not Applicable

A restructuring of chemical-biological defense program elements was made between the FY 1983 and FY 1984 submissions. Project #D020 (Chemical Detection, Identification, Warning, and Sampling Materiel) and Project #D138 (Training Systems for Chemical-Biological Defense) were moved from this program element to Program Element #64724A (Chemical/Biological Detection, Warning, and Training Materiel). This places all chemical-biological protective materiel under Program Element #64725A, and all detection and warning materiel along with training materiel under Program Element #64724A. The restructuring facilitates better management of chemical-biological program execution. Funds shown above for the FY 1983 submission reflect the restructured program. In FY 1982, the decrease of $1634 thousand resulted from a combination of a decision to delay initiation of development of the Multipurpose Decontaminant pending the results of further exploratory development work, an increase in funding necessary to correct deficiencies uncovered in the XM30 mask during testing, and the decision to adopt a lower cost turbine bleed air collective protection system for the M1E1 tank rather than proceed with the Hybrid Collective Protection Equipment (HCPE) System for the M1E1. The M1E1 tank decision takes advantage of the high-pressure bleed air available from a turbine engine to replace the electric blowers and dust prefilters used with the HCPE System and thereby reduce the size and weight of the M1E1 collective protection system. Much of the remainder of the turbine bleed air system uses hardware developed for the HCPE system. The funding decrease of $1070 thousand in FY 1983 is a result of Congressional direction in the FY 1983 Appropriations Act and pro rata application of general Congressional reductions to the RDTE,A appropriation. The decrease of $7462 thousand in FY 1984 is a result of the decision to adopt the turbine bleed air collective protection system for the M1E1 tank, the decision to redirect the XM14 Vehicle-Mounted Decontaminating Apparatus to develop a skid-mounted, rather than vehicle-mounted, decontamination apparatus, and a revision of the anticipated inflation in the proposed Army RDTE budget. The latter decision increases the flexibility of the decontamination apparatus, but resulted in an extension of the development program through FY 1985. The funds released by the Hybrid Collective Protection Equipment decision were redirected to fund the continuation of the decontamination apparatus development program and to other, higher priority Army requirements.

D. (U) OTHER APPROPRIATION FUNDS: (**$** In Thousands) Not Applicable.

Program Element: **#64725A** Title: **Chemical/Biological Protective Materiel**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems** Budget Activity: **#4 — Tactical Programs**

E. (U) RELATED ACTIVITIES: Department of Defense Directive 5160.5 assigns the Army responsibility for research, exploratory development, and advanced development in chemical-biological defense for all Services and for engineering development for the Army and for joint requirements of the Army with other Services. In order to meet other Services' needs and to prevent unnecessary duplication of effort, execution of this responsibility is coordinated through the Joint Development Objectives Guide (JDOG), joint working groups, and joint periodic reviews of the Joint Chemical-Biological Research, Development, Test and Evaluation Program. Supporting exploratory development work is performed under Program Element #62706A (Chemical Defense and General Investigations). Supporting advanced development efforts are performed under Program Element #63621A (Chemical/Biological Protective Materiel Concepts).

F. (U) WORK PERFORMED BY: In-house: Chemical Systems Laboratory, Aberdeen Proving Ground (APG), MD; Test and Evaluation Command, APG, MD; Army Materials and Mechanics Research Center, Watertown, MA; Army Tank-Automotive Command, Warren, MI; Human Engineering Laboratory, APG, MD; Arctic Test Center, Fort Greely, AK; and Tropic Test Center, Panama. Contractors are Honeywell, Inc., Orlando, FL; Donaldson Co., Minneapolis, MN; Brunswick Corporation, Deland, FL; and All-Bann Enterprises, CA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. *(U)* ***DF97 — Decontamination Materiel:*** *This project supports engineering development (ED) efforts in materiel to decontaminate skin,* clothing, equipment, and terrain. Since many chemical-biological agents inflict casualties on contact and persist in target areas for long periods and prolonged wearing of protective equipment degrades performance, it is necessary to provide rapid, effective means of decontaminating chemical-biological agents. During FY 1982, ED was initiated on the XM18 Skid-Mounted, Diesel-Powered Decontaminating Apparatus. The XM18 replaces the XM14 *Truck-Mounted Decontamination Apparatus which completed advanced development in FY 1981.* This program realignment is the result of an Army review of the XM14 program. The review determined that the flexibility gained by developing a skid-mounted apparatus, rather than permanently mounting the apparatus on a truck, warranted redirecting the program. The development effort was restructured in FY 1982 and resumed as the XM18. During FY 1983, ED will be continued on the XM18 decontamination apparatus and initiated on the XM16 Jet Exhaust Decontamination and *Smoke System as this item transitions from advanced development.* During FY 1983, fabrication of the XM18 prototypes will be completed, planning for the XM18 Development Test/Operational Test II (DT/OT II) will be completed, the XM16 ED contract will be awarded, and the preliminary XM16 ED design will be completed. During FY 1984, ED will be continued on the XM16 and XM18 decontamination apparatuses, and ED will be initiated on the XM15 Interior Surface Decontamination System and on an Improved Individual Decontamination Kit. Development Test (DT)II for the XM18 will be conducted during FY 1984. Development Test/Operational Test (DT/OT) II will be conducted, and the Technical Data Package (TDP) prepared for the XM16 during FY 1984. The XM15 is designed to decontaminate the interiors of vehicles, vans, and shelters to include electronic gear where current decontamination means are not suitable for use. During FY 1984, the XM15 ED contact will be awarded, XM15 hardware will be fabricated, and the XM15 DT II will be initiated. The Individual Decontamination Kit will be a further improvement of the M258A1 Decontamination Kit designed to provide

Program Element: **#64725A** Title: **Chemical/Biological Protective Materiel**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems** Budget Activity: **#4 — Tactical Programs**

the individual soldier an increased capability to decontaminate his skin and individual equipment. This item will move to ED directly from exploratory development. The ED contract will be awarded and ED prototypes fabricated during FY 1984.

2. **(U) D017 — Collective Protection Materiel:** This project supports engineering development (ED) of collective protection equipment for vans, vehicles, and shelters and special-purpose chemical-biological shelters. Meets user requirements for contamination-free environments for essential command and control, maintenance, communications, and recuperation functions which cannot be adequately performed using individual protection equipment. During FY 1982 through FY 1984, the project will continue the application of Modular Collective Protection Equipment (MCPE) to vans, vehicles, and shelters in accordance with user-established priorities. During FY 1982, PATRIOT-MCPE compatibility testing was continued, TACFIRE-MCPE compatibility testing was initiated, and development of the AN/TSQ-73 Missile Minder-MCPE application was completed. Compatibility testings of the TACFIRE and PATRIOT MCPE applications will be completed during FY 1983. During FY 1984, the project will continue the application of MCPE to fielded and developmental systems in accordance with user-established priorities.

3. **(U) D019 — Individual Protective Materiel:** This project supports engineering development (ED) efforts in individual respiratory protection to provide protection against threat chemical-biological agents which are effective through the respiratory tract. Efforts focus on providing required levels of protection with minimal breathing resistance or degradation of performance. In FY 1982, the XM30 Series Mask completed Operational Test (OT) II, and a Special In-Process Review was held to review the test results. The OT II results confirmed the limitations of the flexible polyurethane lens, i.e., yellowing and scratching, and the reduced reliability, availability, and maintainability compared to the current M17A1 Mask. The US Army Training and Doctrine Command (TRADOC) concluded the XM30 Series Mask did not offer a significant operational improvement over the current mask. The XM30 program was terminated for the Army in July 1982. The Army continued to complete ED for the Air Force and Navy to enable them to make a decision on whether to procure the XM30. In FY 1983, the Army will initiate a follow-on mask RDTE program. Competitive contracts for the follow-on mask design prototypes will be awarded. A fabrication contract will be awarded, the follow-on design completed and tooling will be started. In FY 1984, tooling will be completed and test items produced, production qualification testing will be conducted, Development Test/Operational Test (DT/OT) II will be conducted, and the Technical Data Package (TDP) prepared.

4. **(U) D023 — Collective Protection Materiel for Armored Vehicles:** To meet the threat of chemical-biological warfare, Congress directed in the FY 1978 Department of Defense Appropriations Act (PL 95-79) that the Army prepare a plan to provide nuclear-chemical-biological (NBC) protection for combat vehicles in development or procurement by 1981, which was done. Subsequently, a threat assessment and review of the Army's tactical doctrine for operating in a chemically contaminated environment resulted in an Army plan for providing NBC collective protection for fielded as well as developmental combat vehicles and their crews. The provision of collective protection for combat vehicle crews provides improved protection; contributes to reducing the performance degradation imposed by individual protection equipment; and, when complemented by a micro- or macro-climatic cooling system, allows sustained operation in a chemical-biological environment under moderately warm to hot climatic conditions with little or

Program Element: #64725A

Title: Chemical/Biological Protective Materiel

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

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no crew performance degradation due to heat stress. This project supports the application of collective protection equipment/capabilities to combat vehicles and manages the development of micro- and macro-climatic cooling systems for combat vehicles. The project assists weapon system project managers in interface definition and engineering efforts necessary to install collective protection equipment/capabilities in combat vehicles. The collective protection systems are subsequently type classified along with new or improved weapon systems as a component of the weapon system. In FY 1982, prototype installations on the Fire Support Team Vehicle (FISTV) and Field Artillery Ammunition Supply Vehicle (FAASV) were completed and tested; mockup installations were prepared for the M109 howitzer, M2 Infantry Fighting Vehicle, and candidate wheeled ambulance vehicles; and the interface definition for the DIVAD Gun was initiated. In FY 1983, the project will fabricate prototype units for the DIVAD Gun, configure collective protection equipment for the M3 Cavalry Fighting Vehicle, and provide equipment to support testing of the M1E1 tank. In FY 1984, the project will support fabrication and testing of prototype M3 Cavalry Fighting Vehicle collective protection equipment, testing of DIVAD Gun collective protection equipment, and continue to support the application of collective protection equipment to user-designated combat vehicles including the Light Armored Vehicle, High Mobility Multi-Purpose Wheeled Vehicle, and Commercial Utility Cargo Vehicle.

H. (U) **PROJECTS OVER $10 MILLION IN FY 1984:** Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64727A

Title: Command and Control

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	15691	13971	36967	32851	Continuing	Not Applicable
	QUANTITIES					Position Location Reporting System: 2 Master Stations, 64 User Units, 20 Portable Test Sets. Tactical Display System: 3 Small Displays 3 Large Displays	
DC98	Position Location Reporting System (PLRS)	11850	12736	15241	16205	2365	100187
D183	Tactical Display System (TDS)	1363	- 0 -	- 0 -	- 0 -	Continuing	Not Applicable
D184	Tactical Computer System/Tactical Computer Terminal (TCS/TCT)	2478	1235	1215	1245	Continuing	Not Applicable
D187	Military Computer Family (MCF)	- 0 -	- 0 -	20511	15401	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program consists of four principal projects. The Position Location Reporting System (PLRS) is a joint Army/Marine Corps development that will provide combat commanders with automatic, near-realtime identification and location of equipped forces on the battlefield, regardless of terrain, weather, or geographic location. The system will augment conventional communications and enhance the tactical commander's ability to accurately, rapidly, and effectively control weapon and maneuver elements through the automatic reporting of friendly force information in a secure, jam-protected network. This capability will provide the commander with the means to ensure rapid employment of combat power. Basic requirements and specifications for the system are stated in a 1982 USA/USMC Joint Services Operational Requirement (JSOR) document. The Tactical Display System is needed to annotate standard military maps in near-realtime in order to access large volumes of data available in the data bases of tactical automated systems to present rapidly changing battlefield situations accurately and selectively while withstanding the battlefield environment. The objective is to develop a near-term interim product line of generic tactical large-

Program Element: #64727A | Title: Command and Control

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screen displays based on today's technology and sufficiently rugged to survive in a military environment. Based on user feedback/acceptance, accelerated development of interim Tactical Display Systems will be accomplished in FY 1984 and FY 1985 to include requisite Integrated Logistics Support (ILS). The Tactical Computer System/Tactical Computer Terminals (TCS/TCT) satisfy Army needs for intelligent terminals for automated field and data processing systems. This equipment makes available to the Army a near-term standard set of modular, militarized, automatic data processing equipment capable of being used in a variety of support packages, thus enabling the Army to achieve reduced life cycle costs, shortened development cycles, simplified logistic support and training, and a reduction of computer proliferation. The modular nature of TCS and TCT further permits product improvements to be accomplished enabling the Army to take advantage of state-of-the-art advances and to provide for efficient insertion of Military Computer Family (MCF) components as they become available for long-term standardization. The Military Computer Family program is needed to reduce hardware and software life cycle costs by reducing proliferation of computer types and provide a common base for survivability, interoperability, and interchangeability. By providing computers with a common Instruction Set Architecture (NEBULA), soaring software maintenance costs will be reduced significantly. These computers are being built with built-in-test and high reliability, fault tolerance and the latest technologies. The program will be extended to a compatible set of peripherals. The increasing speed, lethality and complexity of modern warfare have made battlefield automation essential for weapon system control and up-to-the-minute processing of critical combat information.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	15691	13971	36967	*Continuing*	*Not Applicable*
Funds (as shown in FY 1983 submission)	14965	13650	26486	Continuing	Not Applicable

Increase of $726 thousand in the FY 1982 funding level is a net result of: a $2300 thousand increase in the PLRS project to comply with a Congressionally directed change in the program to correct unresolved developmental problems, and a $1574 thousand decrease in the TDS project due to reprograming to higher priority Army requirements. The funding increase of $321 thousand in FY 1983 is a net result of: a $29 thousand decrease from pro rata application of general Congressional reductions to the RDTE,A appropriation; a $3050 thousand decrease in the MCF project resulting from a Congressionally directed change in the program until DOD submission of the required Computer Study; and a $3400 thousand increase resulting from reprograming of funds for the PLRS project. The funding increase of $10481 thousand in FY 1984 is a net result of: an $11603 thousand increase due to program restructuring in the PLRS ($9303 thousand) and MCF ($2300 thousand) projects; a $56 thousand increase from

Program Element: #64727A

Title: Command and Control

DOD Mission Area: #344 — Tactical Command and Control

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revised civilian pay pricing indices; and a reduction of $1178 thousand which resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE program.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army:						
Funds (current requirements)	- 0 -	28200	35300	74500	44800	182800
Quantities (current requirements)						
Master Stations	- 0 -	2	1	6	2	11
Basic User Units	- 0 -	165	412	687	800	2064
Installation Kits	- 0 -	262	567	1089	1268	3186
Aircraft Procurement Army:						
Funds (current requirements)	- 0 -	- 0 -	5200	6000	15300	26500
Quantities (current requirements)						
Pilot Control Display Panels	- 0 -	- 0 -	92	149	216	457
Installation Kits	- 0 -	- 0 -	92	149	216	457

The above procurement funding is related to the PLRS project (DC98).

Program Element: #64727A

Title: Command and Control

DOD Mission Area: #344 — Tactical Command and Control

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Net funding decrease of $4200 thousand (OPA) in FY 1983 results from Congressional reduction of $15000 thousand and proposed Army Congressional reprograming increase of $10800 thousand. Funding increases of $7900 thousand (OPA) and $900 thousand (APA) in FY 1984 are the net result of program restructuring and better cost estimates gained from a program Baseline Cost Estimate (BCE) completed in July 1982. Quantity decreases (320 Installation Kits — OPA) in FY 1984 result from BCE adjustments. APA quantities in FY 1984 have not changed but are divided into two categories to more accurately describe procurement end items. Total estimated cost and quantities reflect information contained in the July 1982 BCE, and no changes are anticipated.

E. (U) RELATED ACTIVITIES: The US Marine Corps funds 40% of the PLRS development under Program Element (PE) #64719M (Other Marine Corps Development (Engineering)). The Army is also developing an Army Data Distribution System (ADDS) under PE #63713A (Army Data Distribution System), Project #D370 (PLRS/Joint Tactical Information Distribution System (JTIDS) Hybrid). The ADDS is intended to satisfy an urgent Army requirement for secure warfare/intelligence and combat service support systems being fielded in the 1980s. ADDS consists of a mix of Enhanced PLRS User Units (EPUUs) and the JTIDS Class 2 terminal. Army efforts in the joint JTIDS program are conducted under PE #64702A (Joint Tactical Information Distribution System), Project #D451 (Army Support of JTIDS). The PLRS, Army participation in the JTIDS Program and ADDS are centrally managed by one Army Project Manager under Army charter. Through this central management, the Army and Department of Defense insure that no unnecessary duplication of efforts occurs. The Tactical Computer System and Tactical Computer Terminals engineering development models have been deployed in Europe employing the initial maneuver control capabilities. This effort is funded under PE #23740A (Maneuver Control System), Project #D484 (Maneuver Control System). Advanced development of the Military Computer Family is funded in PE #63723 (Command and Control), Project #D186 (Military Computer Family).

F. (U) WORK PERFORMED BY: For PLRS, Project Manager, Position Location Reporting System/Tactical Information Distribution System (PLRS/TIDS), US Army Communications-Electronics Command (USACECOM), Fort Monmouth, NJ. Primary contractor is Hughes Aircraft Company (Ground Systems Group), Fullerton, CA., and The Singer Company, Kearfott Division, Little Falls, NJ. For TDS & TCS/TCT, Project Manager, Operations Tactical Data Systems (OPTADS), USACECOM, Fort Monmouth, NJ. Primary contractor is The Singer Co., Librascope Division, Glendale, CA. For MCF, Project Officer under Director, Center for Tactical Computer Systems, USACECOM, Fort Monmouth, NJ. Contractors currently working in Advanced Development are RCA, Moorestown, NJ; Raytheon, Sudbury, MA; General Electric, Syracuse, NY; and TRW, Redondo Beach, CA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D183 — Tactical Display System:** The objective of this project is to develop a near-term interproduct line of generic tactical large-screen displays, based on today's technology and sufficiently rugged to survive in a military environment. The Interim Tactical Display System is needed to annotate standard military maps in near-realtime in order to access large volumes of data available in the data bases of tactical automated

Program Element: #64727A | Title: Command and Control

DOD Mission Area: #344 — Tactical Command and Control | Budget Activity: #4 — Tactical Programs

systems to present rapidly changing battlefield situations accurately and selectively while withstanding the battlefield environment. During FY 1982, fabrication of 3-43 cm x 43 cm plasma displays and 3-60 cm x 80 cm plasma displays was begun. Continued contractor production, testing, and delivery to the Army will be accomplished during FY 1983. The displays will be interfaced and tested in conjunction with the Maneuver Control System in Europe. Based on user feedback and acceptance in Europe, an engineering development program including Integrated Logistics Support (ILS) is planned for FY 1984.

2. (U) D184 — Tactical Computer System/Tactical Computer Terminal: Funds requested for the Tactical Computer System/Tactical Computer Terminal (TCS/TCT) project will be used to develop additional Test Program Sets based on added circuit board requirements validated by an increasing amount of accrued maintenance data. This action will permit the generic TCS/TCT equipment to improve its operational availability as either stand-alone or embedded equipment for Army systems. Accomplishments during FY 1982 included: acquisition of Producibility Engineering and Planning (PEP); completion of ILS contract except for software programing on the USM-410, which continues; completion of DT II; full communications testing and a successful Development Acceptance In-Process Review (DEVA IPR). For FY 1983 software programing on the USM-410 will be continued with emphasis on technology upgrades. Test Program Set Development and Integrated Logistical Support will continue in 1984 for the preplanned product improvement technology upgrades for the Generic Tactical Computer System/Tactical Computer Terminal.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. (U) Project: DC98 — Position Location Reporting System (PLRS)

a. (U) Project Description: The PLRS system will provide combat commanders with automatic, near-realtime identification and location of equipped forces on the battlefield, regardless of terrain, weather, or geographic location. The PLRS system employs a Master Station and an Alternate Master Station for 100% backup to insure system survivability and continuity of operations during displacements. The air-transportable master station provides computer-controlled network management and continuously updates the position of deployed User Units in manpack, vehicle, and airborne configurations distributed throughout a division's combat maneuver and fire support elements. PLRS-equipped units can obtain their own position, range and bearing to other units or locations, the location of other units, corridor guidance, an alarm when entering a predesignated restricted area such as a minefield, and free-format abbreviated data messages from other users. The system is crypto-secure and is highly resistant to jamming. The network, under Master Station management, automatically uses surface/airborne User Unit relays to achieve over-the-horizon transmission and to overcome close-in terrain obstructions to line-of-site communications.

b. (U) Program Accomplishments and Future Efforts:

Program Element: **#64727A** Title: **Command and Control**

DOD Mission Area: **#344 — Tactical Command and Control** Budget Activity: **#4 — Tactical Programs**

(1) **(U) FY 1982 Accomplishments:** Awarded contract for Producibility Engineering and Planning (PEP)/Reliability, Availability, and Maintainability (RAM) to prepare for FY 1983 production and correct RAM deficiencies noted during testing. Awarded contract for the Full-Scale Development of the PLRS Test Set (PTS) for use at direct support. Received and evaluated through the use of a "Should Cost Team," the Hughes Aircraft Company's proposal for initial production of the PLRS System. Completed DT/OT II and innovative concept testing at the 9th Infantry Division High Technology Test Bed. PLRS was presented to a Marine Corps Systems Acquisition Review Council III (30 Jul 82) and an Army Systems Acquisition Review Council III (1 Sep 82) for a production decision. The Army and Marine Corps indorsed the acquisition strategy and approved PLRS for production. Continued task and media analysis for development of training aids and devices.

(2) **(U) FY 1983 Program:** Complete PEP/RAM and continue PTS development initiated in FY 1982. Award contract for Training Aids and Devices (TADs), Test Requirements Documents/Test Program Set (TRD/TPS) development and Post-Deployment Software Support equipment. Award Initial Production contract. Plan and conduct additional innovative concept evaluations at 9th Infantry Division and 2nd Marine Division for further doctrine and concept refinement.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Continue Initial Production contract, PTS, TADs, TRD/TPS developments. Initiate full-scale development of the PLRS Steerable Null Antenna Processor (PSNAP), an ancillary device to enhance electronic warfare performance.

(4) **(U) Program to Completion:** Complete initial production contract. Complete PTS, TADs, PSNAP development and award PTS, TADs, and PSNAP production contracts.

c. **(U) Major Milestones:**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Army Systems Acquisition Review Council (ASARC) III	Completed 1 September 1982	3rd QTR FY 1982
First Unit Equipped (FUE)	2nd QTR FY 1986	Not Shown
Initial Operational Capability (IOC)	FY 1986	FY 1985

Program Element: #64727A

Title: Command and Control

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Change in ASARC date results from scheduling to accommodate principal members. IOC change results from Congressional denial of FY 1982 production funding.

2. (U) Project: D187 — Military Computer Family (MCF)

a. (U) Project Description: This project provides full-scale development of a family of standardized computers for automated battlefield systems, beginning in FY 1984. The need for MCF stems from the rapid growth of "go-to-war" computers over the last six years, which has resulted in an extensive proliferation of different and incompatible types. In order to curb this steadily increasing proliferation and to make battlefield automated systems affordable, supportable, and survivable, the Army initiated the Advanced Development of the MCF in 1981. The MCF consists of three family members: a super-minicomputer (AN/UYK-19), a microcomputer (AN/UYK-49) and a single-board computer (a component of the microcomputer). All members will execute the Nebula instruction set architecture (MIL-STD-1862A) and DOD's new high order language, Ada. The entire MCF program, of which Project #D187 is the second phase, incorporates a cyclical acquisition strategy of planned, time-phased infusions of advanced technology to maintain technological currency.

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: All MCF efforts were conducted under Program Element #63723 (Command and Control), Project #186 during FY 1983 (Military Computer Family).

(2) (U) FY 1983 Program: Advanced Development of MCF members will continue under Program Element #63723 (Command and Control), Project #D186 (Military Computer Family). While the MCF Full-Scale Development was originally scheduled to begin in FY 1983, the project is currently being delayed pending submission of a DOD study directed by Congress. When approval is given, this program can be initiated as planned, in FY 1983.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: In FY 1983, if approved, or early FY 1984, two competitive Full-Scale Development contracts for the Engineering Development of MCF will be awarded. Significant contractural efforts to be initiated in FY 1984 will include development of: Integrated Logistics Support packages for testing, reliability and maintainability projections for production, life cycle cost analyses, Very Large Scale Integrated Circuits, technology insertion, producibility plans, and FSD models for testing.

Program Element: #64727A

Title: Command and Control

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

(4) **(U) Program to Completion:** The MCF project will accept delivery of Full-Scale Development prototype models from the competing contractors for flyoff comparison during DT/OT II. The evaluation will emphasize the importance of logistics support and will include these factors: reliability and maintainability; life cycle cost and power; size and weight; and speed and memory capacity in order of precedence. Production contract award(s) will follow: current plans call for initiation of the development program for the second generation of MCF computers.

c. **(U) Major Milestones:**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
DT I completed	Apr 1983	1983
In-Process Review	Aug 1983	Not Shown
Full-Scale Development Contract Award	Oct 1983	Aug 1983

FSD Control Award was delayed by Authorization Committees deletion of FY 1983 RDTE funds requested to initiate the FSD phase. The Authorization Bill provides FY 1983 funds to complete the AD effort, but delays the start of FSD until the Congressionally requested DOD computer study report is submitted.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64730A

Title: Remotely Piloted Vehicles (RPVs)

DOD Mission Area: # 217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	76594	77727	138086	103021	Continuing	Continuing
D040	Remotely Piloted Vehicle	76594	77727	103359	61679	2283	426348
D041	Mission Payloads	- 0 -	- 0 -	34727	41342	Continuing	Continuing

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: To win the battle we must attack deep to delay and disrupt the enemy's follow-on forces as a prelude to taking decisive offensive action. Fundamental to the success of this doctrine is the ability to see deep to locate and destroy high-value targets, and quickly assess the ensuing damage. We must see, analyze, decide, and act faster than the enemy. Realistically, today's Army has an inadequate capability to completely implement this doctrine. This program will develop a Remotely Piloted Vehicle (RPV) System to perform target acquisition, designation, aerial reconnaissance, artillery adjustment missions, and battlefield post-strike assessment. Laser designation will be provided for all Army and Air Force laser-guided munitions. The RPV system will extend the attack capability of commanders beyond the forward line of troops to the full range of artillery and close air support weapons. It focuses on the area beyond 5km where forward observers, ground systems, and helicopters are ineffective and the risk to manned systems is high because of the enemy's sophisticated air defense systems. Future preplanned product improvement plans call for providing a night capability through use of a Forward-Looking Infrared (FLIR) sensor package, multiple air vehicle control from a single ground control station, and extended range.

C. (U) COMPARISON WITH FY 1993 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1992	FY 1993	FY 1994	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	76594	77727	138086	Continuing	Continuing
Funds (as shown in FY 1993 submission)	73094	77949	110138	Under Revision	Under Revision

Program Element: #64730A

Title: Remotely Piloted Vehicles (RPVs)

DOD Mission Area: # 217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

FY 1982 increase is for increased contractor costs for the revised program. The funding decrease of $222 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The FY 1984 increase is for additional full-scale development (FSD) hardware to achieve an early operational capability. These funds will (1) provide two additional sets of FSD hardware for early operational evaluation and training experience in FY 1985 in advance of production deliveries in FY 1987, (2) reduce production risk by exercising the Austin, Texas, facility, tooling, and production line prior to start of full-scale production, and (3) smooth the transition from development to production by keeping prime and subcontractors active while the program goes through Development and Operational Tests.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army (OPA-2)	- 0 -	- 0 -	- 0 -	141600	1214000	1355600
Quantities (Air Vehicles/Ground Systems)	- 0 -	- 0 -	- 0 -	48/9	947/65	995/74
Military Construction, Army (MCA)	- 0 -	- 0 -	- 0 -	2298	11160	13458

Production contract award is scheduled for FY 1985. Funding profile reflects requirements from the August 1982 Baseline Cost Estimate for the RPV program as modified by the 30 September 1982 Army Systems Acquisition Review Council (ASARC).

E. (U) RELATED ACTIVITIES: The RPV was funded during Exploratory Development and Advanced Development in FY 1975-1978 under Program Elements #62732A (Remotely Piloted Vehicle Supporting Technology) and #63725A (Remotely Piloted Vehicles). Development of different interchangeable payloads such as night and adverse weather sensors, jammers, radio relay, meteorological, etc., will continue under these two program elements. The Air Force RPV programs, consisting of Program Element #63739F, (Advanced RPVs) and Program Element #64746F (Expendable Drones), are being monitored to utilize applicable technology, as appropriate. The Army, Air Force, and Navy program managers and Marine Corps liaison officer meet to preclude duplication of effort among the Services. The data link is funded under Program Element #64705A (Modular Integrated Communication and Navigation System (MICNS)). Prior to FY 1982, the MICNS engineering development program was funded from Program Element #64748A (Standoff Target Acquisition System (SOTAS)), this program element, and Program Element #64732F (Precision Location Strike

Program Element: #64730A Title: Remotely Piloted Vehicles (RPVs)

DOD Mission Area: # 217 — Land Warfare Surveillance and Reconnaissance Budget Activity: #4 — Tactical Programs

System (PLSS)). The FLIR sensor development is being funded during Advanced Development by Program Element #63725A (Remotely Piloted Vehicles/Drones).

F. (U) WORK PERFORMED BY: US Army Aviation Research and Development Command, St. Louis, MO; Combat Surveillance Target Acquisition Laboratory, US Army Electronics Research and Development Command, Fort Monmouth, NJ; Night Vision and Electro-Optics Laboratories, US Army Electronic Research and Development Command, Fort Belvoir, VA; Research and Technology Laboratories, Aero Mechanics Laboratory, Moffett Field, CA; and Jet Propulsion Laboratory, Pasadena, CA. Contracts were awarded to Lockheed Missiles and Space Company, Inc., Sunnyvale, CA, for system development and to Harris Corporation, Melbourne, FL, for the Modular Integrated Communications and Navigation System (MICNS-antijam data link).

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1994: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1994:

1. **(U) Project: D040 — Remotely Piloted Vehicle**

a. **(U) Project Description:** The program will accomplish the Full-Scale Development (FSD) of the RPV System begun in FY 1979. The RPV System will fill the requirement for unmanned aerial target acquisition, target location, and target designation. Laser designation of targets will be provided for a family of laser-seeking weapons including cannon-launched guided projectiles (COPPERHEAD), ground and helicopter-launched missiles (HELLFIRE), and Air Force laser-guided munitions. The RPV system will extend the eyes of brigade and division commanders to the range of their indirect support weapons where, during combat, ground-based systems cannot see and the risk to manned observation aircraft is high. This system multiplies the effectiveness of indirect fire support weapons, saves money through greater effectiveness of ammunition expended, and assists the commander in optimally employing his forces by providing battlefield surveillance, artillery adjustment, and laser designation on targets to the full range of field artillery weapons. The RPV assists in overcoming the numerical superiority of a potential enemy and enhancing the field artillery's ability to destroy enemy tanks and other targets beyond ground line of sight. The FLIR sensor development will enhance the RPV capability even further by providing for a night sensor for the RPV to provide night and limited all-weather capability of target acquisition, laser designation for laser-seeking weapons, target location, artillery adjustment, and battlefield reconnaissance.

b. **(U) Program Accomplishments and Future Efforts:**

Program Element: #64730A

Title: Remotely Piloted Vehicles (RPVs)

DOD Mission Area: # 217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

(1) **(U) FY 1982 Accomplishments:** As a result of Army funding constraints, the RPV program was restructured to a 70-month program in January 1982. All major subsystem Critical Design Reviews (CDRs) have been completed. One complete RPV section was fabricated, checked out, and set up at Fort Huachuca, AZ, for flight testing of hardware/software designs. The test program extended from June 1982 to November 1982. Seventeen flight tests were performed with truly impressive results. Using a commercial data link and a developmental payload the following were demonstrated: rail launch, automatic net recovery, computer-controlled navigation, telemetry of TV video, air vehicle flight parameters, loss link capability, and high-speed descent. Early software/hardware integration of the fully qualified payload and the Modular Integrated Communication and Navigation System (MICNS) data link were successfully accomplished via breadboards.

(2) **(U) FY 1983 Program:** All hardware and software Critical Design Reviews (CDRs) will be completed during the first quarter FY 1983 along with the RPV System CDR. Element and component qualification tests will be completed. Fabrication of all ground system elements and the majority of the airborne hardware will be complete. Fully qualified MICNS data links and mission payloads will be integrated into the system as Contractor Engineering Design Tests (EDT-C) proceed in preparation for Development Test II (DT-II) in FY 1984. Training and maintenance requirements will be defined by Government review and approval of training course outlines, task and skill analyses, and logistic and maintenance reviews. All integration of hardware subsystems and software will be completed by the end of the fourth quarter. One system will be delivered for early operational testing. A program to provide two additional sets of Full-Scale Development (FSD) hardware for operational use and a potential early combat capability will begin. This program will also reduce production risk, by testing production tooling, production line facilities, and manufacturing planning documents in advance of full-scale production. The prime and subcontractors will also be kept active during the period between the development and production phases of the program.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Full-scale development will continue with development testing moving from contractor to Government control. Reliability, Availability, Maintainability/Logistics (RAM/LOG) data collection will continue. A complete logistics documentation package will be received and evaluated. All Integrated Logistics Support (ILS) documentation will be completed and delivered to the Government. DT II and OT II operator and maintenance training will be conducted, and DT II will begin. Initial provisioning through depot level will be complete as will the first Production Readiness Review.

(4) **(U) Program to Completion:** Both DT and OT are scheduled for completion in FY 1985 with a production decision scheduled for third quarter FY 1985.

Program Element: #64736A

Title: Remotely Piloted Vehicles (RPVs)

DOD Mission Area: # 217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
1st Flight of Prototype	Compl Jul 82	3Q FY 1982
Operational Testing	2Q FY 1985	TBD
Production Award	4Q FY 1985	TBD
Early Operational Capability	4Q FY 1985	N/A

2. (U) Project: D041 — Mission Payloads:

a. (U) Project Description: This project will accomplish full-scale development of a Forward-Looking Infrared (FLIR) sensor for the RPV to provide night and limited all-weather capability of target acquisition, laser designation for laser-seeking weapons, target location, artillery adjustment, and battlefield reconnaissance. FLIR Advanced Development for FY 1982 and FY 1983 is being accomplished under Program Element #63725A (Remotely Piloted Vehicles/Drones). FLIR will move to full-scale development in FY 1984.

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: Not Applicable.

(2) (U) FY 1983 Program: Not Applicable.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: The FLIR Sensor Full-Scale Development program will start in FY 1984. A competitively selected contractor will design and fabricate FLIR payloads to be integrated into the RPV system. The FLIR payload will be interchangeable with the daylight sensor payload. This capability will provide night/limited adverse weather capability to the RPV system. The RPV prime contractor will be responsible for configuring the RPV system for 24-hour operation and for integrating the FLIR payload into the system. A 41-month FSD program is scheduled to begin in second quarter FY 1984. Major milestones for FY 1984 include preliminary design review and critical design review of both the FLIR subsystem and the modifications of the RPV system.

Program Element: **#64730A**

Title: **Remotely Piloted Vehicles (RPVs)**

DOD Mission Area: **# 217 — Land Warfare Surveillance and Reconnaissance**

Budget Activity: **#4 — Tactical Programs**

(4) **(U) Program to Completion:** The FLIR FSD program will continue. Contractor testing will be completed and the system fully integrated with the RPV system. DT/OT II will be completed, and a production contract will be awarded. Other mission payloads will be developed as the requirements are identified. This is a continuing program.

c. **(U) Major Milestones:**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
FSD Contract Award	2Q FY 1984	4Q FY 1983
DT/OT II Completed	2Q FY 1987	TBD
Production Contract Award	3Q FY 1987	TBD

Army funding priorities delayed start of FLIR (FSD) to 2Q FY 1984.

Program Element: #64730A

Title: Remotely Piloted Vehicles (RPVs)

DOD Mission Area: # 217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

I. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. (U) Advanced Development tests of the Remotely Piloted Vehicle — System Technology Demonstrator (RPV-STD) were conducted during July-November 1977 at the US Army Electronic Proving Ground (USAEPG), Fort Huachuca, AZ. As a System Technology Demonstrator, this system was not designed or intended to be a militarized system. Test data were collected to evaluate the system's technical performance. During these tests, military personnel operated the system and performed organizational maintenance. Contractor personnel performed all other maintenance. Test results indicated the RPV System concept demonstrated military utility for target acquisition, designation, and reconnaissance. The RPV-STD system generally performed satisfactorily to ranges and altitudes in excess of the design specifications.

b. (U) Full-Scale Development (FSD) testing of the RPV System will demonstrate that the engineering design and development process is reasonably complete, design risks have been minimized, and the RPV System will meet the design specifications and Required Operational Capabilities. Development Testing II (DT II) will be accomplished in a series of factory, laboratory, and field tests and analyses. Development tests will consist of: Engineering Development Tests — Contractor (EDT-C) to provide data for refining the system hardware, to insure the system's technical characteristics are within the specification, and to eliminate as many technical and design risks as possible; Prototype Qualification Tests — Contractor (PQT-C) to measure the technical and environmental performance of the RPV System and its associated support and maintenance equipment; and Prototype Qualification Tests — Government (PQT-G) to measure the technical performance of the RPV as a complete system, including associated support equipment, training and maintenance packages, human factors and safety; and an estimate of the system's military utility. These qualification tests will reveal the RPV's readiness to enter Operational Testing II (OT II). DT II and OT II will be conducted separately; however, the DT and OT Independent Evaluators will use data from both tests for the required independent evaluation of RPV.

c. (U) Data will be collected to evaluate the following areas: System Performance; Aircraft Performance; Command, Control, and Communications; Sensor Performance; Laser Performance; Reliability, Availability, and Maintainability; Ground Handling; Survivability; Human Factors; Safety; Training Package; Electromagnetic Interference/Compatibility; Environmental Performance; and Logistics Support. A highly successful EDT-C Flight Test Program was conducted from August to November 1982 at Ft. Huachuca, AZ. These early flights, using an interim data link, provided early confirmation of the adequacy of hardware and software performance. Seventeen flights were flown with over 9 hours' flying time logged. The following were demonstrated: Rail launch, net recovery, computer-controlled navigation, telemetry of TV video, loss link capability, air vehicle flight parameters (climb, decent, etc.), way point guidance, manual control, roll and pitch jink, maximum altitude (over 10,000 feet), software for heavy winds, and high-speed descent. Element and component environmental tests began in 1982, with over 400 separate tests scheduled prior to completion of PQT-C.

Program Element: #64730A

Title: Remotely Piloted Vehicles (RPVs)

DOD Mission Area: # 217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

d. (U) The RPV System prototypes to be tested during DT and OT are expected to be nearly identical to the final production configuration, with minor variations as a result of testing. All elements of the RPV System and its support equipment will be available for DT and OT with the exception of some of the Test Program Sets (TPS) and interface packages used for the Equate Automatic Test Equipment. During DT/OT, the contractor will demonstrate Equate compatibility with approximately 15% of the RPV TPSs being evaluated. The remainder of the TPSs will be developed and evaluated before Initial Operational Capability of the RPV System.

e. (U) The RPV system is being developed by Lockheed Missile and Space Company (LMSC). Development Testing will be accomplished by the US Army Electronic Proving Ground (USAEPG). LMSC will provide support for DT tests and technical support, if required, during OT. The DT independent evaluation will be accomplished by the US Army Materiel Systems Analysis Activity (AMSAA). DT II will be conducted from August 1984 to November 1984. Resources for testing consist of four complete RPV systems. These prototypes will be distributed among the various tests as required. The Program Manager for RPV development is Colonel Robert Evans.

f. (U) Reliability, Availability, Maintainability (RAM): RAM data will be collected from both the contractor and Government test programs. The detailed test plan for each test will contain the specific details of RAM data collection. The data will be utilized initially in determining the contractor's progress in reaching the RAM goals, and ultimately in evaluating the system's RAM characteristics against the ROC requirements.

g. (U) Environmental Qualification Tests: The RPV system, subsystems, components, and elements will be subjected to environmental tests which most nearly represent the required specifications for temperature, altitude, humidity, dust, fungus, acceleration, vibration and shock, rain, immersion, explosive atmosphere, salt fog, solar, Electromagnetic Interference (EMI), and Electromagnetic Compatibility (EMC).

h. (U) RPV FLIR mission payload acquisition strategy is under development. DT/OT requirements will be provided when the acquisition strategy is completed.

2. (U) Operational Test and Evaluation:

a. (U) In conjunction with the development tests at Fort Huachuca, AZ, July-November 1977, the US Army Field Artillery Board conducted Force Development Testing and Experimentation (FDTE) to assess the ability of the RPV System Technology Demonstrator (STD) system to conduct daytime reconnaissance, target acquisition, artillery adjustment, and laser designation missions, and to identify the organizational and operational requirements for employment of the RPV System. During this test the RPV-STD system demonstrated the viability of the concept for an unmanned aerial vehicle to navigate an area of interest and to detect uncamouflaged targets of potential military significance. In February-March 1978, the RPV-

Program Element: #64739A | Title: Remotely Piloted Vehicles (RPVs)

DOD Mission Area: # 217 — Land Warfare Surveillance and Reconnaissance | Budget Activity: #4 — Tactical Programs

STD system was engaged by antiaircraft guns and heat-seeking missiles in Survivability Tests without a single hit. In March 1978, at the White Sands Missile Range, the RPV-STD successfully designated a target for the Copperhead laser-guided round, scoring a direct first-round hit on the target.

b. (U) Operational Test II (OT II) of the RPV System will provide the data to evaluate the capability of the system and the RPV platoon to successfully launch, control, and recover the air vehicles used to identify, designate, and adjust fire on threat targets or designate for laser-guided precision munitions. Operational Test II will be conducted with two RPV sections identical to those of the Development Tests. OT II will be conducted and independently evaluated by the US Army Operational Test and Evaluation Agency (OTEA) using military personnel and will be separate from DT II. The test site identified for OT II is Fort Hood, TX, and testing will begin in December 1984 and end in March 1985. Only the Automatic Test Equipment Test Program Sets (TPS) and interface packages will be incomplete for OT II with their follow-on development tests to be completed prior to fielding the system. RAM data collection will be continued by OTEA personnel and used in the final independent evaluation report prepared by OTEA.

3. (U) System Characteristics:

Operational/Technical Characteristics	Objectives	Demonstrated Performance
		(RPV-STD System, 1978)
(U) Range GCS to air vehicle		
(U) Range vehicle to target		
(a) (U) Detection on road/off road		
(b) (U) Recognition		
(c) (U) Identification		
(d) (U) Designation		
(U) Accuracy (CEP) at 25m/45Km		
(U) Emplacement/Displacement		
(U) Survivability	Survive A/A guns and heat-seeking missiles	Survived A/A guns
(U) Minimum radar and IR signatures	Heat-seeking missiles do not lock-on.	N/A

Program Element: **#64730A**

Title: **Remotely Piloted Vehicles (RPVs)**

DOD Mission Area: **# 217 — Land Warfare Surveillance and Reconnaissance**

Budget Activity: **#4 — Tactical Programs**

Operational/Technical Characteristics	Objectives	Demonstrated Performance
(U) Antijam data link	Not Jammable	Not Jammable
(U) Nuclear, Ballistic, Chemical Hardening	MILSPEC	N/A
(U) Endurance of no less than	3 hrs	3 hrs
(U) Altitude	12000 ft	12000 ft

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64740A

Title: Tactical Surveillance System

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical land Warfare

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4696	9456			Continuing	Not Applicable
	QUANTITIES						Not Applicable
D662	Tactical Surveillance System	4696	9456			Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element supports the portion of the Army's Tactical Exploitation of National Capabilities (TENCAP) program engineering development (ED) work which is directed toward developing a tactical support system to receive, process, and disseminate intelligence/information from multiple sources that locate enemy units, activity, and targets representing a general tactical threat. Systems developed will be the primary source of intelligence on enemy second-echelon forces. Such intelligence/information is essential to the tactical commander to enable him to fight and win while outnumbered in a high-intensity conflict. The tactical commander must have the capability to locate, identify, engage, and attrite superior forces at maximum range to insure that a manageable combat power ratio exists in the main battle area. In the TENCAP Program, advanced techniques are applied to exploit deep reconnaissance information collected from a variety of nationally controlled sensors that, in general, is not otherwise obtainable, and then provide that information to tactical commanders in a sufficiently timely and useful form to allow them to maneuver and target their forces to defeat the enemy. This program is described in further detail, at a higher classification level, in the Tactical Intelligence and Related Activities (TIARA) Congressional Justification Book (CJB).

Program Element: #64740A

Title: Tactical Surveillance System

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical land Warfare

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	4696	9456		Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	4696	9483		Continuing	Not Applicable

(U) The FY 1983 decrease is due to pro rata application of general Congressional reductions to the RDTE,A appropriation. The FY 1984 increase is due to realignment within the TENCAP program.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army Funds (current requirements)	- 0 -	- 0 -			Continuing	Not Applicable

(U) The FY 1984 reduction from last year's submission provides additional time to incorporate the findings of Interim Tactical Imagery Exploitation System (ITacIES) operational tests and evaluations before production decision for TacIES system.

E. (U) RELATED ACTIVITIES: Technological developments designed to shorten the time required to collect and disseminate information are related to this activity. These areas include automated reconnaissance procedures, communications technologies, tactical identification and positioning, and use of satellite communications. The initial efforts to provide the technical basis for the equipment and techniques were addressed under Program Element (PE) 63730A, Tactical Surveillance Systems, D660. This work is closely monitored by appropriate offices at the national level to preclude duplication of effort.

Program Element: #64740A

Title: Tactical Surveillance System

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical land Warfare

Budget Activity: #4 — Tactical Programs

F. (U) WORK PERFORMED BY: RCA Corp., Camden, NJ; Aerospace Corp., El Segundo, CA; US Army Communication Development and Readiness Command (CORADCOM), Fort Monmouth, NJ.; DBA, Inc., Melbourne, FL; Hughes Aerospace Corp., El Segundo, CA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D662 — Tactical Surveillance System**

a. **(U) Project Description:** Tactical Exploitation of National Capabilities (TENCAP) Program — This project supports engineering development of a tactical support system to collect, process, and disseminate intelligence/information which locates and identifies enemy units, activity, and targets representing a tactical threat. Advanced techniques are employed to provide essential intelligence information to the corps commander's All Source Analysis Center (ASAC) in near-realtime (NRT). In the ASAC, these data are fused with Human Intelligence (HUMINT), Signals Intelligence (SIGINT), Photographic Intelligence (PHOTINT), and other source data to provide a composite picture of the battlefield. This project is closely coordinated with the TENCAP and SENSOR programs of other Services and other Army information/fusion systems.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Continued software and hardware development for interface of multisource data exploitation system to the Interim Tactical Imagery Exploitation System (ITacIES) and develop unique data processing techniques for high data rate digital imagery.

(2) **(U) FY 1983 Program:** Begin operator training for ITacIES. Begin integrated logistics planning and production engineering for ITacIES. Support TR-1/Advanced Synthetic Aperture Radar System (ASARS) demonstrations and operational evaluations. Begin engineering development of a Tactical Mobile ASARS Correlator (TacMAC).

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Begin operational evaluation of ITacIES. Continue to support TR-1/ASARS engineering development. Begin development of an operational TacIES. Begin integrated logistics planning and production engineering for operational TacIES. Continue engineering development of TacMAC.

Program Element: **#64740A**

Title: **Tactical Surveillance System**

DOD Mission Area: **#322 — Tactical Intelligence and Related Activities for Tactical land Warfare**

Budget Activity: **#4 — Tactical Programs**

(4) **(U) Program to Completion:** This is a continuing program.

c. **(U) Major Milestones:** Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64741A

Title: Division Air Defense Command and Control (SHORAD C^2 System)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	- 0 -	38881	52397	410779	502057
	QUANTITIES						3
D126	SHORAD Cmd & Control	- 0 -	- 0 -	38881	52397	410779	502057

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Short-range air defense (SHORAD) command and control is provided through three major elements: A sensor to provide aircraft position data, command and controlling information provided by data processing subsystems to enhance the air defense system gunner's capability in effectively engaging the target, and a communications medium which provides for the exchange of controlling and sensor information. The present manual SHORAD control system furnishes these elements with unacceptable effectiveness. When considering the improved short-range air defense weapon capabilities and the increased capability of threat aircraft, the present control system does not support the force commander's requirement to manage air defense and use weapons effectively. The shortfalls in the flow of air battle information result in slow, errorprone dissemination of airspace control orders by SHORAD commanders, incomplete and inaccurate engagement information to SHORAD gunners, and untimely and inaccurate sensor data to the entire system. The impact of these shortfalls causes missed opportunities to engage enemy aircraft, the useless expenditure of air defense munitions through the simultaneous engagement of a single aircraft by two or more weapon systems, and increased risk to friendly aircraft. A new SHORAD command and control system is necessary to improve the effectiveness of SHORAD weapons and overcome present shortfalls by integrating weapons, sensor, and data devices into a functional system. This will be accomplished through the use of digital processing of target information, improved dissemination of air threat warning and weapon control orders, and the introduction or additional instrumentation to allow timely and accurate presentation or appropriate battle information at the gunner position. Data for Airspace Management will be provided by the SHORAD C^2 system to support the airspace management element. An automated interface will allow air defense information to be provided to other battlefield automated systems. To support earliest practical deployment of a viable command and control system that fulfills a near-term requirement, the maximum use will be made of already-developed hardware.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands) Not Applicable. This program progresses from Advanced Development (PE #63740) to Engineering Development in FY 1984.

Program Element: #64741A

Title: Division Air Defense Command and Control (SHORAD C^2 System)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army						
Funds (current requirements)	- 0 -	- 0 -	- 0 -	- 0 -	1121900	1121900
Quantities (current requirements)	- 0 -	- 0 -	- 0 -	- 0 -	20	20

E. (U) RELATED ACTIVITIES: This system interfaces with all short range air defense (SHORAD) weapons to include: Roland (PE #63709), Chaparral (PE #23730), DIVAD Gun (PE #64318), Vulcan (PE #23741) and Stinger (PE #64306). The operation and/or configuration of the above systems will be directly affected by the SHORAD command and control system. Unnecessary duplication of effort will be avoided by continued direct contact and exchange of status information between and among the project offices involved.

F. (U) WORK PERFORMED BY: Program Management will be performed by the Project Manager, Air Defense Command and Control Systems (ADCCS), assigned to the US Army Missile Command (MICOM), Redstone Arsenal, AL. Concept Definition is being performed by the Army Missile Laboratory at MICOM. Other contracted efforts will be performed by competitively selected contractor(s). Modifications required for Air Defense weapons systems will be acquired through the office currently responsible for the hardware communications modifications contractor for that hardware.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D126 — SHORAD Command and Control**

a. **(U) Project Description:** A SHORAD Command and Control system will improve the effectiveness of SHORAD systems by providing precise and timely target information, including tentative target identification, to the SHORAD gunner. This will allow the gunner more time for positive visual identification, and allow engagement of targets in the forward aspect. The gunner's effectiveness in selecting only hostile targets for earliest

Program Element: #64741A

Title: Division Air Defense Command and Control (SHORAD C^2 System)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

possible engagement will be enhanced because he will be able to identify and engage targets before the targets pass overhead. This function, called "cueing," will be performed by acquiring target data from a sensor (radar) and transmitting that data to SHORAD gunners via a digital data link over standard Army communications equipment. This will allow the gunner to point in the direction of the approaching target. The system will provide the second major function of the SHORAD C^2 system, called "alerting." Alerting is described as warning all friendly air defense and ground forces of impending air attack so that those forces can take protective/defensive measures. Alerting information can also be transmitted to the lower echelons within the maneuver units. The automated data transmission will greatly expedite this alerting information. The alerting system, in addition to the function described above, will expedite the transfer of weapon control instructions. The SHORAD C^2 system (both cueing and alerting) will be supported by the PLRS/JTIDS (Position Locating and Reporting System/Joint Tactical Information Distribution System) Hybrid. Airspace data from over the division area, such as friendly aircraft position and identification, will be provided through the SHORAD C^2 system to the Division Air Management Element (DAME).

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Not Applicable. This project was in Advanced Development in this FY (PE #63740A).

(2) **(U) FY 1983 Program:** Not Applicable. This Project is in Advanced Development in this FY (PE #63740A).

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Contract will be awarded to begin Engineering Development (ED) of the SHORAD C^2 system. The contractor will procure command and control components and develop the software required to integrate these components into a command and control system. Development of interfaces to permit operation with existing and emerging weapon systems will be initiated by the responsible weapon system managers.

(4) **(U) Program to Completion:** Engineering Development prototypes will be delivered for testing in mid-FY 1986. System tests, to include integration of a sensor with other elements of the system, will be completed in FY 1987. Required maturation will be conducted after tests are complete. Production decision reviews will be completed and full-scale production will begin FY 1987.

Program Element: #64741A

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Budget Activity: #4 — Tactical Programs

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Complete System Alternatives Design	4th QTR FY 1982	Not Applicable
Department of the Army In-Process Review	4th QTR FY 1982	Not Applicable
Request for Proposal for Engineering Development	3rd QTR FY 1983	Not Applicable
Army Systems Acquisition Review Council II	3rd QTR FY 1983	Not Applicable
Engineering Development Award	1st QTR FY 1984	Not Applicable
DT/OT	3rd QTR FY 1986	Not Applicable

This project progresses to Engineering Development in FY 1984. This is the first submission of CDS for this project.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64746A

Title: Automatic Test Support System (ATSS)

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3903	2932	11577	29671	Continuing	Not Applicable
D536	ATSS Family	3903	2932	11577	29671	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Significant advances in technology and its applications to Army systems have created a requirement for an automatic test capability for performance testing and fault location. The planned fielding of more complex sophisticated weapon systems dictates the development and procurement of improved test equipment for fault detecting and fault isolation. The current family of manual test, measurement, and diagnostic equipment (TMDE) and limited automatic test equipment cannot keep pace with the modernization because it is manpower-intensive, relatively slow, and often designed for only specific limited parameters and ranges. Continuation of the current capability or increasing the density could not improve the situation and could not respond to the need for increased weapon system operational readiness. Automatic test capability forward of General Support is needed to provide responsive materiel readiness support for new combat and combat support systems. To ensure readiness, program managers have independently developed, for want of an alternative standard system, automatic test equipment to maintain their systems. This system-peculiar approach to providing Automatic Test Equipment (ATE) has resulted in a proliferation of special-purpose ATE. To address effectively future maintenance problems with the standardized system approach, it will be essential to develop standard criteria for functions, specifications, and computer language use. This program element provides the engineering development funding for ATE below the general support level. Initial efforts are directed toward fielding of the Simplified Test Equipment-Expandable (STE-X) for organizational maintenance of combat vehicles (beginning ED in FY 1982) and the Automatic Test Support System (ATSS) for intermediate-level maintenance which will enter Phase 2 (Full-Scale Engineering Development) in FY 1984.

Program Element: #64748A | Title: Automatic Test Support System (ATSS)

DOD Mission Area: #215 — Land Warfare Support | Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	3903	2932	11577	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	4983	2940	6812	Continuing	Not Applicable

FY 1982 decrease is due to reprograming of funds to a higher priority Army Program. The FY 1983 decrease of $8 thousand is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. Increase in FY 1984 supports the execution of Engineering Development (ED). Refined costs for ED were completed after FY 1983 budget submission.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Both the STE-X and the ATSS were supported during advanced development by Program Element #63748A (Test, Measurement and Diagnostic Equipment Developments).

F. (U) WORK PERFORMED BY: In-house work is performed by the Army Communications-Electronics Command (CECOM), Fort Monmouth, NJ, and the Army Tank-Automotive Command (TACOM), Warren, MI, for the STE-X program and only CECOM for the ATSS program. Only the STE-X program is currently in ED, and RCA Corporation, Burlington, MA, is the prime contractor.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. (U) Project: D536 — ATSS Family

a. (U) Project Description: The Automatic Test Support System (ATSS) is a modular reconfigurable ATE system consisting of two autonomous units: a Contact Test Set (CTS) and a Base Shop Test Facility (BSTF). The CTS will be a man-portable ATE used to fault-isolate and diagnose on-line weapon system failures. The BSTF will be an S280-type, shelter-mounted ATE used off-line to fault-isolate and diagnose failures. Both pieces

Program Element: #64746A | Title: Automatic Test Support System (ATSS)

DOD Mission Area: #215 — Land Warfare Support | Budget Activity: #4 — Tactical Programs

of equipment will fault-isolate down to the Line Replaceable Unit (LRU). The ATSS will provide the Army with standard ATE at the intermediate level of maintenance.

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: Began engineering development of Simplified Test Equipment-Expandable (STE-X). Prepared implementation plan for integration of STE-X into the Army maintenance system.

(2) (U) FY 1983 Program: Continue engineering development of Simplified Test Equipment-Expandable (STE-X). Begin source selection for engineering development contractors for ATSS.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: Move STE-X to limited production. Continue with expanded application. Initiate full-scale engineering development effort for the Automatic Test Support System (ATSS). Up to two contractors will be selected to enter ED. The thrust of the ED effort will be to provide early identification of the DS-ATSS interface allon supported systems to begin the earliest test program set (TPS) planning and development. The two contractors will continue through critical design review at which time they will be required to demonstrate weapon system interfaces and their TPS programming capabilities. One contractor will then be selected to complete development and enter into initial production.

(4) (U) Program to Completion: The ATSS program will complete engineering development in FY 1987 and transition to production.

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Engineering Development (ED) Decision	2nd QTR FY 1984	Not Applicable
Execute ED	3rd QTR FY 1984	Not Applicable
Runoff Between Two ED Contractors	1st QTR FY 1985	Not Applicable
Final Contractor Decision	1st QTR FY 1986	Not Applicable
IOC	2nd QTR FY 1988	Not Applicable

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64759A

Title: Tactical Electronic Countermeasures Systems

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6120	9445			Continuing	Not Applicable
	QUANTITIES						Not Applicable
DL11	Classified Program	- 0 -	- 0 -				
DL12	Communications Electronic Countermeasure Systems	3725	4^34			Continuing	Not Applicable
DL13	Noncommunications Electric Countermeasures Systems	- 0 -	- 0 -			Continuing	Not Applicable
DL14	Expendable Jammers	2395	4811			Continuing	Not Applicable
D540	Protective Electronic Warfare Systems	- 0 -	- 0 -			Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program encompasses the development of tactical electronic countermeasures equipment and systems mounted in both ground vehicles and aircraft. The capability to employ effective ECM is critical for success in a future land battle since the enemy can be expected to have weapons generally as effective as our own, and in greater numbers at least in the early stages of conflict. Accordingly, a capability to degrade or deny hostile forces the effective use of their communications, countermortar/counterbattery, and surveillance radars and infrared/optical battlefield surveillance systems will be a decisive element of the battle. The systems under this program provide the Army with this capability and act as force multipliers to offset hostile numerical and firepower superiority. Existing Army ECM systems must be replaced and upgraded to cover and new foreign equipment developments. These electronic countermeasures (ECM) systems and equipment are for use by brigade, division, corps, and higher commanders.

Program Element: #64798A

Title: Tactical Electronic Countermeasures Systems

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	6120	9445		Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	5621	6964		Continuing	Not Applicable

FY 1982 increases of $499 thousand due to reprograming from lower priority Army programs to complete expendable jammer testing. FY 1983 increase of $2481 thousand due to reprograming to begin development of a Multi-signal Electronic Countermeasures System for the High Technology Light Division. FY 1984 increase of $11187 thousand due to reprograming from lower priority Army projects to continue the Multi-Signal Electronic Countermeasures System development for the High Technology Light Division.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army [1]						
Funds (current requirements)	- 0 -	- 0 -				
Quantities (current requirements)	- 0 -	- 0 -				
Other Procurement, Army [2]						
Funds (current requirements)	45200	- 0 -				
Quantities (current requirements)	13	- 0 -				

Program Element: #64750A

Title: Tactical Electronic Countermeasures Systems

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Army [3]						
Funds (current requirments)	- 0 -	25400				
Quantities (current requirements)	- 0 -	- 0 -				

[1] Funds/Quantities shown are for the hand-emplaced expendable jammer. Increase in Total Estimated Cost to complete of $490 thousand due to Army budget actions to move the total program buy up to the FY 1983-FY 1986 time, and better define probable costs. Total quantities required will depend on the type of device procured. The program consists of a barrage device and a set-on (single frequency) device. The number of devices required to cover a specific area is different for each device and their costs differ. The total requirement will depend on the production in-process review which will decide how many of each device to buy based on the results of the operational tests completed in August 1982.

[2] Funds/Quantities shown are for TACJAM (AM/MLQ-34). Reduction in FY 1984 is due to identification of funds for TACJAM spares and reprograming to the spares line. Funds were added in FY 1985 due to an increase in the Army priority to fully field the active force requirement for TACJAMs.

[3] Funds/Quantities shown for QUICK FIX/BLACK HAWK (UH-60A) aircraft. Changes in funding and quantities are to reflect BLACK HAWK production.

E. (U) RELATED ACTIVITIES: Related electronic warfare developments are conducted by the Navy and Air Force. Navy developments are conducted in Program Elements #64554N (Surface Electronic Warfare); #24575N (Electronic Warfare Support); and #64573N (Shipboard Electronic Warfare Improvement). Air Force developments are conducted in Program Element #64738F (Protective Systems); #64739F (Tactical Protective Systems); and #64710F (Reconnaissance Electronic Warfare Systems). Coordination is effected between the Services to minimize duplication of effort and ensure the interchange of technical data. This is accomplished by reviews conducted by the Office of the Under Secretary of Defense for Research and Engineering, through the exchange of technical reports, attendance at scientific meetings and conferences, and joint participation on subgroups and working panels of the Technical Cooperation Program and by the Joint Tri-Service Electronic Warfare Panel. In addition, each Service's formal requirements documents are reviewed and commented upon by the other Services.

Program Element: #64709A

Title: Tactical Electronic Countermeasures Systems

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

F. (U) WORK PERFORMED BY: Major contractors are: United Technology Laboratory, Greenville, TX; ESL Incorporated, Sunnyvale, CA; Collins Telecommunications (Division of Rockwell International), Dallas, TX; and GTE-Sylvania, Mountain View, CA. In-house development and contract monitoring are conducted by the Army's Electronic Warfare Laboratory, Fort Monmouth, NJ; the US Army Signals Warfare Laboratory, Vint Hill Farms Station, Warrenton, VA; and the product manager for Special Electronic Mission Aircraft (SEMA), St. Louis, MO.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: DL14 — Expendable Jammers: The expendable jammer program is designed to provide the Army with a family of inexpensive communications jamming devices that can be deployed anywhere on the battlefield. These devices will deny the enemy communications while not interfering with friendly communications. These devices are designed to be emplaced by hand and delivered by artillery shells and unmanned aerial vehicles. Part of the program also includes The FY 1982 program was dedicated to completion of the hand emplaced expendable jammer developments. This development ended with a successful development test/operational test II at Ft. Huachuca, AZ, from March 1982 to August 1982. NATO held an observation of these tests in June 1982, with representatives from Denmark, England, France, Italy, Canada and Germany attending. During FY 1983, portions of the artillery delivered expendable jammer program, will be funded from Project #DL14. *This is a result of the program reviews of the artillery delivered program, which resulted in an Army decision to accelerate the program in advanced development and will make the transition to full-scale development in FY 1984.* During FY 1984 the artillery-delivered program will complete advanced development and make the transition to full-scale development.The program to deliver expendable communications jammers by will also begin full-scale development in FY 1984. The Army will begin production of the hand emplaced jammers in FY 1984.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: DL12 — Communications Electronic Countermeasures Systems:**

a. **(U) Project Description:** This project conducts the full-scale development of systems designed to disrupt enemy communications systems. These systems include voice radios and data communications systems. Effective use of communications jamming systems will deny the enemy the ability to effectively coordinate and direct his units on the battlefield and allow the US Army commander to fight a successful battle, even when outnumbered.

b. **(U) Program Accomplishments and Future Efforts:**

Program Element: #64760A

Title: Tactical Electronic Countermeasures Systems

DOD Mission Area: #374 — Multi-Mission Technology and Support

Budget Activity: #4 — Tactical Programs

(1) **(U) FY 1982 Accomplishments:** During FY 1982 the project was basically involved with integration of QUICK FIX mission equipment into the BLACKHAWK helicopter. QUICK FIX is an airborne intercept, jamming and direction finding system designed to support Army division commanders. The FY 1982 program also developed automatic test equipment software for QUICK FIX mission equipment and the AN/TLQ-17A ground based jamming system, which is also the jamming system used on QUICK FIX.

(2) **(U) FY 1983 Program:** Development of AN/TLQ-17A maintenance software will continue. Although the Army will begin fielding the AN/TLQ-17A and TACJAM in 1983 and 1984, the Army has determined that these systems will not meet the mobility, survivability and operational requirements of the High Technology Light Division. In FY 1983 funds were reprogramed from lower priority Army programs to begin a four-year program to develop an additional ground-based jamming systems for the Light Division.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** FY 1984 will continue AN/TLQ-17A maintenance software development. $14.6 million was reprogramed from lower priority Army programs to continue the jamming system for the High Technology Light Division.

(4) **(U) Program to Completion:** This is a continuing program. The systems that complete advanced development under Program Element #63755, Project #DK12 will move to this project for full-scale development. The High Technology Light Division jamming system is scheduled for completion in FY 1986. The FY 1985 and FY 1986 programs are presently unfunded, however, funding requests are anticipated for the FY 1985 budget. These funds will be reprogramed from lower priority Army programs.

c. **(U) Major Milestones:** Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64751A

Title: Single Channel Ground and Airborne Radio System (SINCGARS)

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	- 0 -	13678	5702	20045	39425
D282	SINCGARS Engineering Development	- 0 -	- 0 -	13678	5702	20045	39425

* Prototype quantities
SINCGARS-V — 31
SNAP-II — 30
VEHICULAR INTERCOM SYSTEM — 50

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the engineering development of selected components of the Very High Frequency (VHF) Single Channel Ground and Airborne Radio System (SINCGARS-V) and selected ancillary devices. SINCGARS is the future combat net radio replacing the current VRC-12 series, and is the primary means of communications for armor, artillery, and infantry forces. Configurations consist of manpack and vehicular components. SINCGARS will satisfy the need for a tactical radio system to operate in an electronic countermeasure (ECM) environment.

C. (U) COMPARISON WITH FY 1993 DESCRIPTIVE SUMMARY: ($ In Thousands) Not Applicable.

Program Element: #64751A

Title: Single Channel Ground and Airborne Radio System (SINCGARS)

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army						
Funds (current requirements)	- 0 -	19800	50800	138100	4363700	4576000
Quantities (current requirements)	- 0 -	650	3200	8250	256000	277000

Difference in total estimated cost shown from Program Element 63746A in FY 1983 Summary is a result of Army decision to accelerate production rates; additional quantities of SINCGARS will be procured during FY 1983-86.

E. (U) RELATED ACTIVITIES: Program Element #63746A (SINCGARS Advanced Development); Program Element #62701A (Communications Electronics); Program Element #63707A (Communications Development); and Program Element #64701A (Communications Engineering Development) provide exploratory, advanced, and engineering developments of related and supporting single-channel net radio equipment. No duplication of effort within the Department of the Army or other elements of the Department of Defense are known to exist. Memorandums of Understanding exist between the Department of the Army, the Air Force, and the Navy to define responsibilities and preclude duplicative development efforts.

F. (U) WORK PERFORMED: Contractors have not been identified for Engineering Development of any of the subsystem components. Hazeltine Corporation is now performing advanced development work for the SNAP-II and is expected to perform the subsequent Engineering Development work. One of the two Advanced Development contractors for SINCGARS-V (i.e., Cincinnati Electronics or ITT) is expected to continue Engineering Development work remaining on the SINCGARS-V. The in-house developing organization is the US Army Communications-Electronics Command (CECOM). The National Security Agency (NSA) is responsible for development of the Communications Security (COMSEC) Equipment.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

Program Element: #64751A

Title: **Single Channel Ground and Airborne Radio System (SINCGARS)**

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

1. **(U) Project: D282 — SINCGARS Engineering Development.**

a. **(U) Project Description:** This project provides for the engineering development of the Single Channel Ground and Airborne Radio System (SINCGARS) and Ancillary devices. SINCGARS will replace the aging, less capable AN/VRC-12 family and AN/PRC-77 combat net radios; it will be utilized as the primary means of communication for armor, artillry, and infantry forces.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** None — program is NEW START in FY 1984 for engineering development.

(2) **(U) FY 1983 Program:** None — program is NEW START in FY 1984 for engineering development.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** The FY 1984 program budget request supports the planned 1st full year of production the SINCGARS. In addition, the request will satisfy the continued development of the Vehicular Intercom System (VIS) and the Steerable Null Antenna Processor (SNAP II). Maturity testing on twenty-three (23) advanced development models (ADM) of SINCGARS will take place to revalidate equipment design. Maturity testing will take place at Ft. Riley, KS and Ft. Huachuca, AZ. Because the ADM of the SINCGARS closely resemble production models, a degree of design stability is expected. The VIS and SNAP II will transition from advanced development to engineering development and DT/OT-I will be initiated and completed on both.

(4) **(U) Program to Completion:** Engineering Development on SINCGARS and its ancillary equipment will continue until 1988. Included in the effort is an expected requirement to enhance the anti-jam capability of SINCGARS and continued testing on the SNAP II and VIS.

Program Element: **#64751A**

Title: **Single Channel Ground and Airborne Radio System (SINCGARS)**

DOD Mission Area: **#345 — Tactical Communications**

Budget Activity: **#4 — Tactical Programs**

c. **(U) Major Milestones:**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Advanced Development (AD) Contract Award	Apr 1978	Apr 1978
DA Program Review	Dec 1981	Dec 1981
Maturation Testing [1]	Sep 1984	Mar 1983
ASARC/DSARC III [2]	Apr 1983	Jan 1983
Production Award [3]	Jun 1983	Mar 1983

[1] Maturity Testing will be compressed into two months due to nonavailability of contractor hardware; previous submissions reflected hardware being available for early testing.
[2] & [3] ASARC III has been delayed to April 1983 because Army decision to accelerate production, made on 7 October 1982, caused restructuring of request for proposal (RFP); RFP was released on 17 December 1982; production award delayed accordingly.

Program Element: #64751A

Title: Single Channel Ground and Airborne Radio System (SINCGARS)

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

I. (U) TEST AND EVALUATION DATA:

At an Army Program Decision Review in December 1981, the SINCGARS program was accelerated. The program Initial Operational Capability (IOC) was moved from July 1986 to July 1985. To achieve the July 1985 IOC, a production decision milestone (ASARC III) is scheduled for March 1983. As a result, full developmental and operational testing of SINCGARS will not be accomplished prior to a production decision. However, limited developmental and operational tests will be conducted prior to a production decision, and maturity testing will be conducted after the production decision. The limited developmental and operational testing will provide sufficient data to support an early production decision; maturity testing will provide data to insure the SINCGARS meets parameters for successful fielding.

1. (U) Development Test and Evaluation:

a. (U) The limited developmental testing of SINCGARS-V will consist of a combined Engineer Design Testing (EDT) and Advanced Development Verification Tests (ADVT) to determine and validate the degree to which the Advanced Development Models meet the technical criteria of the user.

b. (U) There are two development contractors: Cincinnati Electronics, Cincinnati, Ohio, and ITT Aerspace/Optical Division, Ft. Wayne, Indiana. The US Army Test and Evaluation Command (TECOM) is the agency responsible for the conduct of development tests. For test and evaluation support, TECOM has contracted with Bell Technical Operational Corporation, Sierra Vista, Arizona. The US Army Materiel Systems Analysis Activity (USAMSAA) is the independent DT designer and evaluator. SINCGARS-V is a major Army program managed by a fully chartered project manager office.

c. (U) The test facility to be utilized in the conduct of DT is the Army Electronic Proving Ground (AEPG) at Ft. Huachuca, Arizona. Army civilian and military personnel will be used to conduct these tests. Contractor test facilities and personnel will be used to conduct the contractor portion of the DT; AEPG personnel will monitor these tests.

d. (U) The schedule for limited development testing is:

(1) (U) Combined ADVT & EDT — 1 Sep - 30 Oct 1982, Conducted at Ft Monmouth, NJ

(a) (U) Performance Verification — 1 Sep - 24 Sep 1982

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(b) (U) Electronic Warfare Parameter Verification — 24 Sep - 15 Oct 1982

(2) (U) Range, Field Test — 17 Oct - 31 Oct 1982, Conducted at Ft Huachuca, AZ

(3) (U) Reliability Growth Testing (Contractor) — 1 Oct 1982 - 2Q FY 1983, at Contractor's Plants

(4) (U) DT Test Report — 17 Nov 1982, From TECOM

(5) (U) Independent Analysis Report — 25 Feb 1983 From USAMSAA

e. (U) Each contractor will provide 4 receiver-transmitters and the listed associated subsystems for limited DT.

(1) (U) Two (2) Vehicular Appliques

(2) (U) Two (2) Manpack Kits - Harness

(3) (U) Two (2) High Power Amplifiers

(4) (U) Four (4) Antennas

(5) (U) Two (2) Data Adapters

(6) (U) Four (4) Electronic Counter-Countermeasure (ECCM) Modules

f. (U) Reliability Growth Testing will be performed during limited DT. Data obtained will identify items requiring frequent maintenance. Sufficient test time will be available to verify the adequacy of design changes incorporated to reduce the frequency of repair. A Maintenance Teardown and Evaluation, a Maintainability Demonstration, and a Prototype Reliability Qualification Test (PRQT) will be conducted from 1 to 7 December 82 to evaluate technical manuals and maintenance capability (i.e., Built in Test Equipment (BITE), test support equipment, maintenance concept, etc.). Personnel used during these tests will be military personnel with appropriate maintenance MOS.

Program Element: #64751A

Title: Single Channel Ground and Airborne Radio System (SINCGARS)

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

g. (U) The items during DT will be similar in configuration to those tested during operational testing (OT). Improvements recommended as a result of DT/OT will be verified during maturity testing and incorporated into the production models.

2. (U) Operational Test and Evaluation:

a. (U) Operational Testing will be conducted in two segments:
Prior Production Award — Limited Operational Testing
Post-Production Award — Maturity Operational Testing

b. (U) Limited Operational Test (LOT) and Evaluation (Prior Production):

(1) (U) LOT will be conducted at Fort Riley, Kansas. LOT will compare each contractor's systems against a baseline system (AN/VRC-12 and AN/PRC-77 family). Testing will concentrate on obtaining data to determine if the competitor's systems satisfy communications requirements in an operational environment. Evaluation will include the SINCGARS ability to interoperate with complementary systems and its ability to reduce command and control communications susceptibility and vulnerability to Radio Electronic Combat (REC).

(2) (U) The number of systems to be delivered for test and the two competing contractors are the same as those listed for the DT. There are no other independent operational tests planned prior to production award.

(3) (U) The LOT schedule is:

(a) (U) LOT Design Test Plan — 10 Aug 82

(b) (U) LOT — 1 Nov-1 Dec 82 Conducted at Fort Riley, Kansas

(c) (U) LOT Preliminary Test Report — 15 Dec 82 Provided by OTEA.

(d) (U) LOT Test Report — 14 Jan 1983 provided by OTEA.

(4) (U) Operational Test and Evaluation Agency (OTEA) is the Army agency responsible for the conduct of the LOT.

Program Element: #64751A

Title: Single Channel Ground and Airborne Radio System (SINCGARS)

DOD Mission Area: #346 — Tactical Communications

Budget Activity: #4 — Tactical Programs

c. (U) Maturity Testing

(1) (U) Maturity Development Testing will be conducted at the winning contractor's plant and at Ft. Huachuca, AZ. Testing will concentrate on verification of the performance parameters measured during DT. Emphasis will be placed on: Operation of basic VHF/FM transceiver; ECCM architecture to include synchronization, antijam and protection, comparability, transmission security (TRANSEC), VINSON interface with basic radio with and without the ECCM module; system interoperability with existing radios; circuit survivability against nuclear effects (i.e., Electromagnetic Pulse (EMP) and radiation); and reliability, availability, and maintainability (RAM) including evaluation of builtin test (BIT) capability.

(2) (U) The systems tested will be representative of prototype production models with very little difference between them and the anticipated final production equipment. Developmental Maturity Testing will be conducted primarily by the contractors and observed by Government test monitors, with TECOM having primary responsibility for test direction, data collection, and test reporting. In addition, TECOM will conduct the Government portion of maturity testing at the Army Electronics Proving Ground. Government maturity testing will emphasize systems type tests and those peculiar tests which could not be conducted at contractor facilities.

(3) (U) Maturity Operational Testing will be conducted at Fort Riley, Kansas from 10 October 1982 - 31 December 1982; testing will consist of a series of radio net communications exercises using various SINCGARS configurations in a realistic battlefield environment. Emphasis will be made on mission performance, survivability, reliability, vulnerability, training requirements and interoperability. Personnel of the 1st Infantry Division will perform the test; OTEA will be responsible for test design and direction.

(4) (U) The source selected contractor will deliver 23 receiver transmitters and the listed associated subsystem for maturity testing:

(a) Twelve (12) Vehicular Appliques

(b) Twenty (20) Manpack Kits

(c) Fourteen (14) Hi Power Amplifiers

(d) Twenty-three (23) Antennas

(e) Sixteen (16) Data Adapters

Program Element: #64751A

Title: Single Channel Ground and Airborne Radio System (SINCGARS)

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

(f) Twenty-three (23) ECCM Modules

The Maturity Test schedule is: Performance Verification — 1 April 31 - May 1983, conducted by contractor. User/Doctrine Test — 10 October - 31 Dec 1983, conducted by Army. EMP Test — September 1983. High Technology Test Bed. User Test — September 1983, conducted by Army. First Article Test — July 1984. FOE — February 1985.

3. (U) Systems Characteristics:

Operational/Technical Characteristics	Objectives	Demonstrated Performance
		DT/OT will be completed in FY 1983.
Frequency Range	30-88 MHz	
Number of Channels	2320	
Channel Spacing	25 kHz	
Voice Communications Range		
Manpack	8 km	
Vehicular	35 km	
Digital Transmission (Data) (Bit Error Rate .1B/S)		
Tacfire Data (1200)	Same as Voice Above	
All Other Data		
Manpack	4.5 km	
Vehicular	17.5 km	
Physical Detectability		
Manpack	200 m	
Vehicular	500 m	

Program Element: #64751A

Title: Single Channel Ground and Airborne Radio System (SINCGARS)

DOD Mission Area: #345 — Tactical Communications

Budget Activity: #4 — Tactical Programs

Operational/Technical Characteristics	Objectives	Demonstrated Performance
		DT/OT will be completed in FY 1993.
Antijam	(Classified)	
(Mean Time to Repair) (MTTR)		
Organizational	15 min	
Direct Support	45 min	
General Support	2.5 hrs	
(Mean Time Between Failure) (MTBF)		
Manpack	1300 hrs	
Vehicular	1250 hrs	

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64757A

Title: Medical Chemical Defense Life Support Materiel

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	- 0 -	4752	21446	Continuing	Not Applicable
D648	Medical Chemical Defense Life Support Materiel	- 0 -	- 0 -	4752	21446	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The modern integrated battlefield demands a medical care system that matches the mobility of the tactical forces it is intended to support. The current casualty care system does not have the capability of effectively handling large numbers of severely injured combat casualties (conventional and/or chemical) and places high demands on the already overburdened combat logistic system. This full-scale engineering development program is required to complete the fielding and logistical support requirements for improved medical equipment, supplies, and drugs essential to counteracting the threat on the modern battlefield caused by the use of chemical warfare agents. This effort will fund development of drug and medical materiel through initial procurement. Follow-on procurement will be met through Operations and Maintenance, Army and Other Procurement, Army funding. Requirements defined in Letter Requirements (LR) and Required Operational Capabilities (ROC) will be supported by this program element.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands) This is a new program element resulting from transition of this effort from advanced development. No Congressional Descriptive Summary was submitted for FY 1983.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This Program Element is supported by Program Element #61102A (Defense Research Sciences), Project #BS11 (Chemical Warfare Agent Effects and Antidotes); Program Element #62734A (Medical Defense Against Chemical Agents), Project #A875, (Medical Defense Against Chemical Agents); Program Element #63764A (Medical Chemical Defense Life Support Materiel), Project #D995 (Medical Chemical Defense Life Support Materiel); and Program Element #63751A (Medical Defense Against Chemical Warfare), Project #D993 (Medical Defense Against Chemical Warfare). The US Army Medical Research and Development Command avoids duplication of effort within the Army by central management of the Program on the Medical Aspects of Chemical Defense. Inter-Service duplication is avoided by coordination and collaboration with the Air Force and Navy as required of the Army as the Executive Agency for the DOD Chemical Defense effort. Such coordination is accomplished

Program Element: #64757A

Title: **Medical Chemical Defense Life Support Materiel**

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

within the framework of a Memorandum of Agreement with the Air Force and through the Joint Technology Coordination Group for Medical Chemical Warfare Defense of the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee. All work is also coordinated with quadripartite and NATO nations through meetings and Data Exchange Annexes.

F. (U) WORK PERFORMED BY: This is a new FY 1984 start. No contractors nor in-house efforts are currently funded by this program element.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D648 — Medical Chemical Defense Life Support Materiel: This project will fund the engineering development required to complete the fielding and logistic support requirements for the drugs, equipment, and materiel to be used to counter the threat of the chemical battlefield. In this project, final phases of drug development in support of a New Drug Application (NDA) to the Food and Drug Administration and advanced toxicology and field studies of chemical warfare agent antidotes, prophylaxes/pretreatments, therapeutics, and skin decontaminants as well as antiradiation compounds will be completed. This FY 1984 project start will initiate the full-scale engineering development of drugs, equipment, and materiel addressing the threat of the chemical battlefield. The chemical warfare agent protective patient wrap will have completed all testing and be recommended as acceptable for Army use. Materiel projects including a Battalion Aid Station Vital Signs Monitor, the forward area survival/heart rate monitor, the individual "buddy-aid" resuscitator, and gas-powered individual resuscitator will begin engineering development. Advanced toxicological testing of pyridostigmine, a nerve agent pretreatment drug, should be initiated.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64758A

Title: Drug and Vaccine Development

DOD Mission Area: #215 — Land Warfare Support

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	- 0 -	4751	9969	Continuing	Not Applicable
D847	Drug and Vaccine Development/Medical Defense Against Biological Warfare	- 0 -	- 0 -	2375	4984	Continuing	Not Applicable
D849	Drug and Vaccine Development	- 0 -	- 0 -	2376	4985	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program will enable completion of development and fielding of drugs and vaccines used against militarily important infectious diseases and biological warfare (BW) agents. This full-scale engineering development program is required to complete the fielding and logistical support requirements for improved drugs and vaccines moved from advanced development. This effort will fund development of drugs and vaccines through initial procurement. Follow-on procurement will be met through Operations and Maintenance, Army (OMA) and Other Procurement, Army (OPA) funding. Requirements defined in Letter Requirements (LR) and Required Operational Capabilities (ROC) will be supported by this program element. This program is part of the Army thrust in Biotechnology.

(4) (U) Program to Completion:

C. (U) COMPARISON WITH FY 1993 DESCRIPTIVE SUMMARY: ($ In Thousands) Not Applicable.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This program element is supported by basic research in the following: Program Element #61102A (Defense Research Sciences), Project BS10A (Military Disease Hazards Research) and Project BS12 (Science Base/Medical Defense Against BW); Program Element #62770A (Military Disease Hazards Technology), Project A870 (DOD Medical Defense Against Infectious Diseases) and Project A871 (Medical Defense Against BW); and Program Element #63763A (Industrial Base/Vaccines and Drugs), Project D807 (Industrial Base/BW Vaccines and Drugs) and Project D810 (Industrial Base/Vaccines and Drugs). Items developed in Program Element #63750A (Drug and Vaccine Development), Project D808 (DOD Drug and Vaccine Development) and Project D809 (Drug and Vaccine Development/Medical Defense Against BW), are designed to transition directly into this program element. At the direction of the Congress, Army and Navy infectious disease research efforts were consolidated in FY 1992 into a single DOD program with the Army designated lead agent and responsible for planning, programing, and budgeting for the DOD

Program Element: #64758A Title: Drug and Vaccine Development

DOD Mission Area: #215 — Land Warfare Support Budget Activity: #4 — Tactical Programs

infectious disease program. Navy scientists will continue to participate in the execution of the program. The consolidation plan will prevent any duplication of effort between the two Services.

F. (U) WORK PERFORMED BY: Work will be performed by contract.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1994:

1. (U) D847 — Drug and Vaccine Development/Medical Defense Against BW: This project is designed to complete development and fielding of rapid identification systems and of drugs and vaccines that provide medical defense against BW agents. In FY 1994, tularemia vaccine development will transition from pilot lot to industrial production to enable the stockpiling of sufficient quantities to immunize all military forces at risk to potential BW exposure. Also, a system for rapid identification and diagnosis of BW agents and/or diseases will be field tested and an industrial base to support the systems will be established.

2. (U) D849 — Drug and Vaccine Development: This project is designed to complete development and fielding of rapid identification systems and of drugs and vaccines that provide medical defense against natural infectious disease threats that affect mobilization and deployment of military forces. In 1994, halofantrine, a new antimalarial drug, will be field tested in areas where drug-resistant malaria is prevalent, and the industrial base to support the production of the drug will be established. Also, a system for rapid diagnosis of natural disease threats to the rapid deployment forces will be tested.

H. (U) PROJECTS OVER $10 MILLION IN FY 1994: Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64798A

Title: Tactical Electronic Surveillance Systems

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7780	10903			Continuing	Not Applicable
D909	Tactical Electronic Surveillance Systems	7780	10903			Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program was in Program Element 64745A prior to FY 1993. The program element supports that portion of the Army's Tactical Exploitation of National Capabilities (TENCAP) program engineering development (ED) work which is directed toward developing a tactical support system to receive, process, and disseminate information from multiple sources which locate enemy units, activity, and targets representing a general tactical threat. Systems developed will be the primary source of information on enemy second-echelon forces. Such information is essential to the tactical commander to enable him to fight and win while outnumbered in a high-intensity conflict. The tactical commander must have the capability to locate, identify, engage, and attrite superior forces at maximum range to insure that a manageable combat power ratio exists in the main battle area. The tactical commander must also have the capability to seize the initiative from the enemy by blunting his strength and exploiting his weaknesses. In the TENCAP Program, advanced techniques are applied to exploit information collected from a variety of nationally controlled sensors which, in general, is not otherwise obtainable, and then provide that information to the tactical command and control environment in a sufficiently timely and useful form to greatly assist the commander in defeating the enemy. This program is described in further detail, at a higher classification level, in the Tactical Intelligence and Related Activities (TIARA) Congressional Justification Book (CJB).

Program Element: #64708A

Title: Tactical Electronic Surveillance Systems

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	7780	10903		Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	7780	15534		Continuing	Not Applicable

(U) The FY 1983 program was reduced as directed by Congressional guidance. The FY 1984 decrease is due to realignment within the TENCAP program and reprogramming to higher priority programs.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Appropriations: Other Procurement, Army Funds (current requirements)	2200	400			Continuing	Not Applicable
Quantities (current requirements)				Not Applicable	Not Applicable	

(U) The FY 1984 increase of $8,000 is due to the ability to accelerate this high priority procurement program.

E. (U) RELATED ACTIVITIES: Technological developments designed to shorten the time required to collect and disseminate information are related to this development. These areas include automated search procedures, data link technologies, tactical identification and positioning, and data reduction and filtering. The use of satellite communications is being considered. The initial efforts to provide the technical basis for the equipment and

Program Element: #64766A

Title: Tactical Electronic Surveillance Systems

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

techniques are addressed under PE 63766A, D907, Tactical Electronic Surveillance Systems. This work is coordinated with the appropriate offices at the national level to avoid duplication of effort.

F. (U) WORK PERFORMED BY: Aerospace Corporation, El Segundo, CA; US Army Electronics Research and Development Command (ER-ADCOM), Adelphi, MD; US Army Communications Research and Development Command, Fort Monmouth, NJ; MRJ, Inc., Fairfax, VA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D909 — Tactical Electronic Surveillance Systems**

a. **(U) Project Description:** TENCAP Program — This project supports engineering development of tactical systems to receive data from national, theater, and organic sensors; process and correlate these data; and disseminate resultant information. Advanced techniques are used to provide hostile identity and location to the Corps Commander's All Source Analysis Center (ASAC) in near-real-time (NRT). In the ASAC the data are fused with other source data to provide a composite picture of the battlefield. This project is closely coordinated with the TENCAP and SENSOR Programs of other Services.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Deployed three additional (ITEP) systems on schedule during FY 1982. Continued joint program efforts.

(2) **(U) FY 1983 Program:** Continue ITEP software improvements in response to user requirements and operational evaluations. Begin implementation of interfaces with the Tactical Imagery Exploitation System (TacIES) and All Source Analysis System (ASAS). Continue joint programs to enhance the tactical utility of developing national sensor mix. Begin integrated logistics planning and production engineering for operational (TEP).

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Continue joint programs to enhance tactical utility of current national sensors. Continue analysis of developing national sensors. Continue integrated logistics planning. Begin engineering development of a fully operational TEP with an Initial Operational Capability (IOC) in consonance with advanced national systems.

Program Element: #64766A

Title: Tactical Electronic Surveillance Systems

DOD Mission Area: #322 — Tactical Intelligence and Related Activities for Tactical Land Warfare

Budget Activity: #4 — Tactical Programs

(4) (U) **Program to Completion:** This is a continuing program.

c. (U) **Major Milestones:** Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64770A

Title: Joint Surveillance and Target Attack Radar System (JOINT STARS)

DOD Mission Area: #217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4070	36758	68961	70526	TBD	TBD
D202	Army Joint Stars	- 0 -	23926	68961	70526	TBD	TBD
D208	AN/UPD-7 Surveillance System	4070	12832	- 0 -	- 0 -	- 0 -	16902

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The US Army lacks the capability to locate, track, and attack moving targets beyond ground line of sight. This is a significant operational deficiency. The speed of modern combat makes it critically important that the division and corps commanders have a responsive, realtime capability to detect, locate, and monitor moving formations out to the enemy's second-echelon units; to allow concentration of friendly combat power at critical times and places; and to employ their organic firepower at maximum ranges. Within the Joint Surveillance and Target Attack Radar System (JOINT STARS) program elements, the Army will develop an airborne surveillance and target attack system that will provide this critically needed capability. The JOINT STARS program results from a merger of the Army's Battlefield Data System (BDS) program and the Air Force PAVE MOVER program. The Joint program objective is to develop a radar to be mounted on the Army's OV-1D (MOHAWK) airframe and the USAF's TR-1 airframe that will provide the capability to locate, track, and attack targets beyond ground line of sight. Target data will be distributed to ground stations at all user echelons via secure data link. Development of this ground station is included in the Joint Program objectives. The joint system will locate moving targets at extended ranges during the day or night, and under most weather conditions. It will be designed to perform successfully in the electronic countermeasures and air defense environments forecast for the -and-beyond timeframe. It will allow the analysis necessary to determine the enemy's tactical development in time to position countering friendly forces and firepower.

Program Element: **#64770A**

Title: **Joint Surveillance and Target Attack Radar System (JOINT STARS)**

DOD Mission Area: **#217 — Land Warfare Surveillance and Reconnaissance**

Budget Activity: **#4 — Tactical Programs**

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	4070	36758	68961	TBD	TBD
Funds (as shown in FY 1983 submission)	3910	40736	54574	TBD	TBD

The funding decrease of $3978 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation and reprograming of funds for AUTODIN replacement. FY 1982 and FY 1984 increases are the result of Army and DOD program restructuring. This is a Joint Army/Air Force program with a new program element which takes the place of last year's BDS program elements 63753A and 64753A. There were no Congressional Descriptive Summaries for this program in FY 1983. The funding for Project D208, AN/UPD-7 Surveillance System, was contained in program element 64221A. The funding presented in paragraph A represents current Army data based on levels established for the BDS program.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Army:						
Funds (current requirements)	- 0 -	- 0 -	- 0 -	13200	TBD	TBD
Quantities (current requirements)				aircraft (OV-1D); Ground Station Modules.		

This is a new program and has no previous procurement funds. The FY 1985 funding is an estimate from the BDS program and does not reflect a true Aircraft Procurement, Army requirement.

Program Element: #64770A

Title: Joint Surveillance and Target Attack Radar System (JOINT STARS)

DOD Mission Area: #217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

E. (U) RELATED ACTIVITIES: The JOINT STARS program combines the Army's Battlefield Data System (Program Element #63753A, Project #D201; Program Element #64753A, Project #D202), the Product Improvement Proposal to provide an electronically scanned antenna for the AN/APS-94F radar on the OV-1D aircraft (Program Element #64221A, Project #D208), and the Air Force's PAVE MOVER program (Program Element #64616F, Projects #2814 and #2727, and Program Element #63747F). This merger ensures, since there are no other Service programs addressing the JOINT STARS requirement, that there is no duplication of effort within either the Army, Air Force, or the Department of Defense. The program management structure is outlined in a Joint Memorandum of Agreement. The Program Manager is appointed by the Air Force; the Deputy Program Manager by the Army. The Program Office is manned jointly, ensuring that day-to-day Army/Air Force coordination is maintained. The entire joint program is monitored by a DOD Oversight Committee with membership from the Army, Air Force, and OSD.

F. (U) WORK PERFORMED BY: Contractors have not yet been selected. Army efforts involve the Materiel Development and Readiness Command and the Electronics Research and Development Command. The Air Force effort is directed by the Electronic Systems Division of the Air Force Systems Command.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D208 — AN/UPD-7 Surveillance System: The Electronically-Scanned Antenna Product Improvement Proposal for The AN/APS-94F radar was terminated. Its funding was applied to the BDS program in FY 1982 and FY 1983.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D202 — JOINT STARS:**

a. **(U) Project Description:** The 19 May 1982 Under Secretary of Defense Research and Engineering memorandum formed a joint program office to develop a common core radar to provide moving and fixed target detection, tracking, and weapons guidance capability to satisfy the battlefield reconnaissance, surveillance, and target attack requirements of both the Air Force and Army. It merged the Air Force's ongoing Assault Breaker/PAVE MOVER program with the Army's emerging Battlefield Data Systems (a lower cost alternative to SOTAS), and designated the Air Force as the Executive Service with the Army as the Participating Service.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Not Applicable.

Program Element: #64770A

Title: Joint Surveillance and Target Attack Radar System (JOINT STARS)

DOD Mission Area: #217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

(2) (U) FY 1983 Program: A Request for Proposal (RFP), including a specification and Statement of Work, will be prepared and released for competitive bid. Proposals will be for a single prime contractor who will have total system responsibility for the design, development, and test of the JOINT STARS system. As a portion of the prime contract, directed subcontracts for the development of both the Army and Air Force variants of the ground station and for the common data link will be implemented. The OV-1 and TR-1 aircraft will be provided as Government-furnished equipment. To aid in further defining operational interface concepts for the joint program, it is planned to integrate one of the two PAVE MOVER radar systems with the previously developed SOTAS ground station. This operational test system will provide for the early identification of operational problems in implementing a realtime surveillance and direct attack system on a joint basis and will provide a means for their definition and resolution.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: The major full-scale development program initiated in FY 1983 will continue. Major milestones will include the preliminary and critical design review. Completion of the first ground station module (Army) (GSM) and the data link will be accomplished. Both subsystems will be integrated prior to delivery to the prime contractor in first quarter FY 1985. Modifications to OV-ID aircraft to support installation of the JOINT STARS radar will be initiated leading to delivery to the prime contractor during 1985. The ground station simulator/trainer will be completed and installed at the US Army Intelligence Center and School, Ft. Huachuca, AZ.

(4) (U) Program to Completion: Tower testing of the radar will begin in FY 1985; after these tests, the radar will be integrated into an OV-1D for the start of system tests. Testing will be completed on or about fourth quarter FY 1986. Production award for modified OV-1Ds will be made in FY 1986. System testing for the Air Force (PSI) configuration of JOINT STARS will begin in FY 1986. The Initial Operational Capability (IOC) for the Army variant of the JOINT STARS is FY

Program Element: #64778A

Title: Joint Surveillance and Target Attack Radar System (JOINT STARS)

DOD Mission Area: #217 — Land Warfare Surveillance and Reconnaissance

Budget Activity: #4 — Tactical Programs

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1993 Submission
JOINT STARS FSED contract award	4Q FY 1993	Not Applicable
Start JOINT STARS System Testing (OV-1D)	3Q FY 1995	Not Applicable
Prod'n award for GSM and JOINT STARS Airborne Radar	4Q FY 1996	Not Applicable
IOC		Not Applicable

*There was no FY 1993 JOINT STARS submission.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64779A

Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	29465	27982	33580	42682	Continuing	Not Applicable
D298	JINTACCS(NATO)	3542	5082	4777	13402	Continuing	Not Applicable
D309	JINTACCS(Army)	11182	11164	13668	13971	Continuing	Not Applicable
D310	JINTACCS(Executive Agent)	14741	11736	15135	15309	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The commanders in chief for joint US and Allied operations have a requirement to coordinate, allocate, and control resources for the tactical battlefield scenario in a timely fashion. In order to accomplish their missions, they need compatibility and interoperability between all battlefield command and control tactical operations systems. The JINTACCS program was established to insure the compatibility and interoperability of tactical command and control system between US unilateral systems and between US and Allied systems such as NATO and PACOM. These needs are specifically addressed by the following activities: (1) Developing all required standards to ensure joint Service compatibility and interoperability of tactical command and control systems; (2) determining the technical capability requirements for addressing and coordinating US/Allied, such as NATO, interoperability of tactical command and control systems; (3) developing and testing message standards for the Joint Tactical Information Distribution System; and (4) test support for and configuration management of the joint interface standards developed by the Army's Tactical Air Command System/Tactical Air Defense System interface requirements program. The standards developed and tested in this program will address the four JINTACCS functional groups of Intelligence, Air Operations, Fire Support, and Operations Control. The program is divided into the three project areas. The Chief of Staff, US Army, is the Joint Chief of Staff Executive Agent responsible for implementing the JINTACCS (Executive Agent) and the JINTACCS (Executive Agent, NATO) projects. The Army is responsible for implementing the JINTACCS (Army) project. These projects are described in detail below.

Program Element: #64779A

Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	29465	27962	33580	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	29465	30066	48038	Continuing	Not Applicable

The FY 1983 decrease is due to reprograming of funds for the Army Data Distribution System, and the FY 1984 decrease in funds is due to reallocation to higher priority Army programs and revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This program is related to the Army's Tactical Command, Control, and Communications (C3) Systems Engineering program (64712A), the Navy's JINTACCS program (64779N), the Marine's Tactical Command and Control Program (64780M), and the Air Force's JINTACCS program (64779F). These programs complement the JINTACCS program by striving for compatibility and interoperability among Army, Air Force, Navy and Marine tactical command and control systems. Close liaison across the programs preclude duplication of efforts.

F. (U) WORK PERFORMED BY: There are numerous contractors performing work for this program effort. The top five are listed below by name and location. There are 11 additional contractors with a total of $7.116 million in contracts. The top five are: Mitre Corp., Bedford, MA; Planning Research Corp., Ft. Monmouth, NJ; CMD Cont/Comms Corp., Torrance, CA; Systems Development Corp., McLean, VA; and BDM, McLean, VA. The in-house organization responsible for compatibility and interoperability and operational effectiveness demonstration testing and documentation is the Communications and Electronics Command and the Joint Interface Test Force, Ft. Monmouth, NJ.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D296 — JINTACCS (NATO): The purpose of this project is to develop standards which will insure compatibility and interoperability among NATO and US/Allied tactical command and control systems. Successful implementation of this JINTACCS project will result in a force multiplier effect through enhanced usage of tactical command and control systems. Efforts performed during FY 1982 are as follows: (1) Technical analytic support to US delegates for the development of Allied Data Systems Interoperability Agency (ADSIA);

Program Element: #64779A

Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

(2) transferred JINTACCS methodology to NATO through the permanent interoperability working group; (3) developed the NATO interoperability management plan and Link-16 TADIL J message standards; (4) provided ADSIA with software for maintaining the NATO information exchange and data element data bases; and (5) supported OJCS, Service, and agency bilateral (international) activities to assess the impact of US interoperability standards development and made recommendations. The goals for FY 1983 are: (1) Provide technical support to ADSIA US delegates; (2) analyze the work of the 23 NATO tactical C² interoperability forums; (3) pursue a tactical C² interoperability vocabulary standardization program; (4) support OJCS, Service, and agency bilateral (international) activities to assess impact on US interoperability standards development and make recommendations. The goals for FY 1984 are: (1) Continue FY 1983 efforts; and (2) support US participation in NATO tactical C² interoperability efforts (these efforts will be progressing through conceptual development into a standard design phase).

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D309 — JINTACCS (Army)**

a. **(U) Project Description:** The Army, as one of the participating services and agencies, is tasked to provide support to the JINTACCS Program and to program and budget funds necessary to accomplish its portion of the program. The tasks and resources required for Army participation in JINTACCS are described below. As a participant, the Army will provide operational facilities such as the Tactical Operations Center, Fire Direction Center, Fire Support Element, Army Air Defense Command Post (there are 26 such Army facilities), and supporting automated systems (consisting of the Tactical Fire Direction System, Missile Minder, PATRIOT, All Source Analysis System, and Maneuver Control System), all to be configured to exchange tactical information with other service/agency operational facilities and systems. Each JINTACCS participating Army facility and system must be designed or modified to utilize JINTACCS standards. To evaluate the achievement of compatibility and interoperability (C&I), testing started in the fourth quarter of FY 1979. The C&I tests will be conducted in an iterative manner on each of four JINTACCS functional groups (Intelligence, Air Operations, Fire Support Operations, and Operations Control) over a period from FY 1979 through FY 1984. Following each functional group's C&I tests, an Operational Effectiveness Demonstration (OED) will be conducted concurrently with annual joint exercises (e.g., SOLID SHIELD 83 and 85) to demonstrate the enhanced capabilities of an interoperable US joint tactical force. Task specifics are provided below.

b. **(U) Program Accomplishments and Future Efforts:**

Program Element: #64778A

Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

(1) (U) FY 1982 Accomplishments: Provided Army positions at technical coordination groups and configuration control boards and maintained Intelligence segment training material. Developed training material for Air Operations (for both compatibility and interoperability tests and operational effectiveness demonstrations). Assessed adequacy of JTIDS variable message format for command and control element design requirements. Confirmed proposed JINTACCS standards validation procedures through Table Top exercise conducted for Operations Control segment. Initiated work on compatibility and interoperability training material for Operations Control and transitioned JINTACCS Intelligence training responsibility to TRADOC. Provided detailed message preparation procedures for TACFIRE application software development. Developed Tactical Computer Terminal (TCT) application software for composing/processing Air Operations messages during compatibility and interoperability testing and developed communications software and electrical interface for Air Operations compatibility and interoperability testing. Initiated Tactical Computer System (TCS)/TCT application software development for composing/processing Operations Control messages for compatibility and interoperability testing. Initiated the following: development of TCT communication software and electrical interface for Operations Control compatibility and interoperability testing; TCS/TCT application software development for composing/processing Air Operations and Intelligence messages for operational effectiveness demonstration (OED-83); and TCS/TCT communication software and electrical interface developments for combined Air Operations and Intelligence operational effectiveness demonstration 83 (OED-83). Trained Army planner/evaluator personnel for Air Operations and configuration management testing, and Intelligence configuration management testing. Managed Army Air Operations compatibility and interoperability testing (both manual mode and TCT-assist mode). Published Air Operations compatibility and interoperability test report and published Army Operations Control compatibility and interoperability test plan. Developed Army position for TADIL-J compatibility and interoperability testing concept. Reviewed Operational Effectiveness Demonstration (OED-81) results to identify required JINTACCS modifications. Published Army Intelligence configuration management test plan. Participated in Intelligence configuration management testing and published Army Air Operations configuration management test plan. Provided support for CINCLANT OED-83 planning. Upgraded test center facilities to support consolidation of TACS/TADS program into JINTACCS program. Developed Army position on voice templates for compatibility and interoperability testing Operations Control and Fire Support. Initiated studies to identify recommended JINTACCS standards implementation within command and control system architecture and to update JINTACCS Army Management Plan (JAMP).

(2) (U) FY 1983 Program: The Developmental Certification Testing (DCT) will be completed in FY 1983 for the Operation Control segment. Tasks continuing are: Participate in the Technical Interface Design Plan (Test Edition) Maintenance Test (TMT) Combined Function for Intelligence, Air Operations, Operations Control, Fire Support segments. The TMTs scheduled through FY 1983 are: (1) design and develop a JTIDS Variable Message Format (VMF) interface for Command element implementation; (2) continued assessing adequacies of JTIDS variable message format for command and control element design requirements; (3) continued developing Army position for TADIL-J compatibility and interoperability testing concept; (4) plan for TADIL-J compatibility and interoperability testing; (5) compile Army-oriented test data for Fire Support DCT; (6) continue the conduct of training for ATU support personnel and Operational Facility System team personnel in all combined functional TMTs; (7) conduct

Program Element: #64779A

Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

training to the OED-83 Army instructors and CINCLANT data controllers and evaluators; and (8) provide technical support to the Army's participation in OED-83.

(3) (U) **FY 1984 Planned Program and Basis for Budget Year Request:** Tasks that will be completed during FY 1984 are: (1) Complete Fire Support and JTIDS C&I test; (2) compile Army-oriented test data for Fire Support; (3) complete software development for JINTACCS messages implementation in TCT/TCS for Operation Control, Intelligence, and Fire Support functions; and (4) complete preparation for SOLID SHIELD 85 OED. Tasks being performed in FY 1983 continuing beyond FY 1984 are: (1) Update and refine JINTACCS Army Management Plan (JAMP); (2) complete SOLID SHIELD 85 OED preparation; (3) participate in Joint Configuration Management of JINTACCS TIDPS; (4) manage and operate the Army's participating Test Unit (ATU); (5) manage Army CM test activities in JINTACCS and Intra-Army Interoperability Testing, i.e., TLS/TCSs; (6) specify JINTACCS standards in command and control architecture; (7) develop JTIDS hardware interface; and (8) continue software post-deployment effort for implementing JINTACCS standards TSQ-73, JTIDS, TCS/TCT, and TACFIRE/MIFASS interface configuration management.

(4) (U) **Program to Completion:** This is continuing program; however, Congressional direction requires that DCT testing for the current character-oriented message standards be completed by the end of FY 1985.

c. (U) **Major Milestones:**

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Complete Air Ops DCT Tests	FY 1982	FY 1982
Complete Ops Control DCT Tests	FY 1983	FY 1983
Complete Fire Support	FY 1983	FY 1984
Complete Amphib C&I Tests	FY 1984	FY 1984
Data Communication Standards Validation (Tentative)	FY 1983	FY 1983
Joint Tactical Information Distribution System (JTIDS)-Message Standards	FY 1982	FY 1982
Complete JTIDS C&I Tests	FY 1985	FY 1985

Program Element: #64779A

Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
TCS/TADS Transition to JINTACCS Progr	FY 1982	FY 1982
Operational Effectiveness Demonstrations (OED83)	FY 1983	FY 1983
Operational Effectiveness Demonstrations (OED85)	FY 1985	FY 1985
JCS Approval of Final Edition		

2. (U) Project: D310 — JINTACCS (Executive Agent)

a. (U) Project Description: This project is needed to insure compatibility and interoperability of the tactical command and control systems used in joint Service/agency military operations. It is required to insure that development and testing of joint message standards for the Joint Tactical Information Distribution System (JTIDS) is accomplished. It administers configuration management of the JCS standards for Tactical Air Control System/Tactical Air Defense System (TACS/TADS) operations. In order to successfully complete this project, the JINTACCS Executive Agency tasks can be summarized as: (1) Develop the technical standards required for the Service/Agency tactical command and control systems to be compatible and interoperable (CI) in a battlefield environment; (2) test the technical CI standards and make corrections until they are acceptable; (3) forward CI standards to JCS for publication; and (4) conduct configuration management on JCS, JTIDS, and TACS/TADS (renamed Joint Tactical Air Operations (JTAO)) interface standards. Specifics tasks are provided below.

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: Developed scope and concept, generated test plans, defined test procedures, acquired test equipment/materials, and conducted maintenance and certification tests for Intelligence functional and for Air Operations functional segments. Conducted 2 Operational Control Table Top Execution exercises. Updated the Operations Control Technical Interface Design Plan (TIDP). Upgraded the Joint Interface Test System for certification and maintenance tests of the Operations Control functional segment. Developed scope and concept, generated test plans, and defined test procedures for the Fire Support functional segment Table Top Execution exercise. Conducted analyses for all Intelligence and Air Operations tests which included chairing, hosting and preparing agenda and minutes for the Joint Analysis Review Panels, and preparation and distribution of test reports. Maintained configuration management of the JINTACCS Developmental Standards through preparation and distribution

Program Element: #64779A

Title: **Joint Interoperability of Tactical Command and Control Systems (JINTACCS)**

DOD Mission Area: #344 — **Tactical Command and Control**

Budget Activity: #4 — **Tactical Programs**

of Developmental Interface Change Proposals, conduct of Development Interface Analysis Groups, and Joint Interface Configuration Management Boards. Prepared, published, and distributed changes and revisions to the Developmental Standards and the Interface Operating Procedure.

(2) **(U) FY 1983 Program:** Write test reports for the Intelligence maintenance tests and for the Air Operations interface certification test. Write test procedures, acquire equipment/materials, perform maintenance tests, and draft final test report for the Intelligence, Air Operations, and Operations Control functional segments. Finalize test procedures, perform Table Top Execution, write test plan and procedure, acquire equipment/materials, conduct test, and draft final report for Fire Support Functional Segment developmental certification. Continue analysis of all functional segment tests and configuration management of all developmental standards documents including configuration management support to JCS should Intelligence and Air Operations be accepted. Support and participate in the Operations Effectiveness Demonstration (OED)-83 to be conducted by the Commander in Chief, Atlantic; publish Joint Information Distribution System Technical Interface Design Plan-Test Edition (JTIPD); complete development of the automated JTIPD; and contribute to the development of US Message Text Formats program as defined in JCS Pub 25.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** (1) Write final test report for FY 1983 Intelligence, Air Operations, and Operations Control maintenance tests, (2) write test procedures, acquire materials, and conduct maintenance tests for Intelligence, Air Operations, Operations Control, and Fire Support segments; (3) write final test reports for Intelligence and Fire Support functional segments; (4) write test procedures for FY 1985 Intelligence, Operations Control, and Fire Support maintenance tests; (5) continue analysis of all function segment tests; and (6) continue configuration management of all development standard documents including configuration management support to JCS for those approved functional segments; (7) monitor Service/agency implementation of Tactical Data Information Link (TADIL)-J; (8) develop all segment baselines for the 1985 OED; (9) continue configuration management (CM) of all JINTACCS standards; (10) conduct CM testing of the Joint Tactical Air Operations (JTAO) standards; and (11) continue contributing to the US Message Text Format program.

(4) **(U) Program to Completion:** This is a continuing program.

Program Element: #64779A

Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 — Tactical Command and Control

Budget Activity: #4 — Tactical Programs

c. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1983 Submission
Publish JTIDS TIDP-TE	FY 1983	FY 1982
Begin Configuration Management testing of the TACS/TADS Standards (JTAO)	FY 1983	FY 1982
Begin Operations Control Segment DCT	FY 1983	FY 1983
Begin Fire Support Segment DCT	FY 1983	FY 1983

DCT is Development Certification Testing. It replaces the compatibility and interoperability testing which is functional and required throughout the program. The Amphibious Segment has been combined with the Operation Control Segments. The JTIPD milestone was delayed because of the long, complex interservice coordination required before all services concurred. Slow delivery of test parts for the Joint Interface Test System (JITS) delayed modifications tests required for the TACS/TADS transition to meet the scheduled milestone.

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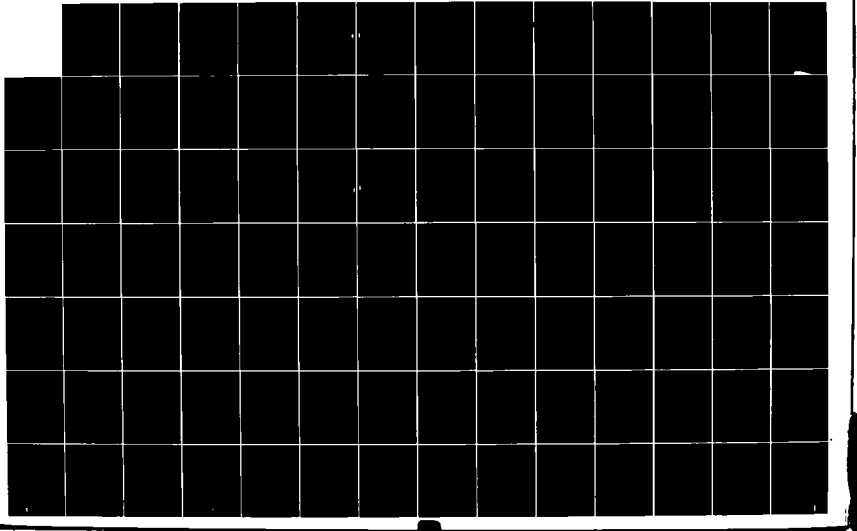

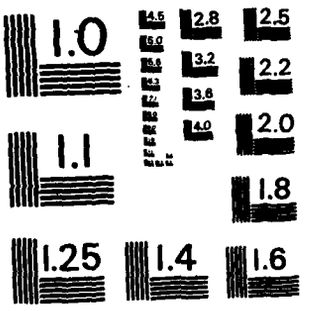

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **65710A**

Title: **Joint Chemical/Biological Point of Contact/Test/ Assessment**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems**

Budget Activity: **#4 — Tactical Programs**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1301	1447	1800	2402	Continuing	Not Applicable
D049	Joint Chemical/Biological Contact Point and Test	1301	1447	1800	2402	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Soviet Union has long recognized and appreciated the ability of chemical-biological weapons to inflict casualties, degrade combat effectiveness, and disrupt the battlefield. The USSR continues to maintain and improve its formidable capability to conduct chemical-biological warfare operations. Consequently the US military must have the capability to survive and conduct sustained operations in a chemical-biological (CB) warfare environment. To do this, the United States must operationally test and evaluate a variety of CB defensive equipment and procedures to assure maximum effective utilization of available assets and provide feedback for development of new equipment and employment doctrine. In 1973 the Department of Defense (DOD) directed the Army to establish a Research, Development, Test, and Evaluation (RDTE) program to support the requirements of Unified Commanders and the Services for testing CB equipment and procedures used in support of their operations. This program succeeded Project Deseret, which was a DOD Joint Services program for operational testing of existing chemical warfare and chemical-biological defense (CW/CBD) equipment. The current Army program continues to provide a means for commanders of US forces to test nondevelopmental equipment, conduct appropriate supporting studies, and adopt operating procedures to provide quick solutions to some of its CB needs while awaiting the results of long-term research and development efforts. These data also support development of user requirements documents and tactical doctrine. Dugway Proving Ground (DPG) is the only DOD facility possessing the specialized personnel, equipment, and facilities (including real estate) to provide the broad range of tests and studies support necessary to satisfy user needs. This program covers indirect costs incurred by DPG in supporting operational tests, investigations and/or studies for Unified Commanders and Services; provides for the publication and maintenance of CB technical data source books; and supports accomplishments of the Army's Executive Agency responsibilities for supporting development of chemical weapons and CW/CBD equipment for the Services.

Program Element: 65710A

Title: Joint Chemical/Biological Point of Contact/Test/ Assessment

DOD Mission Area: #276 — Defensive Chemical and Biological Systems

Budget Activity: #4 — Tactical Programs

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1301	1447	1800	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	1413	1451	2218	Continuing	Not Applicable

The decrease in FY 1982 of $112 thousand resulted from the delay of portions of an FY 1982 test of aircraft operations in a toxic environment to FY 1983. These funds were reprogramed to higher priority Army requirements. The funding decrease of $4 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The FY 1984 decrease of $418 thousand is the result of program planning adjustments from this program element to other, higher priority requirements and a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The Department of the Army (DA), as the DOD Executive Agent for research, exploratory development, and advanced development for chemical warfare and chemical and biological defense (CW/CBD) systems, is responsible for joint operational tests, investigations and/or studies for Unified Commanders and the Services. Work is coordinated and duplication of effort precluded through a joint coordinating group composed of representatives of all Services.

F. (U) WORK PERFORMED BY: In-house efforts are conducted at Dugway Proving Ground (DPG), UT. Contract work is performed by Andrulis Research Corp, Bethesda, MD, and Lockheed Field Test Group, DPG, UT.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D049—Joint Chemical/Biological Contact Point and Test: The purpose of this program is to plan, conduct, evaluate, and report on joint tests and/or operational research studies in response to requirements from the Unified Commanders and the Services and to serve as the Department of Defense joint contact point for all Chemical-Biological (CB) defense tests and CB technical data source books. The tests and studies provide essential operational data on nondevelopmental chemical weapon systems and chemical/biological defense materiel to determine whether tested items and/or systems meet the military technical characteristics required by the user. The joint contact

Program Element: **65710A**

Title: **Joint Chemical/Biological Point of Contact/Test/ Assessment**

DOD Mission Area: **#276 — Defensive Chemical and Biological Systems**

Budget Activity: **#4 — Tactical Programs**

point also publishes and maintains CB technical data source books and provides reports and studies in support of CB data inquiries. To support the entire Army field testing program, this project conducts a continuous test effort to review, evaluate, and select suitable chemical agent simulants. During FY 1982, four tests, three studies, and one technical data source book were in progress. The tests included evaluations of logistics operations in toxic environments, a West German decontaminant, aircraft operations in toxic environments, and mission degradation associated with wearing protective equipment. The data source book covered the characteristics of new threat nerve agents. Five tests and six studies are planned to be in progress during FY 1983. The tests will include continuations of the evaluations of aircraft operations in toxic environments and degradation associated with wearing protective equipment. Tests evaluating amphibious operations and maintenance operations in a toxic environment will start in FY 1983. Planning for an evaluation of the hazards associated with donning and doffing protective equipment in a toxic environment will start in FY 1983. Seven tests, five studies, and one source book are planned for FY 1984. The tests will include continuations of the evaluations of aircraft and amphibious operations in toxic environments, and mission degradation associated with wearing protective equipment. The test of the hazards associated with donning and doffing protective clothing in a toxic environment will be continued in FY 1984. Tests addressing the decontamination of artillery materiel, the employment of a Marine Corps Collective Protection System, and the characterization of a field toxic environment will be initiated in FY 1984. The FY 1984 source book will document characteristics of current chemical-biological protective equipment.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #31307A

Title: Foreign Science and Technology Center

DOD Mission Area: #312 — General Defense Intelligence Program

Budget Activity: #5 — Intelligence and Communications

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT					Continuing	Not Applicable
D381	Scientific/Technical Intelligence					Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This is a continuing program covering acquisition and exploitation of foreign systems in support of intelligence and threat assessment requirements. The program is aimed at obtaining technology employed in foreign threat systems which could constitute a military determination of the extent of threat posed by those systems, and making the foreign systems available for use in development of countermeasures or adversary systems.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)				Continuing	Not Applicable
Funds (as shown in FY 1983 submission)				Continuing	Not Applicable

(U) The increase in funding in FY 1982 was the result of reprograming to take advantage of unanticipated acquisition opportunities. The increase in FY 1984 is due to anticipated acquisition of new candidates to include

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

Program Element: #31307A

Title: Foreign Science and Technology Center

DOD Mission Area: #312 — General Defense Intelligence Program

Budget Activity: #5 — Intelligence and Communications

E. (U) RELATED ACTIVITIES: Scientific and technical information requests from intelligence production activities and the development of operational testing of US hardware are related to evaluation efforts under this program. Exploitation evaluation is coordinated with the Defense Intelligence Agency, all Services, and other interested agencies. Program Element #65709A (Exploitation of Foreign Items) ensures that foreign technology is made available to US RDTE elements in support of engineering development, as well as exploratory research and technology enhancement.

F. (U) WORK PERFORMED BY: The actual evaluation of materiel is normally assigned to the commodity command or separate counterpart laboratory within the US Army Materiel Development and Readiness Command having developmental responsibility for counterpart US materiel. Other resources are tasked in a support role depending upon evaluation requirements and area of expertise. In the case of bi- or tri-Service evaluation where the Army acts as the Executive Agent, the Army is responsible for implementing the evaluation to insure that the objectives and requirements of all Services and agencies are satisfied. The US Army Foreign Science and Technology Center, Charlottesville, VA, has overall management responsibility for Project #D381.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D381 — Scientific and Technical Intelligence: The program offers a high payoff for the resources invested.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #31327A

Title: Technical Reconnaissance & Surveillance (TECRAS)

DOD Mission Area: #312 — General Defense Intelligence Program

Budget Activity: #5 — Intelligence and Communications

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT					Continuing	Not Applicable
D382	TECRAS					Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: TECRAS is a continuing program data necessary to support the development of systems, countermeasures, and tactical doctrine. Objectives of the program are to provide data needed to identify and characterize , such data being needed for

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)				Continuing	Not Applicable
Funds (as shown in FY 1983 submission)				Continuing	Not Applicable

D382 TECRAS — The funding decrease of $8 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. Funding difference in FY 1984 is attributable to program realignment to higher priority Army programs.

Program Element: #31327A

Title: Technical Reconnaissance & Surveillance (TECRAS)

DOD Mission Area: #312 — General Defense Intelligence Program

Budget Activity: #5 — Intelligence and Communications

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army						
Funds (current requirements) [1]			[2]		Continuing	Not Applicable

[1](U) Systems being procured are various devices forareas as well as devices for devices. Also included are sensors for .

[2] (U) Increase in current requirements for FY 1984 is due to addition of new initiatives in the FY 1984 budget. These are new projects in the general mission areas described above.

E. (U) RELATED ACTIVITIES: a DIA effort, is a related program. As applies to the special investigation of new technologies portion of TECRAS (only), this DIA project provides for overall coordination of the R&D initiatives and results with other Services/agencies, and provides related studies in support of the Army R&D effort. A Memorandum of Understanding between DIA and the Army will establish the separation of responsibilities, and coordination through the will ensure that efforts are not duplicated by other Services/agencies.

F. (U) WORK PERFORMED BY: The developing organization having the major responsibility under this TECRAS program is the Night Vision and Electro-Optics Laboratory (NV&EOL), Ft. Belvoir, VA. NV&EOL has been designated lead laboratory for the TECRAS Program and will coordinate delegation to other in-house organizations (e.g., Electronics Warfare Laboratory, Ft Monmouth, NJ) or contractual efforts.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D362 — TECRAS: Funding will support development of systems' parameters; development of a capability to ; investigation of new technology areas to develop applications for meeting requirements; providing a quick-reaction capability Further details may be found at the SECRET NOFORN level in the General Defense Intelligence Proposed Program (GDIPP).

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #31394A

Title: Other Command General Defense Intelligence Program Activities

DOD Mission Area: #333 — Strategic Communications

Budget Activity: #5 — Intelligence and Communications

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT					To Be Determined	To Be Determined
DH87	General Defense Intelligence Program					To Be Determined	To Be Determined

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Program content is TOP SECRET, precluding further description in this summary. Access to information in this program, is controlled by the Office of the Deputy Chief of Staff Research Development and Acquisition.

C. (U) COMPARISON WITH FY 1993 DESCRIPTIVE SUMMARY: ($ In Thousands) Not Applicable.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Available upon request in accordance with paragraph B above.

F. (U) WORK PERFORMED BY: Program information is available upon request in accordance with paragraph B above.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1994: Program information is available upon request in accordance with paragraph B above.

H. (U) PROJECTS OVER $10 MILLION IN FY 1994: Program information is available upon request in accordance with paragraph B above.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #33111A

Title: Strategic Army Communications (STARCOM)

DOD Mission Area: #360 — Support and Base Communications

Budget Activity: #5 — Intelligence and Communications

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	788	812	919	1061	Continuing	Not Applicable
D481	Strategic Communications (STARCOM)	788	812	919	1061	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Provides development efforts for nontactical telecommunication networks, services, and facility controls, and addresses the need for responsive communications and equipment interoperability in support of Army requirements at Echelons Above Corps (EAC). Equipment and systems developed are for worldwide deployment in fixed (base) Army environments and in transportable facilities used for EAC interfaces with the Defense Communications System (DCS). Maximum use is made of commercially developed equipment and technology. The need is to modernize base communications systems, both in the continental US and overseas. Such modernization is in the form of modern digital equipment which is faster, more reliable, and less costly to operate and maintain than the existing old-technology analog equipment. Modernized systems must be interoperable with civilian systems and provide the military commander with credible responsiveness to contingency requirements. System interoperability provides for worldwide connectivity of military forces in direct execution of national objectives.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	788	812	919	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	788	812	954	Continuing	Not Applicable

FY 1984 reduction resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE Budget.

Program Element: #33111A

Title: Strategic Army Communications (STARCOM)

DOD Mission Area: #360 — Support and Base Communications

Budget Activity: #5 — Intelligence and Communications

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: None

F. (U) WORK PERFORMED BY: Project Manager DCS (Army), Fort Monmouth, NJ; US Army Communications-Electronics Engineering Installation Agency (USACEEIA), Fort Huachuca, AZ, and US Army Communications-Electronics Command (USACECOM), Fort Monmouth, NJ. Contractors include Institute of Telecommunications Sciences, Boulder, CO, and various industrial contractors.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D481 — Strategic Communications (STARCOM): The purpose of this project is to provide nontactical communications networks, services, and facility controls for responsive communications and equipment interoperability in support of Army requirements at Echelons Above Corps (EAC). This project is needed to develop equipment and systems for worldwide deployment in fixed (base) Army environments and in transportable facilities used for EAC interfaces with the Defense Communications System (DCS). FY 1982 accomplishments include: installation of 90 Megabits per second (MbPS) fiber optic (FO) link and commercial test and evaluation program, completion or risk analysis of FO applications in the Korean theater, refinement of concepts and techniques for use in the base switching and transmission subsystems, and initiation of analysis and definition of interphases required for interoperability enhancements at EAC. The principal goals for FY 1983 are to complete test and evaluation of 90 MbPS FO communication link, install local base broadband data network capability for test and evaluation, continue interphase and interoperability definition analysis, define Millimeter Wave Radio (MWR) equipment specification requirements as applied to base communications, and perform initial integration testing of EAC interface subsystems. The FY 1984 program will investigate and define criteria and specifications of long-wavelength (1.3 micrometer) optical equipment for FO applications up to 25km, initiate development of hardware and software interfaces applied to achieving interoperability of subsystems, investigate and evaluate MWR applications to base communications, commence MWR equipment procurement to support test and evaluation program, continue test, evaluation, and enhancement of local base broadband data network capabilities, and perform laboratory testing of EAC interface subsystems.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #33126A Title: Long Haul Communications (DCS)

DOD Mission Area: #383 — Long Haul Communications Budget Activity: #5 — Intelligence and C wications

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4460	11057	8661	10010	Continuing	Not Applicable
D149	Army Support for DCS (Defense Communication Systems)	4460	11057	8661	10010	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Supports development efforts to sustain and improve vital command, control, and administrative communications in areas of the Defense Communications Systems (DCS) for which the Army is responsible. Greater demands are placed upon the DCS through requirements for enhanced force deployability and mobility, and by the increasing volume and sophistication of traffic. These growing demands cannot be satisfied by existing equipment and technology. The need therefore exists to develop/acquire, install, and validate modern digital switching and transmission equipment which is more capable, efficient, and reliable than existing, old-technology analog equipment. To enable prompt worldwide force deployability and command control, the new equipment must be interoperable with that of NATO and civilian agencies. The approach taken will provide commanders at all levels with credible responsiveness over a wide range of contingencies in support of US national objectives. The program therefore develops concepts and equipment required by the Army to satisfy stated DCS requirements.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	4460	11057	8661	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	7460	7578	7492	Continuing	Not Applicable

$3 million decrease in FY 1982 was due to reprograming to higher priority programs. $3.5 million proposed reprograming increase in FY 1983 supports implementation of the Defense Data Network. Net increase in FY 1984 reflects $1.4 million to fund the new Secure Voice and Graphics Conferencing Program.

Program Element: #33126A

Title: Long Haul Communications (DCS)

DOD Mission Area: #303 — Long Haul Communications

Budget Activity: #5 — Intelligence and Communications

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: None

F. (U) WORK PERFORMED BY: Project Manager DCS (Army), Fort Monmouth, NJ; US Army Communications Electronics Engineering Installation Agency (USACEEIA), Ft Huachuca, AZ; US Army Communications-Electronics Command (USACECOM), Fort Monmouth, NJ. Contractors include Institute of Telecommunications Sciences, Boulder, CO, and various industrial contractors.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D149 — Army Support for DCS (Defense Communications Systems): The purpose of this project is to sustain and improve vital command, control, and administrative communications in areas of the Defense Communications System (DCS) for which the Army is responsible. The project is needed to develop/acquire, install, and validate modern digital switching and transmission equipment which is more capable, efficient, and reliable than existing, old-technology analog equipment. FY 1982 accomplishments include: completed development testing of MD-9180/GRC Digital Modems for DCS troposcatter links. Defense Switched Network Access Area (DSNAA) concept formulation contracts completed, and Defense Switched Network (DSN) architecture selected. DSNAA contract for concept refinement awarded; completed coordinated development specification for the DCS Reconstitution Radio; continued joint DCS/Tactical Radio Analysis; initiated test and evaluation of alternative power sources for DCS facilities. Completed DCS Facilities Survivability Enhancement Program. Initiated preparation of AUTOSEVOCOM and TRI-TAC interface specifications for Secure Voice Improvement Program (SVIP). Goals for accomplishment in FY 1983 are: complete DSNAA concept refinement and validation planning. Initiate Experimental Integrated Switched Network (EISN) system-level experiments and test and evaluation. Contract for the development of the DCS Reconstitution Radio. Finalize DCS Tactical Radio Analysis. Prepare DCS multiplexer interoperability specifications. Test and evaluate prototype power system using alternate sources and new sources. Continue preparation of AUTOSEVOCOM and TRI-TAC interface specifications for Secure Voice Improvement Program (SVIP) and prepare acquisition requirements packages for interfaces. Goals for accomplishment in FY 1984 are: complete systems design of the Software Defined Network (SDN) and initiate development of the SDN. Continue system-level experiments utilizing the EISN equipment. Conduct integration tests of video, data and secure voice switching and transport within the DSNAA/EISN modes. Complete fabrication and testing of DCS Reconstitution Radio prototype, and initiate fabrication of engineering development models. Complete evaluation of alternate power sources test configurations. Award contracts for AUTOSEVOCOM and TRI-TAC interface development for SVIP. Initiate system concept analysis and definition of Secure Voice and Graphics Conferencing. Complete Military Function Controller prototype design.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #33142A

Title: Satellite Communications Ground Environment

DOD Mission Area: #333 — Strategic Communications

Budget Activity: #5 — Intelligence and Communications

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	37815	35445	55618	78450	Continuing	Not Applicable
D253	Defense Satellite Communications System-Defense Communications System (DSCS-DCS)	22036	16893	37452	51716	Continuing	Not Applicable
D450	Satellite Communications	934	1118	1094	1241	Continuing	Not Applicable
D456	Tactical Satellite Communications (TACSATCOM)	14845	17434	17072	25493	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides funds for the development of satellite communications ground terminals by the Army for use by all the armed services and other Government agencies. Developments under this program provide rapid, reliable, effective communications to support a variety of command and control requirements for tactical and strategic commanders, as well as the National Command Authority and the Defense Communications System. Satellite ground terminals are developed in response to validated requirements of the Office of the Joint Chiefs of Staff to replace or supplement existing communications systems which do not have the capability or survivability required on the fluid modern battlefield.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	37815	35445	55618	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	41524	35545	57043	Continuing	Not Applicable

Program Element: #33142A Title: Satellite Communications Ground Environment

DOD Mission Area: #333 — Strategic Communications Budget Activity: #5 — Intelligence and Communications

Reduction of $3709 thousand in FY 1982 is a result of reprograming to higher priority Army requirements. The funding decrease of $100 thousand in FY 1983 is a result of a pro rata application of general Congressional reductions to the RDTE appropriation. The decrease of $1425 thousand in FY 1984 is due to a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army:						
Funds (current requirements)	217900	274900	232500	278100	Continuing	Not Applicable
Quantities (current requirements)	*	*	*	*	Continuing	Not Applicable

* Not applicable; consists of over twenty line items, with different quantities for each.

E. (U) RELATED ACTIVITIES: This program element is the consolidation of Army efforts in the satellite communications field. These activities are under the management of the Project Manager, Satellite Communications, Fort Monmouth, New Jersey. Related to this activity are the satellite communications programs of the Air Force, responsible for development and procurement of the space segment of the satellite communications system, and the Navy, responsible for development and procurement of shipboard satellite communications terminals.

F. (U) WORK PERFORMED BY: The US Army Satellite Communications Agency, Fort Monmouth, NJ. Major contractors include: Harris Corporation, Melbourne, FL; Magnavox, Fort Wayne, IN; and Torrance, CA; Comtech Laboratories, Inc., Smithtown, NY; Martin Marietta Corporation, Orlando, FL; and Ford Aerospace Corporation, Palo Alto, CA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D450 — Satellite Communications: Conducts research and development to advance the state-of-the-art in satellite communications. Output is moved into either project D253 or D456 for advanced, product-oriented development. Work during FY 1982 has involved development of an advanced satellite transmitter feasibility model and continued development of an advanced man-pack satellite terminal. Funds are required to continue these efforts in FY 1983 and FY 1984 to permit the utilization of these initiatives in Army equipment used in the field.

Program Element: #33142A Title: Satellite Communications Ground Environment

DOD Mission Area: #333 — Strategic Communications Budget Activity: #5 — Intelligence and Communications

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) D253 — Defense Satellite Communications Systems-Defense Communications System (DSCS-DCS)**

a. **(U) Project Description:** This project develops and procures ground satellite terminals for all the armed services and other agencies that use the Defense Satellite Communications System (DSCS). This is a continuing effort directed by Joint Chiefs of Staff validated requirements found in the DSCS Five-Year Plan, published annually by the Defense Communications Agency.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** During FY 1982, development was completed for the State-of-the-Art Medium Terminal (SAMT), the last major terminal system being procured to replace first-generation DSCS terminals. A production contract for the SAMT was awarded to Ford Aerospace. Advanced development was continued on several elements of the Real-Time Adaptive Control System (RTACS), an item critical to continued survivability and versatility of the DCS in the coming decades.

(2) **(U) FY 1983 Program:** Begin advanced development of the software for the Real-Time Adaptive Control System. Complete engineering development of the Adaptive Link Power Control System. Begin engineering development of the Programmable Filter, the Multifunction High-Rate Coder, and the Limited Network Control Element.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Continue development of RTACS software. Complete engineering development of the Programmable Filter, the Malfunction High-Rate Coder, and the Limited Network Control Element.

(4) **(U) Program to Completion:** This is a continuing program that will support the technical evolution of the DSCS in response to requirements of the Joint Chiefs of Staff.

c. **(U) Major Milestones:** Not Applicable; continuing program.

2. **(U) D456 — Tactical Satellite Communications**

a. **(U) Project Description:** This project develops and procures tactical ground satellite terminals for use by all the armed services. The Single Channel Objective Tactical Terminal (SCOTT) represents the Army's entry into second-generation satellite equipment for the tactical forces. It will be a small, transportable satellite terminal operating at extremely high frequencies (EHF), and found at tactical formations down to brigade level.

Program Element: #33142A Title: Satellite Communications Ground Environment

DOD Mission Area: #333 — Strategic Communications Budget Activity: #5 — Intelligence and Communications

Mounted in vehicles such as command post carriers, SCOTT provides, through the choice of frequencies for its operation and the use of advanced technology, a small, light communications capability to the battlefield commander independent of terrestrial relay links. Prototype versions of this terminal have been built and are presently being tested. By direction of the Office of the Secretary of Defense, the Army will field this system in 1987, with a production contract being awarded in FY 1984. To compress the schedule, there will be no engineering development phase; the program will move directly from advanced development into production.

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: Advanced development contracts were awarded for development of solid-state and traveling wave tube power amplifiers for use in SCOTT. Development continued on a dual-frequency antenna feed, and producibility models of the antenna dish were developed. Feasibility testing was conducted on dismounted equipment, and a prototype terminal was installed in an M-577 command post carrier for use in initial testing. Antijam system for the multichannel initial system was developed.

(2) (U) FY 1983 Program: Continue advanced development of EHF power amplifiers; evaluate development models of both solid-state and tube approaches. Complete evaluation of the dual-frequency antenna feed and the antenna dish. Complete testing of the tracked vehicle-mounted terminal. Conduct Army Systems Acquisition Review Council for the production decision on SCOTT. Continue Quick-Erect Antenna engineering development. Begin advanced development of advanced manpack terminal.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: Continue advanced development on tactical anti-jam and integration packages. Award production contract for initial increment of SCOTT terminals. Continue advanced manpack terminal development. Begin full-scale development of super-high-frequency multichannel objective system. Begin advanced development of multichannel Demand-Assigned multiple access modem to increase usage factors on tactical satellite links.

(4) (U) Program to Completion: Provide project office support to resolve issues raised during initial procurement and fielding phases. Complete testing and transition of terminals into the Army inventory as standard items of equipment.

c. (U) Major Milestones: Not applicable; continuing program

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #33401A

Title: Communications Security (COMSEC) Equipment

DOD Mission Area: #360 — Communications Security

Budget Activity: #5 — Intelligence and Communications

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6946	6856			Continuing	Not Applicable
D491	Communications Security Equipment Technology	6946	6856			Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Communications Security (COMSEC) is required to combat the potential enemy's ever-improving signal intelligence exploitation capabilities. A continuing RDTE program is specifically required to achieve the objective of securing Further, the Army requires a multifaceted program in to correlate with equivalent program areas of the National Security Agency (NSA). As examples of requirements in these areas, the Army needs a system to perform fast and accurate emanations systems testing by semiskilled personnel, new techniques for COMSEC integration efforts, , lower power COMSEC devices, and finally, Army materiel developers require continuous COMSEC engineering guidance and assistance to achieve cost effective integration of COMSEC equipment and techniques during the development of Command, Control, and Communications (C3) Systems. This program meets the stated needs by providing TEMPEST (an unclassified code word which refers to the phenomenon of unintentional radiations from electronic information processing equipment which may result in the compromise of classified information) RDTE support to all developers by developing hardware to implement the fielding of National Security Agency (NSA) tactical encryption devices, and by technology investigations, exploratory developments, and systems engineering to implement the objectives of the "National Tactical COMSEC Plan."

Program Element: #33401A Title: Communications Security (COMSEC) Equipment

DOD Mission Area: #390 — Communications Security Budget Activity: #5 — Intelligence and Communications

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	6946	6856		Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	6946	6875		Continuing	Not Applicable

The funding decrease of $19 thousand in FY 1983 is a result of a pro rata application of general Congressional reductions to the RDTE,A appropriation. The funding decrease of $1702 thousand in FY 1984 is a net result of: a $41 thousand increase from revised civilian pay pricing indices; a $1500 thousand reallocation to higher priority programs; and a reduction of $243 thousand which resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE program.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: All COMSEC RDTE within DOD is the responsibility of NSA under DOD Directive C-5200.5. Program Element #33401A, Project #D491, represents those COMSEC RDTE tasks delegated to the Army by NSA, or tasks responsive to NSA's overall program guidance documents. Program Elements #64701A (Communications Engineering Development), #28010A (Joint Tactical Communications Program), #64779A (Joint Interoperability of Tactical Command and Control Systems), and #63746A (Single Channel Ground and Airborne Radio System) are provided COMSEC systems engineering support through this program. To preclude duplication of effort, all tasks are coordinated at regular technical meetings and program reviews with NSA, appropriate Government agencies, and within DOD.

F. (U) WORK PERFORMED BY: The primary contractors performing work in this program are: Honeywell, Inc., Annapolis, MD; Booz Allen, Bethesda, MD; ITT, Fort Wayne, IN; Bendix Corp., Baltimore, MD; and Magnavox, Fort Wayne, IN. The additional number of contractors is 6, with contracts totaling $2,267,201. The primary in-house developing organization is the US Army Communications-Electronics Command, Fort Monmouth, NJ. Assisting in specific efforts are: US Army Aviation Research and Development Command, Fort Monmouth, NJ; US Army Electronics Research and Development Command, Fort Monmouth, NJ; US Army Test and Evaluation Command, Aberdeen Proving Ground, MD; Naval Ocean Systems Center, San Diego, CA; and the National Security Agency, Washington, DC.

Program Element: #33401A Title: Communications Security (COMSEC) Equipment

DOD Missior Area: #360 — Communications Security Budget Activity: #5 — Intelligence and Communications

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D491 — Communications Security Equipment Technology: This is a continuing Army program in support of Army and joint (upon the request of NSA) COMSEC requirements for the provision of secure tactical voice and data communications. The program addresses total Army RDTE needs in the tactical COMSEC area and . In FY 1982, support was provided to major Army communications-electronics system developers which included general COMSEC systems design guidance and TEMPEST evaluations and hardware designs to comply with national compromising emanation standards. Accomplishments include the completion of several exploratory efforts, technology and system engineering investigations, and hardware designs in support of numerous Army tactical communications-electronics programs. Approximately 65% of the FY 1983 program is devoted to the Standards and Assessments, and COMSEC Technical Support tasks which support the major Communications, Command, and Control system developers. The remainder of the project effort is planned to accomplish the following: initiate a Classic Fox (classified program) concept evaluation; initiate technology tasks on , authentication, and rekeying management; complete the JALOUSIE (classified program) concept evaluation; continue Surety program; and continue KASHAN (classified program) techniques program. The FY 1984 program will continue efforts in all COMSEC RDTE areas, with specific emphasis oriented toward the COMSEC Program Guidance provided by the National Security Agency. That is, . This is a continuing program.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63712A Title: Mapping and Geodesy

DOD Mission Area: #367 — Navigation and Position Fixing Budget Activity: #5 — Intelligence and Communications

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1542	3415	238	238	Continuing	Not Applicable
DT44	Digital Topographic Support System	500	1238	238	238	Continuing	Not Applicable
D580	Field Army Mapping	1042	2177	- 0 -	- 0 -	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element supports the advanced development and testing of equipment techniques in support of the field Army in the areas of mapping, survey, and geodesy. The objectives of this program are to develop techniques, software, and equipment for Army mapping, surveying, and military geographic intelligence activities in direct support of field Army tactical deployment of forces and weapon system operation. Major elements of the program are: (1) Quick-Response Multicolor Printer (QRMP), which will permit the Army topographic units to more effectively satisfy Army tactical topographic requirements by the timely reproduction of multicolor topographic maps, terrain intelligence products, and operations overlays; (2) the Digital Topographic Support System (DTSS), which will draw on the Defense Mapping Agency (DMA) digital topographic data base to provide essential digital topographic support for materiel systems which will be deployed in the mid-1990s and beyond. This program addresses the development of a new capability to generate and disseminate up-to-date general and special-purpose topographical data which will enable commanders to use the terrain to their advantage against numerically superior forces. In addition, two transition efforts from technology-based programs will support new technologies in the determination of azimuth and in automated inputs to fire control functions. Both developments are designed to provide emerging systems with smaller, faster, and more accurate azimuth determining/weapons reference units.

C. (U) COMPARISON WITH FY 1993 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1992	FY 1993	FY 1994	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1542	3415	238	Continuing	Not Applicable
Funds (as shown in FY 1993 submission)	1042	3424	1065	Continuing	Not Applicable

Program Element: #63712A

Title: Mapping and Geodesy

DOD Mission Area: #357 — Navigation and Position Fixing

Budget Activity: #5 — Intelligence and Communications

Increase of $500 thousand in FY 1982 funding level is a result of reprograming to support development of program. Reduction of $9 thousand in FY 1983 funding level is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. Reduction of $827 thousand in FY 1984 funding level is a result of reprograming to higher priority Army requirements.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The Army works directly with the Air Force, Navy, and Marine Corps, and under the coordination of the Defense Mapping Agency (DMA) and the Under Secretary of Defense for Research and Engineering (USDRE) in the functional area of Mapping and Geodesy. Specific related program elements are as follows: DMA Program Element #63701B (Mapping, Charting and Geodesy Investigations and Prototype Development); DMA Program Element #64701A (Mapping, Charting and Geodesy Engineering Development and Test); Army Program Element #62707A (Mapping and Geodesy); and Army Program Element #64716A (Mapping and Geodesy).

F. (U) WORK PERFORMED BY: This program is the responsibility of the US Army Engineer Topographic Laboratories (USAETL) at Fort Belvoir, VA, with development support by contractors. The major contractors are Analytics Inc, McClean, VA and Xerox Corp, Pasadena, CA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DT44 — Digital Topographic Support System:** This project supports an increasing battlefield need for production and use of digital topographic data (elevation, natural, and cultural features). Battlefield intelligence techniques will use these data to provide near-real terrain analysis required by the all-source analysis system. In 1982, evaluation of the Defense Mapping Agency prototype digital base was initiated. The evaluation of the data base will continue in FY 1983 with user-oriented products, and a determination of minimum requirements for the data base will be accomplished. In FY 1984 the advanced development prototype for the intelligence function will be completed. Initial requirements for the Army data base will be submitted to the Defense Mapping Agency.

2. **(U) D580 — Field Army Mapping:** This project will develop the Quick-Response Multicolor Printer, which will permit rapid reproduction of relatively small quantities of topographic, cartographic terrain intelligence and other printed material. This capability will fulfill the Army's need for quickly reproduced, up-to-date maps and overlays on the battlefield. Prototypes of several subsystems (mechanical handling, color lay-down, and multispectro laser) were developed in 1982. The marriage of these subsystems will be accomplished in FY 1983 as well as the initiation of acceptance testing. In the first quarter of FY 1984, the acceptance testing will be completed, and a validation In-Process Review will be conducted in the second quarter FY 1984.

Program Element: #63712A

Title: Mapping and Geodesy

DOD Mission Area: #367 — Navigation and Position Fixing

Budget Activity: #5 — Intelligence and Communications

H. (U) PROJECTS OVER $10 MILLION IN FY 1994: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64201A

Title: Aircraft Avionics

DOD Mission Area: #357 — Navigation and Position Fixing

Budget Activity: #5 — Intelligence and Communications

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10602	3789	2283	2934	Continuing	Not Applicable
DC96	Aircraft Navigation and Control Systems	9516	2563	506	- 0 -	- 0 -	42694
DC97	Avionics Systems	1086	1226	1777	2934	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Project DC96 provides engineering development of the Integrated Inertial Navigation System (IINS) AN/ASN-132, which will significantly improve the navigation capability of Special Electronic Mission Aircraft (SEMA) by providing increased reliability and accuracy during surveillance, reconnaissance, and target acquisition missions. Project DC97 provides for engineering development leading to production of avionics equipment. The goal is to provide aircraft subsystems and ground equipment that improve mission performance of tactical helicopters and special mission aircraft operating in an anticipated enemy air defense and electronic warfare environment. Near-term effort is directed at the fielding of a joint Army/Air Force Single Channel Ground-Airborne Radio System (SINCGARS) compatible AN/ARC-186 aircraft radio system (including conformal multiband communications antenna). This will provide tactical forces with an improved long-term, air-to-air, and air-to-ground-to-air, jam-resistant, very high frequency (VHF) communication capability that will allow the Army and Air Force to accomplish their missions in an enemy jamming environment. Also, the need for a TEMPEST secure intercom capability is being addressed through development of the Communication System Control C-10414()/ARC, which will have application in production aircraft. Major emphasis is placed on the development of tri-Service standardization of subsystems and components by way of the Joint Services Review Committee (JSRC).

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	10602	3789	2283	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	11503	3799	20302	Continuing	Not Applicable

Program Element: #64201A Title: Aircraft Avionics

DOD Mission Area: #357 — Navigation and Position Fixing Budget Activity: #5 — Intelligence and Communications

FY 1992 $901 thousand decrease necessitated postponement of contract award for a conformal multiband antenna system. FY 1993 decrease of $10 thousand is a share of general Congressional reductions to the RDTE,A appropriation. FY 1994 net decrease of $18,019 thousand is the result of $19,102 thousand decrement from the Joint Tactical Microwave Landing System (JTMLS) and an increase of $1100 thousand for continuation of the DADS. JTMLS was zeroed following Congressional action on this project. The remaining decrease of $17 thousand is primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The AN/ASN-132 architecture utilizes standard components developed by the Air Force and Army (Air Force standard Inertial Measuring Unit, Multi-Function Control Display Unit, and Army standard AN/UYK-19 Computer) and takes advantage of the large production procurements. Without major redesign, the AN/ASN-132 architecture will allow for possible replacement of the Tactical Navigation System (TACAN) with Global Positioning System (GPS) user equipment for the external reference update function. The AN/ARC-186 modification is a joint Army/Air Force program. The modified AN/ARC-186 radio will allow interoperability with SINCGARS ground ECCM capable radios. A conformal multiband communications antenna is also being developed for compatibility with multiband airborne radios as well as ground SINCGARS-V Radios. A memorandum of understanding (MOU) was approved in October 1992 between the SINCGARS Program Manager (PM) and the Avionics Research and Development Activity (AVRADA) designating AVRADA with responsibility for supporting the PM technically for the AN/ARC-186 modification within the Army. AVRADA is assisting in preparing a draft MOU between the USAF and PM SINCGARS concerning Army modification to the AN/ARC-186. JSRC was established in December 1980 to formally encourage and support the development of multi-Service black box standardization efforts. Related programs of the other Services, the Federal Aviation Administration and other countries are monitored by the Army through committees and working groups (e.g., Air Standardization Coordinating Committee, Working Party 53; Air Force Standardization Panel; Quadripartite Program/Quadripartite Working Group on Aviation; Tri-Service Airborne Multiplex Committee; Advisory Group for Aerospace Research and Development (AGARD), Avionics Panel, Guidance and Control Panel). This program element is related to program elements: #63221A (Aircraft Navigation & Control Equipment), #63207A (Aircraft Avionics Equipment), #62202A (Aircraft Avionics Technology). There is no unnecessary duplication of effort within the Army or Department of Defense.

F. (U) WORK PERFORMED BY: Litton System, Woodland, CA; Collins Radio, Cedar Rapids, IA; Telephonics Corporation, Huntington, NY; US Army Avionics Research and Development Activity, Fort Monmouth, NJ.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1994:

Program Element: #64201A Title: Aircraft Avionics

DOD Mission Area: #357 — Navigation and Position Fixing Budget Activity: #5 — Intelligence and Communications

1. (U) DC96 — Aircraft Navigation and Control Systems: This project provides engineering development of the Integrated Inertial Navigation System (IINS) AN/ASN-132, to effectively support the missions of surveillance, reconnaissance, and target acquisition during all types of conditions including enemy electronic countermeasures efforts. The IINS is required in direct support of the Quick Fix program in EH-60 aircraft and is planned for use in other Special Electronic Mission Aircraft (SEMA) missions in the OV-1D/E, RC-12, and JVX aircraft. In FY 1982, completed installation of Integrated Inertial Navigation System (IINS) AN/ANS-132 prototype model in YEH-60A aircraft. Initiated a contract for the integration of IINS in two UH-60A aircraft, including a test support package. The FY 1983 plan is to complete computer software specifications and conduct DT II/OT II of the IINS. The production procurement package will be initiated. The FY 1984 plan is to convene a development acceptance in-process review for the IINS and refurbish four engineering development models for the Quick Fix program (early production EH-60A aircraft) and initiate production contracts.

2. (U) DC97 — Avionics Systems: This is an engineering development project which provides the basis for the future production of aviation electronics equipment and systems for Army aviation. Near-term developments include the modified AN/ARC-186 airborne radio, communications system control C-10414()/ARC, and tri-Service standardization of avionic components and subsystems. In FY 1982, completed design of Communications System Control (CSC) C-10414()/ARC. Prepared for an FY 1983 contract for an airborne conformal multiband antenna system compatible with frequency-hopping radio sets AN/ARC-186 and AN/ARC-164. The FY 1983 plan is to complete Communications System Control C-10414()/ARC and conduct an In-Process Review for production approval. Award engineering development contract for conformal airborne communications antenna for multiband radios. Monitor the Air Force AN/ARC-186 program which will include Army aviation requirements of SINCGARS-compatible electronic counter-countermeasures, data and secure capabilities. The Joint Services Review Committee (JSRC) efforts include finalization of tri-Service specifications for an Attitude Heading Reference System (AHRS), Flight Data Recorder (FDR), and Digital Audio Distribution System (DADS). FY 1984 plan—Continue contract for the conformal airborne communications antenna and initiate Government testing. Monitor JSRC engineering development contract and begin hardware qualification testing. Monitor Air Force ARC-186 contract and participate in contractor hardware testing.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64716A** Title: **Mapping and Geodesy**

DOD Mission Area: **#357 — Navigation and Position Fixing** Budget Activity: **#5 — Intelligence and Communication**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	325	- 0 -	- 0 -	- 0 -	Not Applicable	Not Applicable
D579	Field Army Mapping Service	325	- 0 -	- 0 -	- 0 -	Not Applicable	Not Applicable

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: Army topographic support missions, capabilities, and requirements have become more complex and more critical to successful battlefield operations. Traditional topographic support places primary emphasis on providing topographic maps to combat commanders. Because of a current need to thoroughly see the battlefield, commanders require and demand terrain information/intelligence beyond that portrayed on standard maps. Equally important, advances in materiel system technology in areas such as siting, targeting, and effects analysis have stimulated use of various additional aspects of the terrain. Consequently, significant efforts reorienting Army topography are being accomplished. This program element addresses the engineering development and testing of materiel for rapid acquisition, processing, and dissemination of topographic maps, digital topographic elevation data, and position location data in the field Army in direct support of tactical deployment of forces and weapon system operation. The program element provides the necessary follow-on engineering development of the systems and equipment originating in Program Element 63712A, including the field Army's Digital Topographic Support System (DTSS), an Azimuth Determining Device, a FIREFINDER Digital Elevation Data Dubbing Facility, and the Quick-Response Multicolor Printer, which will be integrated into the DTSS.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: This program has been deferred until the Advanced Development program proceeds to a transition stage into Engineering Development. A valid requirement still exists for ultimate fielding of the digital topographical capability and the Army intends to develop such a system. The transition into Engineering Development is currently planned for FY 1986.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#64778A**

Title: **NAVSTAR Global Positioning System (GPS) User Equipment**

DOD Mission Area: **#357 — Navigation and Position Fixing**

Budget Activity: **#5 — Intelligence and Communications**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7000	11877	5880	12802	25350	198370
D168	NAVSTAR GPS Equipment	7000	11877	5880	12802	25350	198370

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Traditionally, precise positioning and navigation (POS/NAV) requirements of the Army have been satisfied by a multitude of specialized equipment responsive to particular mission requirements. The result has been a proliferation of POS/NAV systems with varying degrees of accuracy and capabilities. The operations and maintenance costs for these facilities and user terminals represent a large expenditure of funds each year. If the Army is to increase its effectiveness on a highly mobile battlefield, it must be able to navigate and determine the position of its weapons systems and fighting units under conditions of adverse weather, day or night, in all environmental conditions, worldwide. The NAVSTAR Global Positioning System (GPS) will provide the Army an increased capability at an expected significant reduction in life cycle cost with respect to present systems. GPS will consist of 18 satellites, a satellite control segment, and user equipment sets in fighting and administrative vehicles, airplanes and helicopters, on manpacks, and on ships. The system will provide global, highly accurate information which will satisfy a significant portion of Army navigation and positioning missions. This is a joint program. The Air Force is developing and procuring the satellites and space segment, and the Services are jointly developing a family of user equipment to satisfy joint Service needs.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	7000	11877	5880	38152	198370
Funds (as shown in FY 1983 submission)	- 0 -	11911	4773	Continuing	Not Applicable

Program Element: #64778A

Title: NAVSTAR Global Positioning System (GPS) User Equipment

DOD Mission Area: #357 — Navigation and Position Fixing

Budget Activity: #5 — Intelligence and Communications

1. (U) The funds increase of $7000 thousand in FY 1982 is the result of Congressionally approved reprograming to permit continuation of Army development of user equipment. FY 1983 decrease of $24 thousand is due to a pro rata application of general Congressional reductions to the RDTE,A appropriation. The FY 1984 increase of $1107 thousand is due to program realignment within NAVSTAR Global Positioning System (GPS).

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army						
Funds (current requirements)	- 0 -	- 0 -	2400	1600	18700	22700
Quantities	- 0 -	- 0 -	57	33	520	610
Aviation Procurement, Army						
Funds (current requirements)	- 0 -	- 0 -	- 0 -	17200	To Be Determined	To Be Determined
Quantities	- 0 -	- 0 -	- 0 -	260	To Be Determined	To Be Determined

E. (U) RELATED ACTIVITIES: This is a joint program, participated in by all the armed services. The Air Force is the Executive Agent for NAVSTAR. Funding for user equipment is located in Program Elements #64778F, #64777N, and #64719M (NAVSTAR-GPS User Equipment). Phase II space and control segments are also funded by Program Element #64778F (NAVSTAR-GPS). The program manager for the Joint Program coordinates the supporting activities of the Army, Navy, Air Force, Marine Corps, Defense Mapping Agency, and NATO through his respective Service and NATO deputies to provide cohesive and complementary development, test, and evaluation of NAVSTAR GPS, and to ensure that duplication of effort does not occur.

F. (U) WORK PERFORMED BY: Development contracts for the joint Service user equipment were awarded in 1979 to Magnavox, Torrance, California, and to Rockwell/Collins, Cedar Rapids, Iowa. Internal Army program support and development is provided by the US Army Communications-Electronics Command (CECOM) at Fort Monmouth, New Jersey.

Program Element: **#64778A** Title: **NAVSTAR Global Positioning System (GPS) User Equipment**

DOD Mission Area: **#357 — Navigation and Position Fixing** Budget Activity: **#5 — Intelligence and Communications**

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D168 — NAVSTAR GPS User Equipment. This joint Service project develops and procures NAVSTAR-GPS user terminals for land, air, and sea platforms. The Army platforms in the project are the manpack, UH-60 helicopter, and M60 tank versions. The ability to precisely position friendly forces and fires relative to one another and with respect to enemy forces is fundamental to the successful accomplishment of military operations. The present proliferation of specific-purpose POS/NAV systems provides a widely varied accuracy of navigation on the battlefield, and is extremely wasteful of operations and support funds required to maintain them. The objective of NAVSTAR GPS is to provide precision navigation information for all types of military operations, day or night, in any weather, anywhere on the earth. When the entire constellation of 18 satellites is functional, GPS will be able to provide positioning information accurate to 16 meters (spherical error probable) and velocity information accurate to 0.1 meters/second. In addition to the actual user terminals, this program will develop and procure the installation/integration methodology and material to enable this equipment to be properly mounted and used in land forces vehicles, aircraft, and other platforms. It will also develop test equipment required to ensure continued proper operation of the user equipment. With the approval of the Congress, the Army reprogramed $7 million in FY 1982 into the NAVSTAR GPS program to enable continued Army participation in the user equipment development. Advanced prototype models were informally tested at Yuma (Arizona) Proving Ground. In FY 1983, full-scale development of the user equipment will continue. Deliver first prototype sets and begin Development/Operational testing on Army platforms, specifically the M60 tank, and the UH-60 helicopter. The manpack will also be delivered. In FY 1984, the Army will complete full-scale development and Development Testing II. A Defense Systems Acquisition Review Council (DSARC) will be held to approve user equipment production. Source selection will be conducted based upon outcome of testing, with the objective of awarding a production contract in late FY 1984. The program will continue to support user equipment development, operational testing, and system improvements.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

Program Element: #64778A

Title: NAVSTAR Global Positioning System (GPS) User Equipment

DOD Mission Area: #357 — Navigation and Position Fixing

Budget Activity: #5 — Intelligence and Communications

I. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. (U) During Phase I, the GPS concept was validated using eleven different host vehicles. The following parameters were verified: system accuracy, helicopter rotor blade modulation, ionospheric/tropospheric correction, foliage attenuation, signal levels and structure, acquisition and reacquisition time, multipath rejection, satellite clock accuracy, satellite ephemeris accuracy, time transfer, effects of vehicle motion. These parameters were examined in test employing these operational modes: precision weapon delivery, approach to landing, nap-of-the-earth flight, cross-country navigation, rendezvous, shipboard operations, static positioning, photomapping, combined operations. Satisfactory performance was achieved. The only deficiency, prototype reliability, is being corrected.

b. (U) User Segment Joint Service Development Test and Evaluation (DT&E) continues in Phase II, Full-Scale Development. The GPS manpack, vehicular, and aircraft user equipment tested will be prototypes of the production equipment. A total of 34 User Equipment sets with associated support equipment from each contractor will be tested by the Army in Phase II. In-plant testing to evaluate the design began in December 1981 and will end in March 1983. Vehicle tests in Feb 83 will verify host vehicle/user equipment compatibility. The vehicle tests will be performed on a UH-60 helicopter at Lakehurst, NJ, and on an M60 tank at Yuma Proving Ground, AZ. Starting in Mar 83. DT&E will be conducted to assess whether the required systems performance has been achieved. Most of the individual service test objectives will be combined into Joint Service DT&E requirements. An independent Army DT II will evaluate the suitability of the design for Army deployment.

c. (U) COL J. Reynolds (USAF) is the Joint Service Program Manager. He is supported by the Technical Support Contractor — Aerospace Corporation, El Segundo, CA. The developing contractors are: Rockwell Collins Division, Cedar Rapids, IA, and Magnavox Advanced Products Division, Torrance, CA. Testing will be accomplished by the US Army Test and Evaluation Command (USATECOM), US Army Operational Test and Evaluation Agency (USAOTEA), US Air Force Test and Evaluation Center (USAFTEC), US Navy Operational Test and Evaluation Force (OPTEVFOR), and the US Marine Corps Operational Test and Evaluation Agency (USMCOTEA). The DT&E test sites are: Cold Regions Test Center, AK, Yuma Proving Ground, AZ, China Lake NAF, CA, Carswell AFB, TX, Nellis AFB, NV, White Sands Army Missile Range, NM, US Army Electronics Proving Ground, AZ, Dugway Proving Ground, UT, Tropic Test Center, Panama, Ocean Test Ranges.

d. (U) Logistics support characteristics will be evaluated during Phase II DT&E and Initial Operational Test and Evaluation (IOT&E). The Reliability, Availability, and Maintainability (RAM) requirements vary depending on the type of user equipment set. The mature Mean Time Between (unscheduled) Maintenance (MTBM) actions, is required to be greater than 1000 hours for all sets. The goal is to achieve more than 500 hours MTBM during Phase II. Contractors will provide depot-level support during field DT&E and IOT&E. Military personnel will perform other levels of maintenance.

Program Element: #64778A

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2. (U) Operational Test and Evaluation:

a. (U) The Army is the only Service that conducted operational testing during Phase I. These tests were performed in Jan and Feb 79. No deficiencies were noted. The US Army Operational Test and Evaluation Agency (USAOTEA) judged the GPS user equipment suitable for continuation into the full-scale development phase.

b. (U) During Phase II, Full-Scale Development, NAVSTAR GPS Joint Service IOT&E will be conducted. User equipment IOT&E will be combined with DT&E where practical. Each Service's independent test organization will participate in the Joint Service IOT&E by conducting operational tests on service vehicles. IOT&E objectives include: evaluation of operational effectiveness, operational suitability, military utility, mission performance, supportability, vulnerability, human factors, and doctrine, training, and organization. OT II will be conducted from September through December 1983. The OT II will use prototypes of production equipment from the two competing contractors. Two sets each will be tested on the UH-60 helicopter and the M60 tank. Five manpack sets from each of the contractors will also be tested.

3. (U) System Characteristics:

Operational/Technical Characteristics	Objectives	Demonstrated Performance
Manpack weight	10-14 lbs*	***28.5 lb (DT-I)**
System Accuracy	10M CEP*	11.5M CEP (DT-I)**
Mission Accuracy	10-100M CEP*	91.7M (OT-I)**
MTBF	2000 hrs*	****

* Phase III (Operational) Objective.

** Demonstrated during Phase I with advanced development user equipment and 4 satellite constellations.

*** Manpack not designed to fulfill weight requirement in order to save cost.

**** Size of OT I reliability-availability-maintainability (RAM) data sample did not permit precise analysis. Phase II OT will produce a Full-Scale Development assessment.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #63736A

Title: Non-System Training Devices (NSTD) Development

DOD Mission Area: #430 — Non-System Training Devices

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	796	- 0 -	2407	5437	Continuing	Not Applicable
A115	NSTD Infantry	- 0 -	- 0 -	- 0 -	2672	Continuing	Not Applicable
A224	NSTD Armor/Antiarmor	796	- 0 -	2407	872	Continuing	Not Applicable
A225	NSTD Artillery/Air Defense Engineer	- 0 -	- 0 -	- 0 -	1893	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the Advanced Development of Non-System Training Devices. Non-System Training Devices are developed to provide general military training and training on more than one item/system, as compared with System Devices that are developed in support of a specific item/system. Modern weapons systems are being integrated into the force at unprecedented rates. Arrival of this sophisticated, complex equipment coincides with increased constraints on people, dollars, and time in a training environment where ammunition and fuel costs continue to rise. Training devices and training simulation provide force multipliers that improve combat effectiveness and provide more realistic training while helping to control the rapidly escalating costs. The combat effectiveness of Army personnel is key to both compensating for the numerical superiority of opposing forces and for maintaining a ready force. This combat effectiveness can only be achieved by innovative, efficient, and results-oriented training. The major thrust in the development of new training devices is to develop devices allowing a high transfer of knowledge and experience from the training situation to a combat situation. The Army must train as it is to fight. Improved training devices, now available through modern technology, must continue to be developed to provide the training required to prepare US soldiers to fight outnumbered and win.

C. (U) COMPARISON WITH FY 1993 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1992	FY 1993	FY 1994	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	796	- 0 -	2407	Continuing	Not Applicable
Funds (as shown in FY 1993 submission)	1380	- 0 -	6343	Continuing	Not Applicable

Program Element: **#63738A** Title: **Non-System Training Devices (NSTD) Development**

DOD Mission Area: **#430 — Non-System Training Devices** Budget Activity: **#6 — Defensewide Mission Support**

The decrease in the FY 1982 funding level of $584 represents the realignment of the Armor Remoted Target System from this program element into the Infantry Remoted Target System (Program Element 64715A, Non-System Training Devices Engineering). This realignment combined the two systems into one system for both infantry and armor targets. The decrease in the FY 1984 funding level of $3847 reflects deferral of Non-System Training Devices programs to fund higher priority Army requirements. The remaining FY 1984 reduction of $89 thousand resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Close coordination is maintained with other Services through Training and Personnel Technology Conferences, Topical Reviews, a Joint Service Technical Coordinating Group—Simulators and Training Devices, Department of Defense Simulator Advisory Group, worldwide staffing of training device requirements, and the collocation of the Office of the Project Manager for Training Devices (PM TRADE) and the Naval Training Equipment Center (NTEC). This coordination is designed to preclude any unnecessary duplication of effort. The devices contained in this program have normally progressed to Advanced Development from related Program Element (PE) #627227 (Non-System Training Devices Technology), and normally continue development in PE #64715A (Non-System Training Devices Engineering).

F. (U) WORK PERFORMED BY: In-House activities are performed by the Project Manager for Training Devices (PM TRADE), Orlando, FL, and the Naval Training Equipment Center (NTEC), Orlando, FL. There are no current contracts under this program.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: A224 — Non-System Training Devices—Armor/Antiarmor: The FY 1982 program funded for the completion of development of the Eye Safe Simulated Laser Rangefinder (ESSLR). This device provides eye safe laser rangefinder training for various armor tanks. The item proceeded into procurement upon completion of the advanced development program. During FY 1984 an advanced development effort on the Scaled Range Target System (SRTS) will be initiated. Advanced development prototype of the SRTS will be designed, fabricated, and tested. This program will provide the Army with modularized, subcaliber, tank gunnery training with pop-up and serpentine moving targets that will significantly increase training effectiveness without increasing the amount of tank main gun ammunition expended.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64715A

Title: Non-System Training Devices (NSTD) Engineering

DOD Mission Area: #430 — Non-System Training Devices

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	13179	8624	12833	30205	Continuing	Not Applicable
D237	NSTD Artillery/Air Defense/Engineer	3373	295	1112	8984	Continuing	Not Applicable
D239	NSTD Infantry	2968	1953	- 0 -	- 0 -	Continuing	Not Applicable
D241	NSTD Combined Arms	3420	2482	5131	12003	Continuing	Not Applicable
D572	NSTD Armor/Antiarmor	358	494	2890	5238	Continuing	Not Applicable
D573	Project Manager for Training Devices and Naval Training Equipment Center Support	3060	3400	3700	3960	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the Engineering Development of Non-System Training Devices. Non-System Training Devices are developed to support general military training and training on more than one item/system, as compared with System Devices that are developed in support of a specific item/system. Modern weapons systems will be integrated into the force at an unprecedented rate in the 1980s. Arrival of this sophisticated, complex equipment will coincide with increased constraints on people, dollars, and time in a training environment where ammunition and fuel costs continue to rise. Training devices and training simulation provide force multipliers that can improve combat effectiveness and provide more realistic training while helping to control the rapidly escalating costs. The combat effectiveness of Army personnel is key to both compensating for the numerical superiority of opposing forces and for maintaining a ready force. This combat effectiveness can only be achieved by innovative, efficient, and results-oriented training. The major thrust in the development of new training devices is to develop devices allowing a high transfer of knowledge and experience from the training situation to a combat situation. The Army must train as it is to fight. Improved training devices, now available through modern technology, must continue to be developed to provide the training required to prepare US soldiers to fight outnumbered and win.

Program Element: #64715A Title: Non-System Training Devices (NSTD) Engineering

DOD Mission Area: #430 — Non-System Training Devices Budget Activity: #6 — Defensewide Mission Support

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	13179	8624	12833	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	11253	8645	16054	Continuing	Not Applicable

The increase in the FY 1982 funding level of $1926 thousand represents reprograming to fund additional effort in Project D239 required for the Infantry Remoted Target System (IRETS) to maintain schedule; in Project D237 for the Air Ground Engagement System/Air Defense (AGES/AD) to maintain schedule; in project D572 to correct deficiencies in the Blank Firing Adapter - M240; and offset, in part, by decrease in project D241 to provide funds for higher priority training devices. The funding decrease of $21 thousand in the FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The decrease in the FY 1984 funding level of $2,796 thousand primarily resulted from the deferral of the Army Maintenance Training and Evaluation Simulation System to fund higher priority Army requirements. The remaining FY 1984 reduction of $425 thousand resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army						
Funds (current requirements)	41200	75100	77900	99400	Continuing	Not Applicable

The $800 thousand increase in FY 1982 funding is a result of below threshold reprograming actions to reflect actual pricing data. The decrease of $900 thousand in the FY 1983 funding level reflects a partial deferral of the procurement of the Multiple Integrated Laser Engagement System (MILES) for the M2 and M3 Fighting Vehicle System (FVS) as a source for planned FY 1983 reprograming actions. The decrease of $15400 thousand in the FY 1984 funding level reflects a partial deferral of the procurement of the MILES for the M2 and M3 FVS and the delay in procurement of the

Program Element: #64715A | Title: Non-System Training Devices (NSTD) Engineering

DOD Mission Area: #430 — Non-System Training Devices | Budget Activity: #6 — Defensewide Mission Support

Automatic Weapons Effects Signature Simulator to fund higher priority Army requirements. The remaining FY 1984 reduction of $600 thousand resulted from the application of lower inflation indices. It is not feasible to list the quantities and Military Construction Costs because of the type and quantity of different training devices.

E. (U) RELATED ACTIVITIES: Close coordination is maintained with other Services through Training and Personnel Technology Conferences, Topical Reviews, a Joint Service Technical Coordinating Group—Simulators and Training Devices, Department of Defense Simulator Advisory Group, worldwide staffing of training device requirements, and the collocation of the Office of the Project Manager for Training Devices (PM TRADE) and the Naval Training Equipment Center (NTEC). This coordination is designed to preclude any unnecessary duplication of effort. The devices contained in this program have normally progressed to Engineering Development from related Program Element (PE) #63738A (Non-System Training Devices Development) and/or PE #62727A (Non-System Training Devices Technology). This program also funds an Inter-Service Support Agreement that makes available for Army use the resources of the Naval Training Equipment Center (NTEC), which is collocated with Project Manager for Training Devices (PM TRADE).

F. (U) WORK PERFORMED BY: In-house activities are performed by the Army Armament Research and Development Command, Picatinny Arsenal, Dover, NJ and the Naval Training Equipment Center, Orlando, FL. Primary contractors are Xerox Electro-Optical Systems, Inc., Pasadena, CA, Singer Company (Link Division) Binghamton, NY, and Sperry Support Services, Huntsville, AL.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) D237 — Non-System Training Devices — Artillery/Air Defense/Engineer:** This project is used to develop prototype training devices to support artillery, air defense, and engineer training within the Army. The FY 1982 program was used to complete development of the Air Ground Engagement/Air Defense components of the Multiple Integrated Laser Engagement System for tactical engagement scenarios. The FY 1983 program will be for the initiation of design and development of prototype of the Mine Casualty Assessment Producing System (MICAPS). The effort will continue with completion and testing of MICAPS in FY 1984. The MICAPS will provide realistic mine casualty assessment for tactical engagement exercises.

2. **(U) D239 — Non-System Training Devices — Infantry:** This project is used to develop prototype training devices to support infantry training within the Army. The FY 1982 program was used to continue development of the Infantry Remoted Target System (IRETS). This system will provide an integrated solution to the small arms marksmanship target needs of infantry troops. It will feature automatic control devices, stationary and moving target mechanisms, two- and three-dimensional targets, hostile fire simulators, and hit indicators. This target system will provide a realistic threat scenario and allow a high transfer of training value to a combat situation. The FY 1983 program will complete IRETS development.

Program Element: **#64715A** Title: **Non-System Training Devices (NSTD) Engineering**

DOD Mission Area: **#430 — Non-System Training Devices** Budget Activity: **#6 — Defensewide Mission Support**

3. **(U) D241 — Non-System Training Devices — Combined Arms:** This project is used to develop prototype training devices not related to specific Army systems. In FY 1982 this project funded the development of: (a) The Army Training Battle Simulation System (ARTBASS), which will allow the training of leaders and staffs in command and control to cope with the complex and sophisticated environments they will face on future battlefields. It will incorporate such features as varied terrain, accurate portrayal of both friendly and enemy weapons effects, and diagnostic feedback, while using a minimum number of dedicated controllers; and (b) The Alpha Radiac Training Device for the AN/PDR-56 Radiacmeter, which will allow Alpha and EOD Teams to practice Alpha Radiation monitoring and survey techniques without being exposed to hazardous radiation. The trainer consists of two hot-spot simulators, four minitransmitters, and four simulated AN/PDR-56 Radiacmeters. The simulated radiacmeters will exactly represent the operational equipment in appearance, operating controls, and meter readings. The 1983 program includes development and operational testing and will complete effort on these two programs. In FY 1984, effort in the project will include design and initiation of development of prototypes for: (a) The Automatic Weapons Effects Signature Simulator (AWESS), which is a training device to simulate the firing signature of the Army's full family of machine guns (caliber .50 and 7.62 mm), the 20mm machine cannon, and the 25MM automatic cannon. The devices will be used in lieu of blank ammunition to simulate the visual and aural effects of weapons firing during engagement simulation field exercises; and (b) Signal Intelligence/Electronic Warfare (SIGINT/EW) operator and maintenance trainers. The operator trainers will simulate the operational characteristics of the AN/MLQ-34, AN/ALQ-133, AN/TSQ-114, AN/USD-9, AN/MSQ-103, and TCAC/ASAS/SEWS Systems. The maintenance trainer will provide alignment, fault isolation, and maintenance training for complex computer-based SIGINT/EW systems.

4 **(U) D572 — Non-System Training Devices — Armor/Antiarmor:** This project is used to develop prototype training devices to support armor/antiarmor training within the Army. The FY 1982 program completed development of the Blank Firing Adapter for the M240 Coaxial Machine Gun mounted in the main battle tanks (M60A1/A3, M1, and M48A5), assault reconnaissance vehicles (M551), and Bradley Fighting Vehicles (M2 and M3). In FY 1983 this project will fund the integration efforts to combine the Armor Remoted Target System into the Infantry Remoted Target System. In FY 1984 this project will fund the development of prototype models of the Crew Group Trainer, which is a generic device that will simulate a variety of antiarmor weapon systems.

5 **(U) D573 — Project Manager Training Devices and Naval Training Equipment Center Support:** This project is a continuing project to fund the support of Project Manager Training Devices (PM TRADE) personnel and to fund a portionate Army share of the operating costs of the Naval Training Equipment Center (NTEC). This arrangement is the result of an Inter-Service Support Agreement that is reviewed annually.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #64726A

Title: **Meteorological Equipment and Systems**

DOD Mission Area: **#420 — Global Military Environmental Support**

Budget Activity: **#6 — Defense Wide Mission Support**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6098	2166	5274	3492	Continuing	Not Applicable
D511	Meteorological Data System (AN/TMQ-31)	6098	2166	5274	3492	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Greatly increased ranges of artillery weapon systems currently being fielded and in development will cause projectiles to be exposed to atmospheric effects for increased periods of time. Due to the longer projectile time of flight, errors in excess of 1500 meters can be experienced as a result of moderate weather conditions. In addition, expanded corps and division frontages and the requirement for highly mobile artillery weapon systems demand a mobile, reliable, responsive meteorological sounding system. The present system, the AN/GMD-1, is over thirty years old and nonsupportable. The Air Force does not provide this type of meteorological data. The Meteorological Data System, AN/TMQ-31, is urgently required by the field artillery to assure maximum combat effectiveness. The AN/TMQ-31 is capable of providing weather data hourly for surge periods and every two hours on a routine basis. The data is obtained on one of two channels using either the Navigational Aid (NAVAID) or Radio Direction Finding (RDF) techniques. The system itself is highly mobile and can be set up or moved rapidly. In fact, the system can collect data "on-the-move" when using the NAVAID system. The collected data are processed and placed in the appropriate format automatically by the on-board computer. The AN/TMQ-31's use of digital communications to interface directly with the Tactical Fire Direction (TACFIRE) System permits near-realtime distribution of weather data. The system has also been designed to provide maximum reliability. The AN/TMQ-31 is required to provide the weather corrections necessary to permit the first volley "fire-for-effect" essential to offset the numerical superiority of the threat force.

Program Element: #64726A

Title: Meteorological Equipment and Systems

DOD Mission Area: #420 — Global Military Environmental Support

Budget Activity: #6 — Defense Wide Mission Support

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	6098	2166	5274	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	2099	2172	1776	Continuing	Not Applicable

The funding increase of $4 million in FY 1982 was a result of underestimation of system integration costs. The funding decrease of $6 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The funding increases of $3498 thousand in FY 1984 is a result of developing a system trainer for deployment with the AN/TMQ-31.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army:						
Funds (current requirements)	- 0 -	13600	1800	32900	108800	173300
Quantities (current requirements)	- 0 -	6	12	24	72	114

(U) Reduction of $9300 thousand in the FY 1982 funding level is a result of the restructure of the program and a subsequent delay of procurement. The Army reprogramed these funds into other high-priority requirements. The Army plans to reprogram $9400 thousand back into the program in FY 1983 putting the program back on schedule.

Program Element: #64726A

Title: **Meteorological Equipment and Systems**

DOD Mission Area: **#420 — Global Military Environmental Support**

Budget Activity: **#6 — Defense Wide Mission Support**

(U) Addition of $8200 thousand in FY 1984 funding level is a result of the developer correcting an erroneous cost estimate based on FY 1976 dollars. Estimate has now been updated based on FY 1982 dollars. The difference in quantities reflects the updated cost estimate.

E. (U) RELATED ACTIVITIES: Program Element #61102 (Defense Research Sciences), Project #B53A (Atmospheric Sciences); Program Element #62111 (Atmospheric Investigations); Program Element #63741 (Meteorological Equipment and Systems). Duplication within the Army, Department of Defense, and nonmilitary activities is prevented through coordination. Coordination of requirements for development of meteorological equipment is effected through the US Army Training and Doctrine Command (TRADOC) and US Air Force Air Weather Service Meteorological Equipment Coordination Committee. Coordination on meteorological equipment development with NATO allies is accomplished through participation in Panel XII (Meteorology), NATO Army A naments Group. Coordination with the National Weather Service and nonmilitary organizations developing meteorological equipment for civilian use is accomplished through participation in the Interdepartment Committee for Meteorological Services and Supporting Research (ICMSSR), and the Annual Symposium on Meteorological Observations and Instrumentation, sponsored by the American Meteorological Society.

F. (U) WORK PERFORMED BY: This program is the responsibility of the US Atmospheric Sciences Laboratory, Electronics Research and Development Command (ERADCOM), White Sands Missile Range, NM, with work performed by the Combat Surveillance and Target Acquisition Laboratory, ERADCOM, Ft Monmouth, NJ. Bendix Corporation (Environmental Science Division), Baltimore, MD, is the prime contractor for fabrication of the Engineering Development (ED) prototype models of the AN/TMQ-31.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D511 — Meteorological Data System (AN/TMQ-31): The system will provide reliable, responsive weather data to the battle area. The field artillery urgently requires this system to assure maximum combat effectiveness by increased accuracy of fire support. In FY 1982 the system underwent successful contractor accuracy verification at Wallops, VA. Technical manuals were completed and verified and key individual training completed in preparation of OT II. In FY 1983 Operational Test II will be conducted at Fort Sill, Oklahoma. The system will be type classified and a contract for production will be awarded in FY 1983. In FY 1984 the fielding plan will be completed. The software programing for automated test equipment will be completed and development of the system trainer will continue.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#65102A**

Title: **US Army Training and Doctrine Command (TRADOC) Studies and Analyses**

DOD Mission Area: **#440 — Technical Integration/Studies and Analyses**

Budget Activity: **#6 — Defensewide Mission Support**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1543	1487	1508	3725	Continuing	Not Applicable
M980	TRADOC Studies and Analyses	1543	158	390	2577	Continuing	Not Applicable
M981	Army Model Improvement Program	- 0 -	425	506	533	Continuing	Not Applicable
M982	Army Model Improvement Program — DARCOM	- 0 -	904	612	615	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element finances contract studies and analyses for the US Army Training and Doctrine Command (TRADOC) to investigate specifically defined problems related to materiel systems that require the application of sophisticated analytical techniques and which, when solved, will make substantive contributions to Army planning, programing, and decisionmaking. Department of the Army guidance leads to prioritization of these problems. This program element funds studies and analyses that address high-priority problems requiring capabilities not available in-house and not duplicative of other DOD efforts.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1543	1487	1508	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	1543	3287	3429	Continuing	Not Applicable

The funding decrease of $1800 thousand in FY 1983 is a result of Congressional direction in the FY 1983 Appropriations Act. The funding decrease of $1921 thousand in FY 1984 is a result of realignment of Army priorities.

Program Element: #65102A

Title: US Army Training and Doctrine Command (TRADOC) Studies and Analyses

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The program is coordinated with other Department of the Army Study Programs by the Office of the Chief of Staff of the Army. Inter-Service efforts are coordinated by the Office of the Under Secretary of Defense for Research and Engineering. Prior to initiating a new study, the Defense Technical Information Center is queried to determine if existing studies might answer or provide insight to the question under consideration. Completed studies are filed with the Defense Technical Information Center. Studies that are not in direct support of developmental systems or the development of new tactics or doctrine are funded by the Operations and Maintenance, Army appropriation.

F. (U) WORK PERFORMED BY: Work is done by in-house resources and contract. Contracts include: Jet Propulsion Laboratory, Pasadena, CA; Vector Research, Inc., Ann Arbor, MI; Mitre Corp., McLean, VA; General Research Corp., Santa Barbara, CA; and American Power Jet, Ridgefield, NJ. The TRADOC Integrating centers (i.e., Combined Arms Combat Developments Activity, Soldier Support Center, and Logistics Center) assist Headquarters, TRADOC in formulating the TRADOC Studies and Analyses Program. The TRADOC Service Schools, Integrating Centers and HQ, TRADOC monitor the execution of the program by the contractors. The AMIP effort is managed by the AMIP Management Office at Ft. Leavenworth, KS.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) M980 — TRADOC Studies and Analyses:** Contractual support for the following efforts was initiated or completed in FY 1982: Close Combat (Light) Mission Area Analysis (MAA); TRADOC Reliability, Availability, Maintainability (RAM) Data Evaluation; Strategic Missile Defense, Systems Parametric Analysis of Potential Critical Nodes; Intelligence/Electronic Warfare MAA; Forward Area Directed Energy System, Combat Support, Nuclear, Biological, and Chemical MAA; Data Base Management Concept; and Design of a Combined Arms Taskforce. In addition, the AMIP was supported with funds from the M980 project during FY 1982. In response to HQDA and TRADOC guidance in FY 1983 and FY 1984, MAAs for Combat, Combat Support, and Combat Service Support will be conducted to identify deficiencies in relation to the threat. The MAAs will provide recommendations for solving deficiencies in tactics, doctrine, training, organizations, and materiel requirements. Developmental systems will be analyzed with regard to cost effectiveness to provide information relative to continued development and procurement of new systems. Cost and Training Effectiveness Analyses will be performed in order to determine the preferred solution for training Army personnel in the operation and maintenance of new military systems. Tactics, doctrine, and organizational requirements for Army modernization will be defined and implementation recommendations will be developed.

Program Element: #65102A

Title: US Army Training and Doctrine Command (TRADOC) Studies and Analyses

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

2. (U) M981 — Army Model Improvement Program (AMIP) — TRADOC: This project develops a hierarchy of combat development and training simulations and wargames in response to the continuing requirement for analysis of the battlefield from foxhole through theater operations. The AMIP hierarchy will achieve consistency of functional area representations and is designed for responsive analytical support to decisionmakers. FY 1982 Accomplishments: The development of the battalion-level simulation has progressed through model testing; the corps/division-level model reached final development of the wargame version which included advanced planning for the fully automated version; the theater-level model progressed through the requirements definition stage and has entered into preliminary design. Goals: FY 1983 — Complete testing and place the battalion-level simulation model into production; develop the wargame version of the battalion-level model; complete development and testing, and place the corps-division level wargame into production; continue the automated version of the model; complete development of the theater-level simulation model with selected functional area representations and put the model into production; begin development of a wargame version of the theater model; test the hierarchy concept and demonstrate linkage of models within the hierarchy and confirm interfaces with functional area models; establish a management dialog with training development modelers to expedite the exchange of information between the combat development and training communities. (This represents a new effort by the analytical community to bring model development and training model development under centralized management.) FY 1984 — Continue the refinement of models based on the changing needs of decisionmakers. Provide for configuration control of the hierarchy models. Integrate the changing technology of improved hardware and software development into the hierarchy; continue a directed research effort to gain insight into modeling command and control, service support functions, intelligence fusion processes, directed energy weapons and other systems emerging from expanding technology. It is presumed that threat forces, tactics, and operational concepts will change sufficiently to require that model architectures may need to be updated.

3. (U) M982 — Army Model Improvement Program (AMIP) — (DARCOM): This project supports the US Army Materiel Development and Readiness Command's (DARCOM) development of data bases and communications techniques and the gathering of input data for the Army Model Improvement Program (AMIP). DARCOM provides all (friendly and enemy) item system performance data and characteristics required for AMIP and participates in model development to insure proper representation of item-level system performance. This project provides for the acquisition of data base management software and in-house generation and gathering efforts. This project complements the model developments in Project M981 with the development of consistent supporting data bases for (both blue and red forces) characteristics and performance measures. FY 1982 accomplishments: Matured data structures supporting the model and designed a data management system to expedite the exchange of needed data between the model users and data producers. Data producers were organized to assemble needed blue and red data and operational concepts data responding to model development requirements. Procedures were examined for the initial step in defining a data management system. Goals: In FY 1983 and FY 1984, the activities outlined above will demand increased understanding of performance parameters of new and planned equipment for the Air-Land Battle 2000 period. Data development must keep pace with the model development effort.

Program Element: #65102A

Title: US Army Training and Doctrine Command (TRADOC) Studies and Analyses

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65201A

Title: Aviation Engineering Flight Activity

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5358	5775	6720	7675	Continuing	Not Applicable
D066	Aviation Engineering Flight Activity	5358	5775	6720	7675	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides the necessary mission funds for the US Army Aviation Engineering Flight Activity (AEFA), located at Edwards Air Force Base, CA. AEFA provides the only capability within the Army to conduct engineering flight tests including preliminary airworthiness evaluation of all aircraft, support of required development testing for procurement of new aircraft systems, and airworthiness qualification of certain modifications to existing aircraft. This required testing certifies the aircraft as safe to fly, provides the limits of its tactical flight envelope, and provides essential technical data for evaluation. AEFA also conducts an orientation course that reviews academic fundamentals and flight test techniques to prepare Army aviators for the US Naval Test Pilot School. Funds are included for civilian employee wages and benefits, temporary duty per diem and travel, rents and utilities, contractual services including computer maintenance and housekeeping functions, supplies and materials, and replacement of capital equipment used in flight test data reduction. AEFA is collocated with the Air Force Flight Test Facility and provides the Army a unique capability to perform its own aircraft engineering flight tests.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	5358	5775	6720	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	5432	5791	6714	Continuing	Not Applicable

The FY 1982 decreased funding reflects minor reprograming due to higher priority Army requirements. The FY 1983 decreased funding reflects pro rata application of general Congressional reductions to the RDTE,A appropriation. The FY 1984 increased funding reflects minor restructuring of planned projects and requirements as well as changes in the civilian pay pricing index.

Program Element: #65201A

Title: Aviation Engineering Flight Activity

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defensewide Mission Support

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This activity provides flight test support on a reimbursable basis to agencies such as the US Navy, US Air Force, the United States Forest Service, and the National Aeronautics and Space Administration (NASA) on joint projects such as development of the XV-15 tilt rotor research aircraft, the Rotor Systems Research Aircraft (RSRA), and support of the space shuttle landings at Edwards Air Force Base, CA. These activities are joint in nature and are managed through Memorandums of Understanding. There is no unnecessary duplication of effort.

F. (U) WORK PERFORMED BY: United States Army Aviation Engineering Flight Activity, Edwards Air Force Base, CA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D066 — Aviation Engineering Flight Activity: The purpose of this project is to conduct engineering flight testing of Army aircraft being developed or procured. This includes Development Test I and II, flight tests to evaluate vehicles incorporating advanced concepts with potential military application, and tests to determine the airworthiness of proposed engineering change proposals or modifications to existing aircraft systems. Engineering flight testing consists of precision flight to collect airborne data to be used for engineering evaluation and includes such items as aircraft performance, structural integrity, and handling qualities. The data are normally collected using a specially designed and installed data acquisition package. Data from the flight testing are required as a basis for the US Army Aviation Research and Development Command (AVRADCOM) Statement of Airworthiness Qualification, which assures compliance with pertinent design standards. In FY 1982, USAAEFA completed 24 test projects which required 472 flight test hours and 748 test support hours. Among the major test programs accomplished were the Airworthiness and Flight Characteristics (A&FC) Part II and Part III, climatic laboratory evaluation and contractor icing evaluation of the AH-64; the UH-60A icing evaluation with unprotected blades; an OV-1 antideice system improvements evaluation; a UH-60A flight evaluation of alternate test techniques for determining stability derivatives (Rotorcraft Systems Integration Simulator); a continuing evaluation of the XV-15 Tilt Rotor; an evaluation of the William's Aerial System Platform (WASP II); a qualification of the improved Helicopter Icing Spray System (HISS) with an additional auxiliary power unit (APU) installed; support of the Bell 214ST and the Sikorsky S-76 commercial helicopter icing programs; and support of the landings of the space shuttle "Columbia" at Edwards Air Force Base, CA. FY 1983 major test programs are expected to include an A&FC for the CH-47D; several preliminary airworthiness evaluations (PAE) for the UH-60A: Expanded Gross Weight and Center-of-Gravity Evaluation, Pitot Static System Evaluations, External Stores Support System (ESSS) Evaluation; the AH-64 icing evaluation; a commercial helicopter icing evaluation; an OV-1 Takeoff and Landing Performance Evaluation; and a UH-1H pneumatic boot evaluation. FY 1984 major test programs are expected to include an evaluation of the Army Helicopter Improvement Program (AHIP) test vehicle; a UH-1H fiberglass rotor blade evaluation; an icing evaluation of the YEH-60A "Quick Fix" Helicopter; and an HH60D Helicopter Engineering evaluation. Also anticipated are continuing tests of rapid deployment force modifications to various fielded aircraft.

Program Element: #65201A

Title: Aviation Engineering Flight Activity

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defensewide Mission Support

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65301A

Title: Kwajalein Missile Range

DOD Mission Area: #461 — Major Ranges and Test Facilities

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	139351	151706			Continuing	Not Applicable
D614	Kwajalein Missile Range	139351	151706			Continuing	Not Applicable

* Non-Security Exemption

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Kwajalein Missile Range (KMR) is a national range whose principal missions are to support Air Force Intercontinental Ballistic Missile (ICBM) development and operational testing, Ballistic Missile Defense (BMD) development and testing, and KMR is the only range in the free world where ICBMs can be fired to full range in a tactical configuration with sophisticated technical data collection during the terminal portion of the trajectory. These trajectory data are required by the Army's BMD program to support systems development, test, and validation. Locating BMD experiments on KMR has a synergistic effect since both the strategic offensive and defensive programs benefit. It is also our only range where BMD interceptors can be tested against full-scale ICBM targets. In addition to the support of weapons system development programs, KMR collects data on

C. (U) COMPARISON WITH FY 1993 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1992	FY 1993	FY 1994	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	139351	151706		Continuing	Not Applicable
Funds (as shown in FY 1993 submission)	139351	152140		Continuing	Not Applicable

* Non-Security Exemption

Program Element: #65301A

Title: Kwajalein Missile Range

DOD Mission Area: #451 — Major Ranges and Test Facilities

Budget Activity: #6 — Defensewide Mission Support

The funding decrease of $434 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation act. The FY 1984 reduction of $7679 thousand resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army:						
Funds (current requirements)	3358	- 0 -			Continuing	Not Applicable

* Non-Security Exemption

This paragraph was "not applicable" under the FY 1983 Congressional Descriptive Summary due to administrative error. The FY 1984 estimate in this submission includes projects for a Multi-Purpose Recreational Center (Kwajalein), Photo Lab Waste Water Treatment Plant (Kwajalein), a Missile Assembly Building (Omelek), and a Live Explosive Storage Facility (Omelek); the latter two were initially programed in FY 1983 and subsequently deferred to FY 1984. The FY 1985 program contains a single project entitled Erosion Control.

E. (U) RELATED ACTIVITIES: There are no related activities. No other DOD facility duplicates capabilities available at KMR.

F. (U) WORK PERFORMED BY: Contractors are: Global Associates, Oakland, CA; Kentron International, Dallas, TX; Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA; Radio Corporation of America, Moorestown, NJ; GTE Products Corporation, Needham Heights, MA; and three other contractors with contracts totaling an additional $6.5 million. KMR is managed by the Ballistic Missile Defense Systems Command, Huntsville, AL.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

Program Element: #65301A

Title: Kwajalein Missile Range

DOD Mission Area: #451 — Major Ranges and Test Facilities

Budget Activity: #6 — Defensewide Mission Support

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D614 — Kwajalein Missile Range**

a. **(U) Project Description:** The Army and Air Force have programs planned which have significant test and data-gathering requirements at KMR. Air Force programs require firing at ICBM range with complete data collection during terminal trajectory. Army programs require range sensors to collect technical data in support of BMD experiments being conducted at KMR. These test data cannot be obtained except through the use of technical facilities available on and in the vicinity of KMR. Data collection support

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** KMR supported the Strategic Air Command (SAC) Minuteman operational and training tests and the Ballistic Missile Office (BMO) Advanced Maneuvering Reentry Vehicle (AMARV) firing program. Army programs supported were the BMD Designating Optical Tracker (DOT), Air Launch Probe System (ALPS), and the Systems Technology Reentry Experiment (STREP). After an extensive modification program, the ALTAIR radar successfully completed a systems verification test demonstrating its capability to track both near-earth and deep-space satellites. The C-7A Sonobouy Missile Impact Location System (SMILS) and Terminal Area Support Aircraft (TASA) development programs were completed which extends the data-gathering capability into the Broad Ocean Area (BOA) to support MX test programs.

(2) **(U) FY 1983 Program:** SAC Minuteman operational test programs continue at the FY 1982 level. BMO initiates MX testing in the BOA, and a Large Ballistic Recovery Vehicle (LBRV) firing mission is scheduled. The ALTAIR radar will operate as a contributing sensor to the Space Detection and Tracking System (SPADATS) by detecting, tracking, identifying, and cataloging all manmade objects in space The BMD Homing Overlay Experiment (HOE) is a new test program at the range, and KMR will continue support to STREP. Major Improvement and Modernization (I&M) projects include the replacement of the ALTAIR UHF transmitter and the TRADEX computer, upgrades to the Telemetry Data Recorders, and acquisition of a Mobile Optical Tracker. An Interim Use Agreement (IUA) covering three years or until the Compact of Free Association is ratified, whichever occurs first, was signed by the Republic of the Marshall Islands and the US Government on 20 October 1982, ending a four-month demonstration by Marshallese landowners. Payments under the IUA total $32.5 million over the three-year period.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** The MINUTEMAN and MX mission workload and limited support will be provided NASA's Space Transportation System. Planned I&M projects include initial funding of a joint Service acquisition of a Multiple Object Tracking Radar, safety system augmentations, and continued effort on the Kiernan Reentry Measurement Site computer and software replacements. Effort initiated in previous years to reduce the backlog of base maintenance and repair projects will continue.

Program Element: #65301A

Title: Kwajalein Missile Range

DOD Mission Area: #451 — Major Ranges and Test Facilities

Budget Activity: #6 — Defensewide Mission Support

(4) (U) **Program to Completion:** This is a continuing program.

c. (U) **Major Milestones:** Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65702A

Title: Support of Development Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defense Wide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	36068	42063	50382	61025	Continuing	Not Applicable
DE95	Cold Regions Test Center	5869	6238	6591	7325	Continuing	Not Applicable
DE96	Tropic Test Center	3308	3578	3839	4273	Continuing	Not Applicable
D026	Test Design and Evaluation	3650	4513	4969	6302	Continuing	Not Applicable
D127	Meteorological Support to RDTE Activities	6338	9713	16076	17578	Continuing	Not Applicable
D204	Field Smoke Assessment	2380	2205	2196	2238	Continuing	Not Applicable
D575	R&D Field Support Activity	222	220	246	262	Continuing	Not Applicable
D618	Aviation Development Test Activity	7982	8329	9085	10161	Continuing	Not Applicable
D621	USA Test Facilities Register	326	284	295	327	Continuing	Not Applicable
D623	TECOM Instrumentation Development	4010	4377	4048	9020	Continuing	Not Applicable
D625	TECOM Test Methodology	1963	2606	3037	3539	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This element comprises ten projects, all of which support the Army's development testing effort. The US Army Cold Regions Test Center, Fort Greely, AK, and the US Army Tropic Test Center, Fort Clayton, CZ, are operated and maintained under Projects DE95 and DE96, respectively. These test centers determine the effects of extreme natural environments on the man-materiel interface, and represent the Army's capability for testing materiel under conditions of cold, hot, and tropic natural environments. The Aviation Development Test Activity, Fort Rucker, AL, performs development and product improvement tests of aircraft and aircraft components. Project D623, US Army Test and Evaluation Command (TECOM) Instrumentation Development, and Project D625, TECOM Test Methodology, provide indispensable support to TECOM's testing mission. Project D621, US Army Test Facilities Register, finances establishment and maintenance of an overall test facility and instrumentation register by TECOM. Project D127 provides meteorological support to White Sands Missile Range, 12 other permanent sites, and various temporary sites. Project D026, Test Design and Evaluation, provides funding for the US Army Materiel Systems Analysis Activity to design test plans and evaluate test results for major and designated nonmajor systems. Project D204, Field Smoke Assessment, finances smoke tests (smoke weeks) to acquire data relating to effectiveness of obscurant-generating systems and performance of electro-optical (EO) devices operating in obscured battleground environments; provides data for Army combat simulations; and supports development of new and improved instrumentation/

Program Element: #65702A | Title: Support of Development Testing

DOD Mission Area: #454 — Other Test and Evaluation Support | Budget Activity: #6 — Defense Wide Mission Support

methodology for characterization of smoke obscurants. Project D575, R&D Field Support Activity, provides direct liaison to resolve materiel problems related to test support activities at the National Training Center, Fort Irwin, CA.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	36068	42063	50382	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	36635	43180	56377	Continuing	Not Applicable

The funding decrease of $567 thousand in FY 1982 is a result of two types of adjustments: minor differences between actual costs of program execution and prior year estimates; and reprograming to meet higher priority Army requirements. The funding decrease of $1117 thousand in FY 1983 is a result of two adjustments as follows: reprograming of funds for High Technology Light Division ($1000 thousand); and pro rata application of general Congressional reductions to the RDTE,A appropriation ($117 thousand). The funding decrease of $5995 thousand in FY 1984 is a result of reduced funding allocations for modernization of meteorological support equipment and aviation development test facilities, and for TECOM instrumentation development, partially offset by revised civilian pay pricing indices.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This program, with its emphasis on support of development testing, is closely related to: Army materiel development activities; development test (DT) activities of the US Army Test and Evaluation Command (TECOM) funded by Program Element (PE) #65804A (DARCOM Ranges and Test Facilities); and testing activities of the US Army Operational Test and Evaluation Agency (OTEA) and the US Army Training and Doctrine Command (TRADOC) funded by PE #65712A (Support of Operational Testing). Instrumentation and test methodology are developed under PE #65702A for the ranges and test facilities funded by PE #65804A. The Army Staff directs close and continuous coordination between agencies responsible for development, test, and use of materiel items, to insure greatest possible effectiveness of Army testing activities and to avoid duplication of instrumentation development efforts. The Office of the Director of Defense Test and Evaluation carefully reviews the management, operation, and maintenance of all Department of Defense test facilities and planned testing programs to avoid unnecessary duplication, to insure that the highest priority capabilities are established expeditiously and suitably maintained, and to insure integration of testing by the Services. Whenever possible, related technology development/application efforts of other DOD agencies are used to advantage. Projects DE95, Cold Regions

Program Element: #65702A

Title: Support of Development Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defense Wide Mission Support

Test Center, and DE96, Tropic Test Center, are two of the three Army installations or activities responsible for natural environmental testing. The third is the desert climatic test center located at Yuma Proving Ground (YPG), AZ.

F. (U) WORK PERFORMED BY: Approximately 80 percent of the effort is performed in-house by military and civilian personnel; the rest is performed by contractors. Major contractors include: FBA/Wilsyk, Inc., Anchorage, AK; Contract Services, Panama, Republic of Panama; Northrop World-Wide Aircraft Services, Fort Rucker, AL; University of Tennessee Space Institute, Tullahoma, TN; Physical Sciences Laboratory, New Mexico State University, Las Cruces, NM; GEO Atmospheric Corporation, Lincoln, MA; Radian, Austin, TX.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DE95 — Cold Regions Test Center:** This project provides for the operation and maintenance of the US Army Cold Regions Test Center (CRTC), Ft Greely, AK (formerly the US Army Arctic Test Center). Missions include planning, conducting, and reporting on cold region, mountain, and northern environmental phases of developmental tests and other types of tests. The CRTC maintains a technical base consistent with testing requirements through an improvement and modernization program that includes acquisition of new capabilities for testing of advanced weapon systems; efficiency improvements (e.g., automation to reduce test costs or manpower); and replacement of obsolete instrumentation. Equipment tested in FY 1982 included: smoke rounds; fuel-dispensing equipment; and cold weather clothing. During FY 1982, range and test facility improvements included procurement of data collection and analysis equipment and an Electro-Optical Data Acquisition System. Scheduled tests for FY 1983 include: Bradley Fighting Vehicle, M2; Small Unit Support Vehicle; Military Skis; and Heavy Expanded Mobility Tactical Truck. Scheduled FY 1984 tests include: M1 Abrams Tank; Light Armored Vehicle; Jet Exhaust Decontamination System; SGT York Air Defense Gun System; and Modular Pack Mine System. Further improvement and modernization of ranges and facilities will be accomplished in FY 1983 and 1984 to include ADP equipment and automation of data collection, remote field instrumentation, and electro-optical equipment.

2. **(U) DE96 — Tropic Test Center:** This project finances the operation and maintenance of an environmental test facility for testing equipment in a natural tropic environment in a manner similar to the way CRTC is operated. Equipment tested in FY 1982 included: NAVSTAR Global Positioning System; XM11 Simulator, Projectile Airburst, Liquid; XM137 Dispenser and Chemical Agent, Simulant; Tank, Collapsible, 20,000 gal; Battle Dress Uniform; 120mm Cartridges; Shillelagh Missile; TOW Missile (10-Year Surveillance Test); Stinger Guided Missile System; Patriot Missile Round (Storage Reliability); Materials (Tropical Exposure); and battlefield obscurants. Instrumentation procurement actions provided for the capability to maintain surveillance testing and for automation of data acquisition and analysis. Scheduled FY 1983 test workload includes: 120mm tank Ammunition, Hawk Decoy; VIPER Improved Light Antitank Assault Weapon; Hellfire Missile; 15kW Silent Lightweight Electric Energy Plant; and Hybrid Collective Protection Equipment. Scheduled FY 1984 test workload includes: 120mm Gun System; Jet Exhaust Decontamination System; Hellfire Stockpile

Program Element: #65702A

Title: Support of Development Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defense Wide Mission Support

Reliability Program; Individual Decontamination System; and Water Testing Kit, Chemical Agents, XM272. Further improvement and modernization of ranges and facilities will be accomplished in FY 1983 and 1984.

3. (U) D026 — Test Design and Evaluation: This project provides funds to the US Army Materiel Systems Analysis Activity (AMSAA) for independent design of development tests and for subsequent independent analyses and evaluations of the results of these tests. These evaluations contribute to decisions on all major US Army Materiel Development and Readiness Command (DARCOM) materiel acquisitions (e.g., Advanced Attack Helicopter, MI Abrams tank, and Patriot missile system) and selected nonmajor acquisitions. AMSAA has been allocated 63 civilian spaces for this purpose. Each test design is fully coordinated with the primary agencies involved in that materiel acquisition including the US Army Test and Evaluation Command (TECOM), US Army Operational Test and Evaluation Agency (OTEA), the project manager, and contractors. Consideration is given to test sample size, duration, costs, and risks and how they interrelate in the decisionmaking process. AMSAA makes assessments of all factors pertinent to the materiel acquisition decision process, including contractors' data, development test (DT) and operational test (OT) results, producibility, life cycle cost, and logistic factors. During FY 1982, AMSAA completed nine Independent Evaluation Plans (IEPs), fifteen Test Design Plans and fourteen Independent Evaluation Reports (IERs). Some systems for which evaluations are currently scheduled in FY 1983 include: M1 Tank; SGT York (DIVAD); PATRIOT; 181mm Mortar and Ammunition; and 8" Howitzer Guided Projectile. FY 1984 funding will provide for continuation at the same level of effort. Program monitoring will continue on approximately 60 systems. Some systems to be evaluated are: M1E1 Tank; Gun and Ammunition, 120mm; Light Antitank Alternatives; product improvement of the AH-64 Target Acquisition Designation Sight; M1 power train durability; PATRIOT follow-on evaluation; and the 9mm pistol.

4. (U) D204 — Field Smoke Assessment: This project finances smoke tests (Smoke Weeks) to acquire data relating to effectiveness of obscurant-generating systems and vulnerabilities of electro-optic (EO) devices to smoke and obscurant countermeasures, under analytically characterized obscured environments. It also provides data for Army computer modelers, and supports development of new and improved instrumentation/methodology for characterization of smoke obscurants and determining effectiveness of EO items in obscured battlefield environments. Accomplishments for FY 1982 include conduct of Smoke Week IV, involving over 20 different E/O Systems, conduct of NATO Project Group (PG) 16 anti-infrared smoke grenade trials, conduct of Smoke Symposium VI, and initiation of a computer-stored data base. Plans for FY 1983 include: conduct NATO Project Group (PG) 16 anti-infrared smoke grenade trials; conduct field tests for "smart" guidance system, high-energy laser systems, and target acquisition systems; conduct Smoke Symposium VII; and update the computer-stored data base. Projections for FY 1984 are to: conduct an assessement of E/O systems in a winter environment (SNOW II); conduct Smoke Symposium VIII; develop methods to "dynamically evaluate" E/O systems and charactertze E/O performance in an arid environment; and maintain the computer-stored data base.

Program Element: #65702A

Title: Support of Development Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defense Wide Mission Support

5. (U) **D675 — R&D Field Support Activity:** This project provides for accomplishment of several functional support activities to support DARCOM research and development programs, such as resolving materiel problems related to test activities conducted at the National Training Center, Fort Irwin, CA. This includes fixed and recurring costs, such as salaries, travel, and tenant overhead charges. FY 1983 and FY 1984 activities will continue at the same level of effort as in FY 1982.

6. (U) **D618 — Aviation Development Test Activity:** This project provides for the fixed and recurring costs of the US Army Aviation Development Test Activity (AVNDTA), Ft Rucker, AL, a subordinate element of the US Army Test and Evaluation Command (TECOM). AVNDTA conducts development testing (DT) and production acceptance testing of Army aircraft. AVNDTA also gathers data to aid in establishing component service life, repair parts consumption, required inspection cycles, and needed improvements. Fixed and recurring costs include: an aircraft maintenance contract, salaries of civilian test personnel, host support costs, and modernization of instrumentation. In FY 1982, AVNDTA had 161 active test projects. Examples are: Special Electronics Mission Aircraft (SEMA); Transportable Helicopter Enclosure; Infrared (IR) Jammers; Missile Approach Detector and Airborne Target Handoff System. The major modernization effort was automation of data acquisition and display. FY 1983 funds will provide for continuation of the testing mission. Items scheduled for test are: AH-IS Improved Main Rotor Blade; Growth/Maturity of CH-47D; CH-47D Engine Development; Advanced Scout Helicopter (ASH) planning; continued testing of the Airborne Target Handoff System, the Laser Warning Receiver, and the Aviator's Night Vision Imaging System. Tests scheduled for FY 1984 include: YAH-64 Advanced Attack Helicopter, Day/Night Mast-Mounted Sight, Helicopter Automatic Targeting System, Missile Detector System, Radar Jammer, Radar Warning Receiver, CH-47D Modernized Chinook, UH-60A Black Hawk, and other aircraft systems and components. Modernization of ranges and facilities in FY 1983 and FY 1984 will include procurement of photo/video equipment, simulation equipment, and replacement special-purpose equipment.

7. (U) **D621 — USA Test Facilities Register:** This project finances publication, updating, and distribution of the US Army Test Facilities (TEST FACS) Register. The register contains descriptions and locations of Army test facilities, instrumentation, and test equipment as a means to reduce unnecessary or duplicative instrumentation procurement. This project also provides for support of the DARCOM Test Facilities Management Office and for associated control procedures. Volume II was updated in FY 1982; the major improvement was the conversion to the DARCOM Standard System 2000 Data Base. In FY 1983 and FY 1984, purchase of interface equipment is planned to provide TECOM installations with direct access to the TESTFACS data base.

8. (U) **D623 — TECOM Instrumentation Development:** This project provides for development of unique instrumentation that cannot be procured in the marketplace. Instrumentation development thrusts include the application of modern technology to obtain a more efficient test capability requiring fewer test personnel. FY 1983 and FY 1984 funding will provide for Direct Fire Weapon Instrumentation, Real Time Chemical Agent Sampler, Software Simulation Instrumentation, and Munitions/Submunitions Tracking System.

Program Element: **#65702A** Title: **Support of Development Testing**

DOD Mission Area: **#454 — Other Test and Evaluation Support** Budget Activity: **#6 — Defense Wide Mission Support**

9. **(U) D625 — TECOM Test Methodology:** This project provides for improvement of test methodology to enable effective testing and to reduce test costs, personnel, and duration. Methodology efforts are prerequisite to determining instrumentation requirements. FY 1982 accomplishments included improved shock and vibration test schedules for transport of loose, restrained, and secured cargo. In the smoke/obscurant area, concentration and particle-sizing instrumentation calibration, static fire techniques, and special problems associated with nonhygroscopic and nonspherical smoke/obscurant particles were addressed. In support of binary munition testing, methods for forecasting dispersion and persistence of toxic agents and for challenging protective apparel were developed. In the electromagnetics area, methodology for testing performance, software, and interoperability of automated battlefield C³I systems continued. During FY 1983 and FY 1984, five major thrusts will be pursued: test methodology for automated battlefield systems, automation of test capabilities and data handling, system performance and reliability testing, materiel vulnerability to battlefield conditions, and logistic suitability of materiel.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D127 — Meteorological Support to RDTE Activities:**

a. **(U) Project Description:** This project provides for atmospheric meteorological measurements, atmospheric characterization, and meteorological advisory services to Army RDTE activities and to users of the national range at White Sands Missile Range (WSMR), NM. Support is provided at WSMR, 12 other permanent test sites, and various temporary sites. The project also provides for operation of three sites in the Meteorological Rocket Network. Services provided consist of: personnel, equipment, and supplies for data collection, analysis, and dissemination; weather forecasts, warnings, and advisory services. Required meteorological observations include measurements of: solar radiation at various wavelengths, refractive index, air density, soil moisture, temperature, humidity, and wind (near the ground and in space). Support provided is critical to adequate assessments of atmospheric effects on high-priority Army materiel systems, as well as on-range and off-range rocket firing impact predictions. This project also provides for procurement of modern and efficient equipment to replace 1950-vintage observation devices.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Standard and mission-unique atmospheric measurements and meteorological services (advice and consultation; and data collection, reduction, and prediction) were provided to an average of 49 Army RDTE activities in support of 600 projects. Projects supported include the AH-64 Advanced Attack Helicopter; electro-optics; smoke and aerosols; and the M1 Tank program.

Program Element: #65702A

Title: Support of Development Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defense Wide Mission Support

(2) (U) **FY 1983 Program:** High-priority programs to be supported will include: precision guided munitions, surface- and air-launched missiles, remotely piloted vehicles, and smoke/aerosol tests. Civilianization of military spaces in the meteorological support teams will begin. A comprehensive effort to modernize the equipment inventory will also be initiated.

(3) (U) **FY 1984 Planned Program and Basis for Budget Year Request:** High-priority programs to be supported include: the Ground-Launched Cruise Missile; Pershing II Missile System; and various smoke and obscurant tests. The civilianization of meteorological support teams (and military phase-out) will be completed in FY 1984, to include recruiting, hiring, and training 200 civilian personnel and releasing military spaces. Obsolete and inefficient instrumentation will be replaced by modern automated equipment. Examples are: a laser doppler velocimeter and a multitrack upper air sounding system required for support of surface-launched missiles and high-energy lasers.

(4) (U) **Program to Completion:** This is a continuing program.

c. (U) **Major Milestones:** Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65706A

Title: **Materiel Systems Analysis**

DOD Mission Area: #430 — Non-System Training Devices

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	12435	13129	14475	15553	Continuing	Not Applicable
M541	Materiel Systems Analysis	12435	13129	14475	15553	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The US Army Materiel Systems Analysis Activity (AMSAA) provides an independent technical capability in the Army Materiel Development and Readiness Command (DARCOM) for the conduct of major systems cost effectiveness analyses. AMSAA assesses the expected worth of existing and proposed Army materiel systems throughout their life cycle to provide a meaningful basis for major decisions. AMSAA serves as the DARCOM lead activity for survivability, reliability, availability, and maintainability (RAM) methodology, and the Army Model Improvement Program (AMIP). It supports major Army commands and higher headquarters in the conduct of Cost and Operational Effectiveness Analyses (COEAs) and provides special system evaluation support to DARCOM major subordinate commands and program managers.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	12435	13129	14475	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	12435	13166	14216	Continuing	Not Applicable

The funding decrease of $37 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation.The funding increase of $259 thousand in FY 1984 resulted primarily from prior year civilian pay increases.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

Program Element: #65706A | Title: Materiel Systems Analysis

DOD Mission Area: #430 — Non-System Training Devices | Budget Activity: #6 — Defensewide Mission Support

E. (U) RELATED ACTIVITIES: AMSAA is the Army's executive agent for the Joint Technical Coordinating Group for Munitions Effectiveness (JTCG/ME), which has the responsibility for managing the technical and fiscal aspects of the JTCG/ME program. This involves systems analyses and testing in an effort to determine the effectiveness and performance of the operational weapons/munitions systems of all military services. JTCG/ME is financed by Program Element #65805A (DOD Munitions Effectiveness and Explosive Safety Standards), Project #D620 (DOD Munitions Effectiveness). AMSAA designs development tests to provide the basis for independent evaluations which contribute to decisions with respect to acquisition of major and selected nonmajor materiel systems. Inherent in this responsibility is monitoring of development tests and providing a complete and independent evaluation of the worth of the approximately 70 systems. Test design and evaluation is financed by Project #D026 (Test Design and Evaluation), Program Element #65702A (Support of Development Testing), AMSAA also supports the Army Model Improvement Program in the development of a hierarchy of models and data bases for use in Army studies and analyses. AMSAA support of this effort is financed by Project #M982 (Army Model Improvement Program-DARCOM). Program Element #65102A (TRADOC Studies and Analyses).

F. (U) WORK PERFORMED BY: Approximately 5% of the effort, representing expertise not available in-house, is conducted under a number of small contracts; the rest is performed in-house by AMSAA personnel. Contractors include General Applied Science Laboratory, Westbury, NY, and Alphatech, Burlington, MA.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: M541 — Materiel Systems Analysis**

a. **(U) Project Description:** This project funds the US Army Materiel Systems Analysis Activity (AMSAA), for carrying out its primary mission, the conduct of independent systems analyses and effectivness evaluations for major materiel systems. AMSAA also maintains contact with Army materiel users in the field to ascertain needed improvements. AMSAA is located at Aberdeen Proving Ground, MD.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** The technical accomplishments in FY 1982 included providing item-level performance inputs to TRADOC Cost and Operational Effectiveness Analyses (COEAs) and Army-requested studies; and continuing to develop and expand the Army's capability to perform communications, command, and control performance evaluations. AMSAA conducted an evaluation of the All-Source Analysis System as part of the evaluation of the overall Army Command and Control System being accomplished by HQ DARCOM. Other efforts completed in FY 1982 included: the NATO Anti-Artillery Study; the US/Germany Second Echelon Interdiction Technical Assessment; a Mobility Analysis with a

Program Element: **#65706A** Title: **Materiel Systems Analysis**

DOD Mission Area: **#430 — Non-System Training Devices** Budget Activity: **#6 — Defensewide Mission Support**

Close Combat (Light) Mission Area Analysis; an evaluation of the Automatic Target Recognizer for the Program Manager, Advanced Attack Helicopter; RATTLER (Medium-Range Manportable Antitank Guided Missile) requirements development; M1 Tank Fire-On-The-Move Performance Assessment; Military Operations in Urban Terrain (MOUT) model development support; Lethal Attack of Emitter Study; Armored Combat Vehicle Technology (ACVT) Parametric Analysis, and the Chemical Management Study.

(2) **(U) FY 1993 Program:** Examine thermal suppression of armored vehicle signature and the detection by modern air defense gun radars of nap-of-the-earth helicopter flight. Develop a chemical warfare data base to assess item-level performance in a chemical warfare environment. Continue methodology development to characterize the reliability of software-driven systems. Continue evaluation of an Intelligence Integration Test Bed to permit evaluations of the item-level performance of sensor and fusion systems. Continue the MOUT model development effort to better characterize urban warfare for development of weapons requirements. Assess the capability of Guided Antiarmor Monitor Projectile (GAMP) munitions to support the High Technology Test Bed.

(3) **(U) FY 1994 Planned Program and Basis for Budget Year Request:** Integrate logistics support considerations into the concept exploration phase of the materiel acquisition process. Provide item-level performance estimates in support of TRADOC COEAs/Mission Area Analyses and Department of the Army studies. These estimates will be made for various battlefield environments such as smoke, dust, and naturally occurring obscurants. Major thrusts include: command, control, and communication systems; smart sensors and weapons; electronic warfare; and test, measurement, and diagnostic equipment. Continue to conduct effectiveness analyses in support of major programs, such as air defense, aviation, and armor systems.

(4) **(U) Program to Completion:** This is a continuing program.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65709A

Title: Exploitation of Foreign Items

DOD Mission Area: #460 — International Cooperative RDT&E

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2053	2016	2648	3101	Continuing	Not Applicable
D650	Exploitation of Foreign Items	2053	2016	2648	3101	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This is a continuing program covering acquisition and evaluation of foreign materiel in response to the expressed needs of Army research and development elements. Program objectives are the transfer of foreign technology to US development projects and to maximize use of foreign innovations, inventiveness, ideas, and technology for the benefit of the US. The program seeks to conserve dollars, save research and development man-hours, and provide information on the latest state-of-the-art of foreign materiel.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	2053	2016	2648	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	1953	2021	2737	Continuing	Not Applicable

The funding increase of $100 thousand in FY 1982 is a result of reprograming of funds for new exploitation candidates. The funding decrease of $5 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. The funding decrease of $89 thousand in FY 1984 resulted primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

Program Element: #65709A

Title: Exploitation of Foreign Items

DOD Mission Area: #460 — International Cooperative RDT&E

Budget Activity: #6 — Defensewide Mission Support

E. (U) RELATED ACTIVITIES: Exploitation/evaluation is coordinated with the Defense Intelligence Agency, all Services, and other interested agencies. The International Materiel Evaluation Program reviews and evaluates foreign free world materiel in the late stage of development or deployment to meet US Army needs and to enhance North Atlantic Treaty Organization (NATO) standardization/interoperability through the acquisition of NATO Common Materiel. Program Element #31307A (Scientific/Technology Intelligence) is used for acquisition of threat items for evaluation and exploitation in support of intelligence activities and long-range threat analyses.

F. (U) WORK PERFORMED BY: The US Army Foreign Science and Technology Center, Charlottesville, VA, has overall management responsibility for Project #D650 (Exploitation of Foreign Items). The commodity command or separate laboratory within the US Army Materiel Development and Readiness Command having development responsibility for counterpart US materiel performs the work. Other government resources are tasked in a support role depending upon evaluation requirements and area of expertise. In the case of bi- or tri-Service evaluation, where the Army acts as the Executive Agent, the Army is responsible for implementing the evaluation to insure that the objectives and requirements of all Services and agencies are satisfied.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: D650 — Exploitation of Foreign Items: Exploitation of small quantities of foreign materiel, representative of the most advanced foreign technology and engineering designs available, is conducted to transfer foreign technology to US exploratory and advanced engineering development projects. The primary objectives are to contribute to cost avoidance, enhance US designs, eliminate or compress the time devoted to costly stages of US development, and increase the option range for US designs. Significant technology gain is transferred to US designs by Value Engineering Programs (VEP), Product Improvement Programs (PIP), and incorporation into US engineering designs. Resultant reports are distributed to interested DOD agencies. FY 1982 and Prior Accomplishments (examples of technology gains and cost avoidance): Gains derived from projects completed in FY 1983 will be reported as they occur. FY 1983 candidates include: In FY 1984 evaluation and exploitation of foreign material technology will continue. The thrust of this program is to contribute to the reduction of dollars and time devoted to the costly areas of basic research and exploratory development; demonstrate new and unique approaches to the solution of developmental problems; and furnish examples of foreign ideas/innovations for incorporation into the United States technology base. The request will support requests for evaluation of 60 items for exploitation. Targets of opportunity will be considered as the occasion arises. This is a continuing program.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65712A

Title: Support of Operational Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	43583	48365	62378	79606	Continuing	Not Applicable
DN01	US Army Operational Test and Evaluation Agency (OTEA) Support Equipment	- 0 -	- 0 -	2406	3550	Continuing	Not Applicable
DV02	Test Boards	17426	17632	20697	25766	Continuing	Not Applicable
DV03	US Army Training and Doctrine Command (TRADOC) Initial Operational Test and Evaluation (IOTE)	3529	6322	6095	7451	Continuing	Not Applicable
D001	US Army OTEA IOTE	11651	13404	12961	14410	Continuing	Not Applicable
D918	Communications-Electronics User Testing	144	441	469	512	Continuing	Not Applicable
D976	Development and Acquisition of Threat Simulators	- 0 -	1458	5301	6774	Continuing	Not Applicable
D985	Concepts Evaluation of Materiel	3250	2411	2346	3446	Continuing	Not Applicable
D986	TRADOC Support Equipment	7583	6697	11432	17431	Continuing	Not Applicable
M992	National Training Center Support	- 0 -	- 0 -	469	466	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program finances the conduct of operational testing of Army systems under development so as to support decisionmaking related to materiel acquisition programs. The program element consists of nine projects that provide for the recurring costs of operating the TRADOC Test Boards; for the direct costs of operational tests of developmental materiel by OTEA, TRADOC, and the US Army Communications Command; for an economical test vehicle which provides quick-reaction testing of materiel issues related to potential Army needs; and for development of instrumentation and simulators for TRADOC/OTEA test organizations. The funds programed each year for each of the three projects that finance operational testing direct costs are equal to the sum of the anticipated costs of conducting each of the tests scheduled for that year. The funds for these projects are not proportional to the number of tests because individual test costs vary widely (e.g. one test may require ten soldiers for two weeks, while another may involve hundreds of participants for six months). The other six projects account for approximately 60% of program element funds and are programed on a level-of-effort basis with some variations (e.g., to develop specific items of instrumentation or threat simulators that provide effective test capabilities).

Program Element: #65712A

Title: Support of Operational Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defensewide Mission Support

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	43583	48365	62378	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	42584	50106	60283	Continuing	Not Applicable

The increase of $999 thousand in the FY 1982 funding level is a result of three Army adjustments: expanded development of simulators to create a more realistic threat environment; increased civilian staffing at the Intelligence and Security Board and Aviation Board; and increased host-tenant costs at the test boards. The funding decrease of $1741 thousand in FY 1983 is a result of Congressional direction in the FY 1983 Appropriations Act ($1606 thousand), and pro rata application of general Congressional reductions to the RDTE,A appropriation ($135 thousand). The funding increase of $2095 thousand in FY 1984 is a result of acceleration in planned simulator development in the Army Development and Acquisition of Threat Simulator (ADATS) program in response to the increased emphasis on realism in testing, increased funding at the Intelligence and Security Board, and prior year civilian pay increases.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The Army Staff monitors the close and continuous coordination between TRADOC agencies responsible for test and use of materiel items, development test activities, materiel developing agencies, and OTEA to insure the greatest possible effectiveness of Army testing activities and to avoid duplication of instrumentation development efforts within the Army. The Director of Defense Test and Evaluation, OSD, also reviews planned testing and development of support equipment to insure integration of testing by the Services and to avoid duplicative developments of instrumentation throughout the Services. Simulator requirements are coordinated with the other Services through an Under Secretary of Defense for Research and Engineering (USDRE)-chartered Tri-Service committee. Full-time liaison personnel are assigned by each of the Services to appropriate test activity headquarters of the other Services. High-level staff management of resources for user testing is provided by the US Army Test Schedule and Review Committee, whose principal product is the Army Five-Year Test Program. The Five-Year Test Program includes the Army's plan for Initial Operational Test and Evaluation (IOTE) and Follow-on Evaluation of all materiel items, and for testing in support of force development for the following five years. Its execution is supervised by the US Army Operational Test and Evaluation Agency (OTEA).

Program Element: #65712A

Title: Support of Operational Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defensewide Mission Support

F. (U) WORK PERFORMED BY: Initial Operational Test and Evaluation (IOTE) is primarily conducted at Army troop installations under the management and supervision of the proponent TRADOC activities or OTEA and is assisted by available local troop support. Instrumentation development is primarily a contractor effort. Contractors include: General Dynamics Corp., San Diego, CA; Jet Propulsion Lab, Pasadena, CA; General Electric, Syracuse, NY; International Laser Systems, Orlando, FL; and MILGO, Inc., Miami, FL. Some instrumentation development is performed in-house by Harry Diamond Laboratories, Adelphi, MD; Naval Postgraduate School, Monterey, CA; US Army Missile Command, Redstone Arsenal, AL; and US Army Tank-Automotive Command, Warren, MI. TRADOC Combined Arms Test Activity (TCATA), Combat Developments Experimentation Command (CDEC), and the Test Boards are staffed by both military and Government civilian personnel.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DN01 — US Army Operational Test and Evaluation Agency (OTEA) Support Equipment:** This project provides funds for development of support equipment peculiar to initial operational tests and evaluations (IOTE) of assigned major and selected nonmajor materiel systems. It includes instrumentation, targets, and data collection and processing equipment. No funding was provided in FY 1982. Since the FY 1983 Congressional reduction in Program Element 65712A was nonprejudicial, partial funding by reprograming is planned. Efforts planned in FY 1983 include developing improved remote-controlled ground target vehicles and a laser spot information system. In FY 1984, development of the remote-controlled target vehicles and the laser spot information system will continue. Development of a laser designator detector and obscured battlefield instrumentation will begin in FY 1984, as will OTEA participation in the Army Development and Acquisition of Threat Simulator program.

2. **(U) DV03 — US Army Training and Doctrine Command (TRADOC) Initial Operational Test and Evaluation (IOTE):** This project provides for planning and conduct of IOTE of nonmajor materiel systems and for preparation of independent evaluation of military utility, of operational effectiveness, and of suitability for the acquisition decision process. It funds only costs directly attributable to conduct of the tests, including: data collection and reduction services; training and temporary duty of test personnel; communications services; development, procurement, installation and operation of special equipment; costs of modifying end item or support equipment and costs of subsequent rehabilitation; and costs of transporting test items. FY 1982 accomplishments include IOTE of the Remotely Monitored Battlefield Sensor System, the Steerable Null Antenna Processor, and the High Altitude Airdrop Resupply System. Planned IOTE in FY 1983 include the Chaparral Forward-Looking Infrared (FLIR) Night Vision Device, the Aviation Ground Power Unit, the Meteorological Data System, and the Facility Intrusion Detection System. FY 1984 IOTE will include the AH-64 Flight and Weapons Simulator, the Armor Remoted Target System, the Personal Equipment Decontamination System, and the Megabit Digital Troposcatter Subsystem.

Program Element: #65712A

Title: Support of Operational Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defensewide Mission Support

3. (U) **D918 — Communications-Electronics User Testing:** This project provides for conduct of operational test and evaluation of newly developed communications equipment for the US Army Communications Command to obtain data for production decisions. It funds the costs of installation, transportation, test instrumentation, software support, travel of test personnel, and contractual test support. FY 1982 accomplishments include operational test of the Electromagnetic Radiation Monitoring System, alternate power generator sources, antijam modems for satellites, and security devices. FY 1983 plans include operational test of the Steerable Null Antenna Processor, satellite terminals, digital transmission systems and multiplexers. In FY 1984, planned tests include the Defense Satellite Communications System, the KY-883/GSC Encoder/Decoder, a limited network control, a multifunction high-rate coder, a jammer analysis and modification subsystem, and a low-speed time division multiplexer.

4. (U) **D976 — Army Development and Acquisition of Threat Simulators:** This project provides a realistic adversary environment for development, operational, joint, and force development testing and for limited support of training. Hardware simulators replicate foreign air defense systems, surface-to-air missiles, jammers, C3I, electronic warfare (EW) equipment, and ground and airborne vehicles. This is a continuing program initiated in 1972 and funded in project D986 until FY 1983, when it was broken out for management visibility. FY 1982 accomplishments were the continued development of the XM-04, XM-29, XM-CC, and XM-14 simulators and XM-09 product improvement. The project in FY 1983 will provide funding for validation engineering support, installation of field service modifications, and development of an XM-07 Test Set and a verification van. The equipment nomenclature/designators are revised effective FY 1983 to improve management control and auditability by relating the equipment to the threat being represented. Nomenclatures used herein are the revised ones. FY 1984 will see continued funding for validation engineering support; for support of coordinated interagency planning, development, acquisition, and scheduling of threat simulators; and for development of a validation van, and XM-60, XM-29, and XM-11 simulators. Equipment upgrade to meet new intelligence estimates will continue.

5. (U) **D985 — Concepts Evaluation of Materiel:** This project funds procurement of commercially available, foreign or other Service items to permit conduct of innovative tests of limited scope and duration that provide insights into feasibility of a materiel concept or system for which a potential requirement can be clarified or initiated. Items selected for such testing have high potential for increasing combat effectiveness and/or decreasing operating/support costs and entail low acquisition costs. Tests may lead to development of a new materiel requirement, modification of an existing requirement or development plan, or initiation of a product improvement. In FY 1982, the project procured items for innovative tests with emphasis on tactics and techniques for combat service support equipment in the area of light antitank assault weapons. In FY 1983, the project will continue quick-reaction testing of vehicles, foreign mortar systems, machineguns, training aids, radios, and other available equipment. Commercial teaching equipment, video games, and computers will be examined for adaptability to Army simulation requirements. FY 1984's planned program will continue to provide TRADOC commanders with a quick, simple process for resolving and solidifying combat development and training development concepts pertinent to potential new materiel requirements or improvements. This approach has proven far more cost-effective than resolving issues later in the materiel development cycle.

Program Element: #65712A

Title: **Support of Operational Testing**

DOD Mission Area: **#454 — Other Test and Evaluation Support**

Budget Activity: **#6 — Defensewide Mission Support**

6. (U) **M992 — National Training Center Support (NEW START):** This project provides for development of an instrumentation system for the National Training Center (NTC) at Fort Irwin, CA. The instrumentation system will enable participating units, commanders, and staffs to review their performance in a simulated combat environment and thereby increase their combat readiness by recognizing and learning from mistakes. This capability may well be the most effective of all so-called "combat multipliers." FY 1982 requirements were met using off-the-shelf items. Since the FY 1983 Congressional reduction in Program Element 65712A was nonprejudicial, partial funding by reprograming is planned. In FY 1983 and 1984, the project provides for evaluating the potential for integrating air defense systems and aircraft by interfacing the Multiple Integrated Laser Engagement System (MILES) related Air Ground Engagement System/Air Defense Engagement System (AGES/AD) into NTC instrumentation. After the evaluation and integration are completed, NTC will have a system that provides position location, laser engagement, and realtime feedback for individual soldiers, existing land vehicles, and existing aircraft in a battlefield environment.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. (U) **Project: DV02 — Test Boards.**

a. (U) **Project Description:** This project finances the fixed and recurring costs (civilian salaries, host-tenant costs, utilities, supplies, etc.) in support of operational testing incurred by TRADOC activities: Armor and Engineer Board, Ft Knox, KY; Air Defense Board, Ft Bliss, TX; Infantry Board, Ft Benning, GA; Field Artillery Board, Ft Sill, OK; Aviation Board, Ft Rucker, AL; Intelligence and Security Board, Ft Huachuca, AZ; Communicatons Electronics Board, Ft Gordon, GA; Airborne Board, Ft Bragg, NC; and the TRADOC Combined Arms Test Activity, Ft Hood, TX. The primary mission of these activities is operational testing of developmental Army materiel, including some of the major systems assigned to OTEA as well as the nonmajor systems. In addition, the boards conduct concept evaluation of materiel, and support joint tests and force development testing and experimentation. Direct test costs are funded by Project DV03, TRADOC IOTE, in this same program element.

b. (U) **Program Accomplishments and Future Efforts:**

(1) (U) **FY 1982 Accomplishments:** Continued to provide fixed and recurring costs for the 8 test boards in support of tests, including those for the Improved 81mm Mortar System and Off-Route Antitank Mine System.

(2) (U) **FY 1983 Program:** Planned test support includes CHAPARRAL FLIR Night Vision Device, Aviation Ground Power Unit, Meteorological Data System, Facility Intrusion Detection System, Infantry Remoted Target System, and AN/TSQ-84A Communications Technical Control Center upgrade.

Program Element: **#65712A** Title: **Support of Operational Testing**

DOD Mission Area: **#454 — Other Test and Evaluation Support** Budget Activity: **#6 — Defensewide Mission Support**

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** IOTE support includes AH-64 Flight and Weapons Simulator, Armor Remoted Target System, Personal Equipment Decontamination System, Megabit Digital Troposcatter Subsystem, Tank Weapons Gunnery Simulation System, and Low-Cost Night Vision Goggles. Also, about 90 military spaces will be converted to civilian spaces (either contractor or civil service).

(4) **(U) Program to Completion:** This is a continuing program.

2. **(U) Project: D001 — US Army Operational Test and Evaluation Agency (OTEA) Initial Operational Test and Evaluation (IOTE).**

a. **(U) Project Description:** This project finances the direct costs (e.g., labor, supplies, travel, test support) of conducting IOTE on major and selected nonmajor materiel systems. IOTE refers to test and evaluation of the operational effectiveness and suitability of developmental materiel, conducted under conditions as close as possible to those encountered in actual field use with typical troops representative of those trained to employ the materiel, for the purpose of developing data to assist in making important program decisions prior to commitment to production. OTEA actively participates in the conduct of tests and provides an independent evaluation of each prospective system's operational effectiveness and suitability directly to the appropriate decision review. Funds programed for a given year are equal to the sum of the anticipated costs of conducting the tests scheduled for that year and are not proportional to the number of tests scheduled because the costs of individual tests vary widely.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Conducted IOTE of assigned systems to include Position Location Reporting System, High Mobility Multipurpose Wheeled Vehicle, Improved 81mm Mortar, and STINGER-POST Man-Portable Air Defense System.

(2) **(U) FY 1983 Program:** Conduct IOTE to include: PERSHING II, Single-Channel Ground And Airborne Radio System, Multiple-Launch Rocket System, Single Subscriber Terminal, and Defense Satellite Communications System.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Conduct IOTE to include: Army Helicopter Improvement Program, NAVSTAR GPS Test Facilities User Equipment, Position Location Reporting System, M1E1 (120mm) Gun, and Forward-Looking Infrared Augmented COBRA TOW Sight/Improved TOW Missile System.

(4) **(U) Program to Completion:** This is a continuing program.

Program Element: #65712A

Title: Support of Operational Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defensewide Mission Support

3. (U) Project: D986 — TRADOC Support Equipment.

a. (U) Project Description: This project finances the development of instrumentation for Operational Testing (OT) and Force Development Testing and Experimentation (FDTE) at TRADOC Combined Arms Test Activity (TCATA), Combat Developments Experimentation Command (CDEC), and the 8 test boards. TCATA conducts large-scale FDTE and OT; CDEC conducts precise field experiments and OT; the boards conduct OT, concepts evaluations, and small-scale FDTE. This project provides for essential instrumentation to simulate the user environment and to measure performance of hardware and personnel under battle conditions. Beginning in FY 1983, project D976 funds development of threat simulators.

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: Continued development of communications and noncommunications systems for electronic warfare testing at the Intelligence and Security Board, and of the Mobile Automated Field Instrumentation System (MAFIS) aimed at FY 1985 Initial Operational Capability (IOC) to provide a highly mobile capability for support of force-on-force testing at noninstrumented test sites.

(2) (U) FY 1983 Program: Continue emphasis on development of MAFIS, which absorbs 60% of project resources. Additional efforts include the automatic data collection system upgrade at TCATA, and the intervisibility and pairing through obscuration programs.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: MAFIS, absorbing 35% of programed funds, continues to be a major effort. A substantial investment will be made in the modernization and improvement of TRADOC's instrumentation capability. Instrumentation developments will include: Intervisibility Instrumentation System to determine which combatants on a battlefield are visible to each other, and for how long; TRADOC Obscuration Pairing System to provide for direct fire weapons simulation on an obscured battlefield; and Advanced Weapons Simulator to measure the ballistic solution of each simulated round, calculate lethality effects, and assess realtime firing results.

(4) (U) Program to Completion: This is a continuing program. MAFIS is scheduled to become operational in FY 1985. It will accommodate 200 players and will have an add-on capability. A second phase of MAFIS development will begin in FY 1985 to provide enhanced capabilities (e.g., exploiting technology such as millimeter wave radar to penetrate battlefield obscuration). Other efforts that will be initiated in FY 1985 include development of more accurate techniques for evaluating damage probabilities and measuring location and expanded memory techniques for distributed storage at player positions not accessible to a central data processor.

Program Element: #65712A

Title: Support of Operational Testing

DOD Mission Area: #454 — Other Test and Evaluation Support

Budget Activity: #6 — Defensewide Mission Support

c. (U) Major Milestones: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65715A

Title: Defense Systems Management College

DOD Mission Area: #471 — General Management Support

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	203	- 0 -	200	206	Continuing	Not Applicable
M199	Defense Systems Management College	203	- 0 -	200	206	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Defense Systems Management College (DSMC) was established by the Deputy Secretary of Defense to conduct education in the field of weapons system acquisition management, to conduct associated research and special studies, and to assemble and disseminate systems acquisition management information regarding policy and implementation. In order to provide the student with a realistic scenario, the College implemented a program (System X II) that applies advanced computer learning technology in a real-world simulation of the System Acquisition Life Cycle. This simulation provides students realistic practice as program managers while in the academic environment. The System X II program involves the application of computerized decision exercises based on actual programs. System X II will be available to assist actual program managers to test and evaluate their acquisition strategies, conduct life cycle trade-off analyses, and evaluate their program readiness for upcoming milestone decisions.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	203	- 0 -	200	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	203	202	201	Continuing	Not Applicable

During Congressional review of the FY 1983 Department of Defense budget request, funding for this program was not authorized by the Joint Authorization Committee. The funds requested for FY 1984 are required to continue improvements to system X II in direct support of the defense acquisition management mission. The decrease in FY 1984 from the previous submission reflects a revision of the anticipated inflation in the proposed Army RDTE budget.

Program Element: **#65715A** Title: **Defense Systems Management College**

DOD Mission Area: **#471 — General Management Support** Budget Activity: **#6 — Defensewide Mission Support**

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: None

F. (U) WORK PERFORMED BY: Project and program offices, Defense Systems Management College.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1994: M199 — Defense Systems Management College: The mission of the Defense Systems Management College is to conduct education in the field of weapons system acquisition management, conduct associated research and special studies, and to assemble and disseminate systems acquisition management information. This is a continuing program.

H. (U) PROJECTS OVER $10 MILLION IN FY 1994: Not Applicable.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65801A

Title: Programwide Activities

DOD Mission Area: #471 — General Management Support

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	61642	65000	74362	83879	Continuing	Not Applicable
MM88-01	Command Headquarters Support	43005	46525	53181	60204	Continuing	Not Applicable
MM88-02	General Administrative Activities	3213	3710	3771	4090	Continuing	Not Applicable
MM88-03	Special Purpose and Automatic Data Processing Equipment	14701	13804	16057	17477	Continuing	Not Applicable
MM88-04	Minor Construction	723	961	1353	2108	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program funds efforts directed toward support of Army research, development, test, and evaluation (RDTE) installations, activities, and/or operations required to accomplish overall assigned general research and development missions which cannot be allocated to specific research and development projects. This is a continuing program which includes: logistical and facility support to Army Management Headquarters Activities; operating costs of those RDTE headquarters-type activities not classified as Army Management Headquarters Activities; and support to R&D laboratories and research facilities for equipment items and minor construction projects which cannot be identified to a specific R&D project. Requested resources finance: salaries and related costs for civilian personnel assigned to other than Army Management Headquarters Activities; costs for personnel performing logistical-type support at R&D commands; purchased base operations/facility support to R&D commands; purchase and installation of special-purpose and automatic data processing equipment items which support two or more R&D projects; and RDTE-funded Occupational Safety and Health Act and Environmental Protection Agency minor construction requirements.

Program Element: #65801A Title: Programwide Activities

DOD Mission Area: #471 — General Management Support Budget Activity: #6 — Defensewide Mission Support

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	61642	65000	74362	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	60301	70101	72037	Continuing	Not Applicable

Changes in funding as reflected above are as follows: (1) During the execution of the FY 1982 program, funds were reprogramed into this program element for equipment purchase, from Program Element #65898 (Army Management Headquarters (Research and Development) (AMHA)); (2) FY 1983 reflects Congressional actions on the FY 1983 budget request ($-5.1 million); (3) FY 1984 reflects the result of several actions: transfer of $+2.5 million from other R&D projects for Army Industrial Fund (AIF) Residual funding to properly fund certain base operations functions previously carried as AIF overhead; transfer of $+3.4 million from Program Element #65898 (AMHA) as a result of the reorganization of the US Army Tank-Automotive R&D and Readiness Commands into a single command, which included the establishment of a non-AMHA RDTE Center; minor adjustments resulting from the realignment of the US Army Materiel Development and Readiness Command headquarters ($+.3 million); anticipated program savings as a result of these actions ($-2.5 million); and a reduction of $1.4 million which resulted from a revision of the anticipated inflation in the Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Command headquarters perform staff management functions related to work performed by RDTE laboratories and test facilities. Other projects included in this program element provide for the installation and purchase of equipment required in support of more than one RDTE project.

F. (U) WORK PERFORMED BY: Subordinate commands and other activities of the US Army Materiel Development and Readiness Command, the US Army Medical R&D Command, and the Corps of Engineers R&D activities.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

Program Element: #65801A Title: **Programwide Activities**

DOD Mission Area: #471 — **General Management Support** Budget Activity: #6 — **Defensewide Mission Support**

1. (U) **MM 88-02 — General Administrative Activities:** Is a continuing program which provides for the operations of four Standardization Groups located in Australia, Canada, Germany, and the United Kingdom; travel of the Army Science Board; operations of Army RDTE liaison offices; payment of patent office fees; and other administrative activities not identified to specific RDTE mission projects.

2. (U) **MM 88-04 — Minor Construction:** Provides funds for installation of equipment and construction needed for abatement of Environmental and Occupational Safety and Health Act requirements at RDTE-funded facilities.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. (U) **Project: MM 88-01 — Command Headquarters Support**

a. (U) **Project Description:** This project provides funds for logistic and base operations support provided to RDTE commands identified as Army Management Headquarters Activities; for the operation and logistical support provided to RDTE commands and R&D centers which are not identified as Army Management Headquarters Activities.

b. (U) **Program Accomplishments and Future Efforts:**

(1) (U) **FY 1982 Accomplishments:** Provided support for logistical functions associated with US Army Materiel Development and Readiness Command (DARCOM) Headquarters and subordinate R&D Army Management Headquarters, operation of and logistical support to the US Army Test and Evaluation Command, Natick R&D Command, and Mobility Equipment R&D Command. This includes salaries and benefits for authorized civilian personnel and related operating costs, as well as base operations and other support costs reimbursed to other appropriations or Army Industrial Fund under host-tenant agreements and/or regulations. R&D Army Management Headquarters which are furnished logistic and other support services in this project include US Army Materiel Development and Readiness Command Headquarters, Armament R&D Command, Aviation R&D Command, Missile R&D Command, Tank-Automotive R&D Command, Communications R&D Command, and Electronics R&D Command.

(2) (U) **FY 1983 Program:** Resources have been programed for: (1) Annual costs for operation of and logistical support to RDTE commands which are not designated as Army Management Headquarters Activities and (2) for annual logistic/base operations support costs for support of DARCOM Headquarters and the six subordinate R&D Commands designated as Army Management Headquarters Activities.

(3) (U) **FY 1984 Planned Program and Basis for Budget Year Request:** This is a continuing level of effort program. The FY 1984 program will continue the operations and support of the RDTE subordinate commands as described above. In addition, the FY 1984 program reflects an increase associated with funding of certain Army Industrial Fund base operation functions previously carried as AIF overhead and subsequently

Program Element: #65801A Title: Programwide Activities

DOD Mission Area: #471 — General Management Support Budget Activity: #6 — Defensewide Mission Support

charged to R&D customers incorrectly. Effective in FY 1984, these base operations costs will be funded in this project. Funds have been transferred from benefiting RDTE,A projects to support this increase. The FY 1984 program also reflects changes resulting from the reorganization of the US Army Tank-Automotive Readiness and R&D Commands. This reorganization resulted in the formation of a single command (US Army Tank-Automotive) and an R&D Center. The R&D Center will provide management and support to R&D projects performed by the Tank-Automotive Command. These resources were transferred from Program Element #65896 (Management Headquarters (Research and Development)).

(4) (U) **Program to Completion:** This is a continuing program.

2. (U) **Project: MM66-03 — Special-Purpose and Automatic Data Processing Equipment**

a. (U) **Project Description:** This program finances the procurement and maintenance of scientific, engineering, technical, and other laboratory equipment unique to research and development missions and not identified to a single RDTE project. Included in this program is the acquisition of automatic data processing and special-purpose equipment including replacement or modification of equipment required to maintain and perpetuate state-of-the-art capabilities in research and development laboratories. This program is the primary source of funds for acquisition of multipurpose scientific and technical RDTE laboratory equipment which supports more than one R&D project.

b. (U) **Program Accomplishments and Future Efforts:**

(1) (U) **FY 1982 Accomplishments:** FY 1982 approved funding level enabled the Army to begin implementation of a phased program to replace and upgrade the scientific, engineering, technical, medical, and automatic data processing equipment in the R&D laboratories and research facilities. This phased program represents implementation of a Department of Defense Laboratory Task Force recommendation to establish a modernization policy and program and insure that general-purpose, special, and laboratory equipment is replaced or acquired in a timely manner.

(2) (U) **FY 1983 Program:** The FY 1983 program will continue the equipment modernization program started in FY 1982.

(3) (U) **FY 1984 Planned Program and Basis for Budget Year Request:** The FY 1984 request continues the requirement for a phased program to upgrade the Army's R&D special-purpose equipment inventory. The Army's laboratory general purpose use scientific and technical equipment inventory is in excess of $450 million. This project is the primary source of funds within the RDTE, A appropriation for the purchase of scientific, engineering, and technical special-purpose equipment utilized in support of two or more research and development projects.

(4) (U) **Program to Completion:** This is a continuing program.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65602A

Title: International Cooperative Research and Development

DOD Mission Area: #480 — International Cooperative RDT&E

Budget Activity: #6 — Defensewide Mission and Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	629	1039	1053	1110	Continuing	Not Applicable
M796	International Cooperative Research and Development	629	1039	1053	1110	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program allows the Army to operate more efficiently with Allied land forces. To accomplish this objective, the program sponsors exchanges of research and development technology through participation in inter-Allied forums such as the NATO Army Armaments Group (NAAG) the American, British, Canadian, Australian (ABCA) Standardization Program, and The Technical Cooperation Program (TTCP) involving the United States and Canada. By exchanging information on research and development, it is possible to consider ways to omit duplication of effort thereby leading to an eventual reduction in the costs of combat and combat support systems. Inter-Allied standardization and interoperability and logistic teamwork are also furthered.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	629	1039	1053	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	980	1041	1093	Continuing	Not Applicable

*Travel costs essentially determine the outlays of this program. The strong position of the dollar in FY 1982 is expected to continue in FY 1983. In addition, the program is monitored to make certain that international travel is confined to the purposes for which the program is intended. The decrease of funding in FY 1982 of $351 thousand is a result of reprogramming to higher priority Army requirements. The funding decrease of $40 thousand in FY 1984 is a result of minor program adjustment.

Program Element: #65802A

Title: International Cooperative Research and Development

DOD Mission Area: #460 — International Cooperative RDT&E

Budget Activity: #6 — Defensewide Mission and Support

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: In furthering international cooperative research and development, the program supports staff talks between the Army and the key NATO land forces, the United Kingdom, the Federal Republic of Germany, and France. Under the program also, meetings are held to develop and to oversee Memorandums of Understanding and Data Exchange Agreements between the Army and its counterparts in NATO and in Korea. These discussions generate close working relationships to improve the combat and logistic effectiveness of the Army and those forces with which it will operate during wartime. In Western Europe, the program defrays the US share for the NATO Industrial Advisory Group (NIAG). This group produces prefeasibility studies to improve NATO readiness.

F. (U) WORK PERFORMED BY: Headquarters, Department of the Army, US Army Materiel Development and Readiness Command, Corps of Engineers, the Office of The Surgeon General, and the US Army Training and Doctrine Command are principally involved. Representatives of these agencies attend the international meetings to improve the combat posture of the US Army and its Allies.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: M796 — International Cooperative Research and Development: This project will continue toward the objectives outlined in the foregoing paragraphs. Expenditures are mainly for domestic and international travel associated with scientific and technological exchanges. In FY 1982, the activities of the International Cooperative Research and Development Program covered a range of activities in addition to information exchanges on military technology. The Program sponsored a meeting of the NAAG Panel X Interservice Group on Air Vehicles for Tactical Air Mobility that was held at the Naval Postgraduate School, Monterey, California. The agenda covered the threat, icing problems, and antiarmor helicopter systems. NAAG Panel Group 16, involving the United States, Belgium, France, the Federal Republic of Germany, the Netherlands, and Norway, have been testing and evaluating anti-infrared smoke for combat vehicle self-protection. In FY 1982, the summer phase of the trials was held in Bourges, France, where eight competing smoke rounds were evaluated. Observations and scientific data were recorded for use by each participating country. The program continued to support the Four-Power Senior National Representatives (Army) annual meetings composing the United States, France, the Federal Republic of Germany, and the United Kingdom, under SNR auspices. The four countries are engaged in codevelopment of an Antitank Guided Weapons Program. The United States is responsible for the next manportable replacement; the Europeans, the next-generation vehicle-mounted system. The program also had the task of determining the impact on the Army of the specialty metals restriction that was contained in the FY 1982 DOD Appropriations Bill. In FY 1983, FY 1982 programs will go on. NAAG Panel 16 will finish the smoke trails, bilateral staff talks, NAAG and SNR meetings will continue to be held, and NIAG studies funded. The program will also support the cooperative effort of the United States, France, the Federal Republic of Germany, and Italy on behalf of the Multiple Launch Rocket System (MLRS). In FY 1984, ongoing programs will continue. The International Cooperative Research and Development Program will maintain its efforts to explore ways to expand the benefits to the Army through the program's varied activities.

Program Element: #65802A

Title: International Cooperative Research and Development

DOD Mission Area: #499 — International Cooperative RDT&E

Budget Activity: #6 — Defensewide Mission and Support

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65803A

Title: Technical Information Activities

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3831	5249	5421	6182	Continuing	Not Applicable
MY11	Modernized Army Research & Development Information System (MARDIS) Support—US Army Computer Systems Command (CSC)	554	575	552	551	Continuing	Not Applicable
MY14	MARDIS Proponent Support	- 0 -	89	90	93	Continuing	Not Applicable
M720	Technical Information Functional Activities	937	967	1042	1070	Continuing	Not Applicable
M728	Information Technology	724	796	868	1278	Continuing	Not Applicable
M729	Youth Science Activities	696	661	669	682	Continuing	Not Applicable
M731	Government/Industry Data Exchange Program (GIDEP) and the Advisory Group on Electronic Devices (AGED)	- 0 -	535	559	643	Continuing	Not Applicable
M761	Technical Information Analysis Centers	620	948	926	953	Continuing	Not Applicable
M903	Signal Intelligence (SIGINT)/Electronic Warfare (EW) Technical Information	300	678	715	912	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for upgrading of the accuracy, timeliness, availability, and accessibility of scientific, technical, and management information at all levels of Army research and development (R&D). This includes initiatives to improve information derivation, storage, access, display, validation, transmission, distribution, and interpretation. This program provides necessary Army information to all Defense Technical Information Center (DTIC) data banks. It provides the technology and operational guidance basis for effective performance of 300 Army technical libraries. Specific examples of the effort undertaken in this program include analog-to-digital information conversion, information compression to conserve memory storage, high-resolution electronic media displays, and centralized access to remote data banks.

Program Element: #65803A

Title: Technical Information Activities

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	3831	5249	5421	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	4628	5249	6179	Continuing	Not Applicable

The decrease of $797 thousand in FY 1982 funding is a result of reprograming to higher priority Army requirements. The funding decrease of $758 thousand in FY 1984 is primarily a result of realignment of Army priorities.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: This program complements Integrated Software Research and Development (ISRAD) activities funded in PE #65898A (Army Management Headquarters Activities). The Army participates in input and output of the Defense Technical Information Center, Federal Information Managers Forums, and maintains liaison with the National Commission on Libraries and Information Services. Regular liaison with all Department of Defense (DOD) and other Government technical information representatives is maintained to assure that no duplication of effort exists and that maximum transfer of information occurs. This program also cooperates with the National Library of Medicine Research Program in automatic storage and retrieval of technical information.

F. (U) WORK PERFORMED BY: Approximately one-half of the work has been accomplished under contract by: Applied Data Research Services, Inc., Vienna, VA; Academy of Applied Sciences, Boston, MA; Tracor-Jitco, Rockville, MD.; Harold Davidson, Inc., Fairfax, Va. The remainder of the work is performed by civilian personnel assigned to the US Army Materiel Development and Readiness Command and the US Army Computer Systems Command.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) MY11 — MARDIS Support (CSC):** Provides for installation, operation, and maintenance of the Modernized Army R&D Information System (MARDIS). Supports the MARDIS Team at CSC that performs the required programing, testing, fielding, and maintaining of the computer software. In FY 1982, an interactive system package was expanded to include 9 of the 11 data processing installations supporting MARDIS. This

Program Element: #65803A

Title: Technical Information Activities

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

allows users to enter their data at terminals with realtime input. The expansion to the other two installations will be completed in FY 1983. Also planned for FY 1983/84 is the preparation and fielding of a front-end edit package which will allow the interactive system to provide the same data edit checks now available only to batch users.

2. (U) **MY14 — MARDIS Proponent Support:** Funds a contract for technical support to the headquarters Army proponent agency for MARDIS. In FY 1982 (funded under MY11), prepared the specifications and requirements for the interactive input system, and trained people at 6 installations now using the system after testing the systems to ensure proper operation. In FY 1983/84, plan to train the remaining 5 installations, prepare the specifications for an interactive automated edit package, and revise the MARDIS user's manual so there is a general system volume and an interactive users volume.

3. (U) **M720 — Technical Information Functional Activities:** Supports the R&D work unit reporting system, the central DOD-wide resource for documenting ongoing R&D in the smallest identifiable record. This enables sharing of common-interest R&D and minimizes duplication. In FY 1982 — Developed interactive Army On-Line-Edit (OLE) system for work unit information reporting. FY 1983 — Continue contract effort of OLE system expansion to make system available to all Army elements responsible for work unit information reporting. FY 1984 — Continue contract effort and training of Army OLE users. This is a continuing level of effort program.

4. (U) **M728 — Information Technology:** Improves R&D information access, display, interpretation, transmission, and storage. In FY 1982, two tasks, Government/Industry Data Exchange Program and Advisory Group on Electronic Devices (GIDEP and AGED), were financed in this project. A medical technical information project designed to improve storage, access, and interpretation of X-ray (analog) information was initiated. Accomplishments in GIDEP include a $40 million cost savings through common part failure identification and cost avoidance. In FY 1983, projects will be initiated for alternative methods of storage, retrieval, and distribution (e.g., videodiac application) and in conjunction with the Defense Technical Information Center, for the development of an automated index of data bases. In FY 1984, tasks will be initiated to develop: an Army Technical Posture Report, Medical Technical Information Support, Technical Information Conference Support, and the Army Patents File.

5. (U) **M729 — Youth Science Activities:** Provides support to youth science activities at over 500 high schools to develop interest in science and engineering occupations. This is to insure that a cadre of technical talent will be available to fill Army needs of the future. No other program fulfills this long-range Army requirement. In FY 1982, youth from over 500 high schools participated in science programs enabling students to compete in the areas of science and mathematics. In FY 1983, the previous year's effort will continue with the addition of an effort to enable youth, interested in science, to spend 2 to 4 weeks of the summer working in an Army laboratory. This will allow students to gain actual experience in laboratory activity and to have direct contact with practicing scientists. FY 1984 — Support to youth science will continue to assure nationwide exposure.

Program Element: #65803A

Title: Technical Information Activities

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

6. (U) **M731 — Government/Industry Data Exchange Program (GIDEP) and the Advisory Group on Electronic Devices (AGED):** Provide Army portion of tri-Service logistic commanders mandated effort in GIDEP and AGED. These are formally structured information exchange programs to enable prompt reliable sharing of common interest hardware and electronic information. In FY 1982, GIDEP and AGED were supported under M728 — Information Technology. FY 1983 — The programs (GIDEP and AGED) continue to provide needed information to over 650 organizations in Government and industry in the areas of common parts and failure warnings. FY 1984 — Continue the programs and expand access to the needed information.

7. (U) **M761 — Technical Information Analysis Centers:** Provides partial support to the seven (of twenty) DOD-chartered Technical Information Analysis Centers (TIAC) that are operated by the Army. These "centers of excellence" centralize unique cost-saving, state-of-the-art information and expertise in high-technology subjects of specific interest to the DOD. FY 1982 — Partial support to seven TIAC was provided to enable centralized management and control and to disseminate Army headquarters and DOD policy. In FY 1983 and FY 1984 partial support will continue to be provided to the seven TIAC. Trial support may be provided to a new center currently under Army/DOD consideration (Chemical Information).

8. (U) **M903 — Signal Intelligence (SIGINT)/Electronic Warfare (EW) Technical Information:** This project provides technical information requirements specific to the signal intelligence and electronic warfare needs of the Army that cannot be met through conventional resources or technologies. Provides dedicated R&D to the special information-processing requirements of analog and digital information problems in SIGINT/EW. 1982 — Pursued the development of automated access to SIGINT/EW information. 1983 — Additional classified resource material will be incorporated in the SIGINT/EW data file for use of engineers and scientists in laboratory research. Remote access to this file will be made available to other users (White Sands, Vint Hill, and Adelphi). 1984 — Continue to improve accessibility, availability and timeliness of information to support the specialized needs of the Army Intelligence community.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#65804A**

Title: **US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities**

DOD Mission Area: **#451/Major Ranges and Test Facilities**

Budget Activity: **#6 — Defense Wide Mission Support**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	278925	295649	333373	408650	Continuing	Not Applicable
DE90	Yuma Proving Ground	34086	36695	40876	46544	Continuing	Not Applicable
DE91	Aberdeen Proving Ground	68736	71214	75112	81375	Continuing	Not Applicable
DE92	Dugway Proving Ground	26184	29181	29560	53535	Continuing	Not Applicable
DE93	White Sands Missile Range	133358	142820	161454	181747	Continuing	Not Applicable
DE94	Electronic Proving Ground	16561	15739	18259	30060	Continuing	Not Applicable
MM40	Small Business Innovative Research (SBIR)	- 0 -	- 0 -	8112	15389	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element sustains a capability for development, production acceptance, and product improvement testing of materiel, weapons, and weapon systems at five US Army Test and Evaluation Command (TECOM) activities that have been designated as elements of the DOD Major Range and Test Facility Base. Each of the five has an established capability uniquely required to assure technical adequacy and quality of materiel under development or procurement such as missiles, tactical vehicles, and communications equipment. The DOD Major Range and Test Facility Base is designed to preclude proliferation and duplication of specialized test facilities. This program element finances all costs of operating and maintaining the facilities that cannot be identified with a particular weapon system undergoing testing. These costs include improvement and modernization of ranges and test facilities to insure a testing capability commensurate with the state-of-the-art in materiel development; maintenance of a highly skilled professional workforce; other test support costs not reimbursed by users; and base operations, which includes maintenance and repair of buildings, grounds, and structures. Additionally, this program element identifies funds for the Army Small Business Innovative Research Program in compliance with the Small Business Innovative Development Act of 1982, PL 97-219.

Program Element: #65804A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451/Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	278925	295649	333373	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	278924	300671	337847	Continuing	Not Applicable

The funding decrease of $5022 thousand in FY 1983 is a result of: Congressional direction in the FY 1983 Appropriations Act ($2671 thousand); pro rata application of general Congressional reductions to the RDTE,A appropriation ($851 thousand); and reprograming of funds for High Technology Light Division ($1500 thousand). The funding decrease of $4474 thousand in FY 1984 is a result of the following adjustments: less instrumentation modernization and less real property maintenance and repair (-$12.8 million) to make funds available for higher priority Army requirements (e.g., High Technology Light Division); prior year civilian pay increases (+$7.3 million); lower fuel pricing indices (-$1.9 million); contracting of functions formerly performed by military personnel (+$0.8 million); identification of funds for Small Business Innovative Research by a pro rata reduction in all budget activities (+$8.1 million). The remaining FY 1984 reduction of $6.0 million results primarily from a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army						
Funds (current requirements)	4200	38530	30360	43354	Continuing	Not Applicable

Projects comprising the current program follow. Changes since the FY 1983 submission reflect continuous review, update, and reprioritization of the Army's MCA Program.

Program Element: #65804A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451/Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

FY 1982 — Funding was for installation of: storm sashes on 64 buildings ($890 thousand); a sprinkler system at Phillips Army Airfield ($510 thousand); and a kinetic energy launch system ($2600 thousand), all at Aberdeen Proving Ground (APG).

FY 1983 — $4950 thousand is for an addition to the Electromagnetic Environmental Test Facility at Electronic Proving Ground. $9400 thousand is for an M1 Abrams tank training facility at APG. $18100 thousand is for enlisted barracks modernization (Phase I) and $6080 thousand is for family housing rehabilitation; both are at APG, and both are a result of Congressional direction. A low-altitude air defense system launch complex at White Sands Missile Range (WSMR), shown last year, is no longer scheduled.

FY 1984 — $17500 thousand is for replacement of a gas filter system (OSHA) at the Chemical Systems Laboratory, $8900 thousand is for a weapons maintenance training facility, $3650 thousand is for a Chemical Surety Materials Laboratory, all at APG. The last project was not scheduled last year. $310 thousand is for a "Quality of Life" physical fitness center addition at a WSMR remote location.

FY 1985 — $21732 thousand is for a Chemical-Biological Defense Laboratory (at the Chemical Systems Laboratory), $4730 thousand is for a vibration test facility, $2113 thousand is for nuclear reactor upgrading, and $3790 thousand is for a Chapel Center (scheduled for FY 1984 in last year's submission), and $1550 thousand is for dining facility modernization, all at APG. $4044 thousand is for the Communications-Electronics Test and Evaluation Center at EPG. $1984 thousand is for a nuclear effects security system and $1772 thousand is for a CM/CCM Test and Evaluation Center for the Electro-Optical Guided Weapons CM/CCM Joint T&E Directorate, both at WSMR. $1639 thousand is for a "Quality of Life" physical fitness center at a YPG remote location (scheduled for FY 1984 in last year's submission).

E. (U) RELATED ACTIVITIES: These five US Army Test and Evaluation Command activities plus Kwajalein Missile Range comprise the Army's contribution to the DOD Major Range and Test Facility Base. This base also includes designated Air Force and Navy test facilities, all of which operate under a DOD uniform reimbursement policy; users of these facilities pay directly identifiable testing costs, and the host activity finances all other operating and maintenance costs. Further, the Office of the Director of Defense Test and Evaluation reviews management, operation, and maintenance of all DOD test facilities to avoid unnecessary duplication of capabilities, to insure that highest priority capabilities are established expeditiously and suitably maintained, and to insure integration of testing by the Services. In addition to the five facilities financed by Program Element (PE) #65804A, TECOM operates and maintains four other separate test facilities: Aviation Development Test Activity, Fort Rucker, AL; Cold Regions Test Center, Fort Greely, AK; Tropic Test Center, Republic of Panama; and Jefferson Proving Ground, Madison, IN. Applicable RDTE projects to finance the Aviation Development Test Activity, the Cold Regions Test Center, and the Tropic Test Center are included in PE #65702A (Support of Development Testing). PE #65702A also includes other projects that support Army testing efforts. The Jefferson Proving Ground munitions quality assurance testing mission is initially financed by the Operations and Maintenance, Army appropriation with subsequent reimbursement from the Procurement of Ammunition, Army appropriation. Also specifically related to the Army testing capability are PE #65806A (High-Energy Laser System Test Facility

Program Element: #65804A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #461/Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

(HELSTF)) (at WSMR), and PE #65807A (Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE)) (at EPG). HELSTF and MAINSITE are also operated by TECOM. In addition to the foregoing, this program with its emphasis on testing, is related to the activities of other Army test facilities, commodity commands, and other military service facilities, as well as the US Army Operational Test and Evaluation Agency.

F. (U) WORK PERFORMED BY: Testing is primarily performed by DA civilians and military personnel assigned to the respective facilities with support functions, such as data collection and reduction, and maintenance of radars and instrumentation, being performed by contractor personnel. Housekeeping functions, such as custodial duties and maintenance of buildings, grounds, and structures, are also performed on a contractual basis. Contractors include: Dynalectron, Albuquerque, NM; RCA Service Company, Cherry Hill, NJ; Cortez, Albuquerque, NM; PSL, Las Cruces, NM; DLM-Wells, Cherry Hill, NJ; DMA, Washington, DC; IBM, Owego, NY; Bell Technical Corporation, Tucson, AZ; Jet Propulsion Laboratory, Pasadena, CA; Bell Textron, Tucson, AZ; Hawthorne Aviation, Fort Huachuca, AZ; Van Guard Technologies, Fairfax, VA; Raytheon Corporation, Bedford, MA; Visual Instrumentation Corporation, Burbank, CA; Harry Cramer, Salt Lake City, UT.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: MM40 — Small Business Innovative Research (SBIR): This project responds to the Small Business Innovation Development Act of 1982, PL 97-219, which amends the Small Business Act (15 USC 631). The purpose is to stimulate technological innovation and use small business to meet Army research and development needs. The project establishes a uniform, simplified format to award small business concerns contracts for submitting innovative and imaginative solutions to identified Army problems requiring research and development. Proposals will be submitted in two phases in response to an annual solicitation published by the Department of Defense initially in March 1983. The Army's Small Business Innovative Research (SBIR) efforts are directed toward taking advantage of technologies in which the US enjoys a lead and the imagination and diversity of small business. As a result the major areas of interests in which the Army seeks proposals to solve identified problems are: Very Intelligent Surveillance and Target Acquisition; Distributed Command Control, Communications, and Intelligence; Self-Contained or "brilliant" Munitions; Soldier-Machine Interface; Biotechnology and Chemical Defense; Medical Support; Combat Equipment and Materials. This project is funded by pro rata reduction of funds in all budget activities in accordance with Congressional guidance. Army funds were devoted to small business innovative research in FY 1983 through the Defense Small Business Advanced Technology Program, although a separate project was not identified.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. (U) Project: DE90 — Yuma Proving Ground.

Program Element: #65804A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451/Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

a. **(U) Project Description:** This project finances the costs of operating and maintaining Yuma Proving Ground (YPG) except those costs that can be directly identified to a user of the facility. YPG's mission is to plan, conduct, analyze, and report the results of development and other tests of aircraft armament, long-range artillery, and air delivery and mobility systems. YPG also conducts natural desert environmental tests and provides personnel, when required, to support arctic environmental tests at the US Army Cold Regions Test Center, Fort Greely, AK. Its land area comprises more than 1 million acres. Major facilities include an artillery firing range, an air-to-ground and ground-to-ground fully instrumented aircraft armament range, an instrumented air delivery test area, and mobility test areas.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** 114 tests were completed, including 46 Army R&D tests, 35 Army production and post-production tests, 6 Army product improvement tests and malfunction investigations, and 27 other tests. Development and production testing of many artillery munitions were accomplished, including: Sense and Destroy Armor (SADARM); Indirect Fire Training Ammunition; M732, M734, M735, M739 Fuzes; and Rocket-Assisted Projectile M549A1. Other items tested included: automotive systems, such as Fire Support Team Vehicle; Long-Range Surveillance System (AN/USD-502); Global Positioning System (GPS); and Aircraft Controlled Exit System (ACES) Airdrop Program. Instrumentation procured during FY 1982 included: Multitarget Trilateration Position Locating System, Real Time Display Augmentation System, Graphic Displays, Network Surveillance Radar, and Optical Tracking Mount. These items will be integrated into a computer-controlled network which will give YPG a unique capability for testing Army aircraft armament and artillery weapons. The growth in the backlog of maintenance and repair (BMAR) of real property was halted in FY 1982.

(2) **(U) FY 1983 Program:** Test workload will exceed in-house capability by more than 35%. Contracts with the private sector will continue to be utilized to control the test backlog. Items to be tested include: the contractor phase of the Advanced Attack Helicopter (AAH) development, Elevated Kinetic Energy Weapon Test Bed, Light Armored Vehicle, 60,000-pound capacity Airdrop System, further testing of SADARM and numerous other artillery munitions, and production acceptance testing of long-range artillery munitions. Improvement and modernization of instrumentation include an automated data processing system that will directly link all major users within YPG, supporting test operations in realtime. A computer-controlled Versatile Tracking Mount to obtain in-flight data on projectiles, rockets, and aircraft is also planned. The backlog of maintenance and repair of real property will again be constrained.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Test workload is expected to substantially exceed the in-house capability, requiring continued contractual support of testing efforts. Items to be tested include: Armored Fighting Vehicle; Large Caliber Armament Systems; High-Mobility Multipurpose Wheeled Vehicle (HMMWV); NATO Field Artillery Ammunition; High-Level Airdrop Technology; NAVSTAR Global Positioning System; and artillery systems. Improvement and modernization of instrumentation will include another Versatile Tracking Mount and

Program Element: #65804A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451/Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

a digitized video tracking system for tracking tests of aerial delivery items. An Automated Ballistic Measuring System will replace an existing analog system with faster and more accurate digital equipment to support artillery testing. Test instrumentation will be procured to automate measurement and acquisition of climatic and dynamic test data. Deterioration of the physical plant will be constrained, and a small reduction will be made in the backlog of maintenance and repair of real property.

(4) **(U) Program to Completion:** This is a continuing program.

c. **(U) Major Milestones:** Not Applicable.

2. **(U) Project: DE91 — Aberdeen Proving Ground.**

a. **(U) Project Description:** This project finances the costs of operating and maintaining Aberdeen Proving Ground (APG) except those that can be directly identified to a user of the facility. The mission of APG is to conduct tests of weapons and weapon systems; munitions and components; survey and target acquisition equipment; combat, special, and general-purpose vehicle and ancillary automotive equipment; combat engineer equipment; and troop support equipment. It also provides a radiation environment simulating the neutron output of a nuclear weapon using a fast-burst nuclear reactor, and conducts nuclear radiation survivability evaluations. APG has 75,000 acres, half of which are under water. Its major test facilities are instrumented firing ranges for testing different types of weapons and facilities for testing tracked and wheeled vehicles. This project provides base operations support on a nonreimbursable basis to Army R&D agencies located at APG, such as the Ballistic Research Laboratory, Chemical Systems Laboratory, Army Materiel Systems Analysis Activity, and Headquarters, US Army Test and Evaluation Command.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** 102 R&D tests, 147 production tests, 11 product improvement and malfunction investigations, and 93 other tests of materiel were conducted. Tests included: First Article Testing of the M2 Infantry Fighting Vehicle (IFV) and the M3 Cavalry Fighting Vehicle (CFV); Initial Production Testing of the M1 Tank Power Train; First Article Testing of the Heavy Expanded Mobility Tactical Truck (HEMTT); Engineer Design Testing of the High Mobility Multipurpose Wheeled Vehicle; Development Test II of the XM256 Tank Gun; and Prototype Qualification (Government) testing of the SGT York Gun System. Test data handling capability was improved with the completion of Phase I of the Automated Data Acquisition and Processing Techniques (ADAPT) project and initiation of Phase II. This included procurement of data acquisition systems for support of ballistic, tank, and air defense testing and of additional computer capability to enhance speed of data communications between test sites and to provide for mobile data acquisition measurement. Test instrumentation was acquired to replace obsolete equipment and improve capabilities and to improve range safety. Action was taken to constrain further growth of the backlog of maintenance and repair (BMAR) of real property.

Program Element: #65804A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451/Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

(2) (U) **FY 1983 Program:** Tests scheduled include: First Article Testing of the M2 Infantry Fighting Vehicle (IFV) and the M3 Cavalry Fighting Vehicle (CFV); Engineer Design Testing of the M1E1 Armor; Production Testing of the M1 Tank; and comparison testing of the Heavy Expanded Mobility Tactical Truck (HEMTT). Planned improvement and modernization of ranges and test facilities include: upgrade of digital and video data acquisition systems to support fire control and automotive testing of vehicle performance; video scoring systems for tank firing and mortar height-of-burst measurements; and a new Mobile Automatic Ranging Tracking System (MARTS) to provide precise position location for automotive mobility evaluation and evasive target scoring determination. Additional ADP equipment for the main computer facility will be provided to enhance data communications. APG will again constrain growth in the backlog of maintenance and repair of real property.

(3) (U) **FY 1984 Planned Program and Basis for Budget Year Request:** Testing scheduled includes: the Infantry and Cavalry Fighting Vehicles; Prototype Qualification Testing of the M1E1 (Contractor and Government); production testing of the Heavy Expanded Mobility Tactical Truck (HEMTT); First Article Testing of the High Mobility Multipurpose Wheeled Vehicle; and further testing of the SGT York Gun System. Modernization will include additional instrumentation for combat vehicle performance evaluation and additional video systems for tank firing. A new project for secure data transmission will modify an existing data acquisition van to meet TEMPEST security requirements. An improved version of the existing Pointing Angle Measuring System will allow high tracking rates in support of air defense tests. Other instrumentation will upgrade environmental simulation equipment. The continuation of the effort for the ADAPT project will provide for extension of the radio frequency cable link to cover additional test sites and for acquisition of a satellite link for data communications with other TECOM installations. An increase in funding for the maintenance and repair of real property will result in a small reduction of the backlog.

(4) (U) **Program to Completion:** This is a continuing program.

c. (U) **Major Milestones:** Not Applicable.

3. (U) **Project: DE92 — Dugway Proving Ground.**

a. (U) **Project Description:** Project finances all costs of operating and maintaining Dugway Proving Ground except those costs that can be directly identified to a user of the facility. Project provides for maintaining a capability for development, production, and product improvement tests of chemical weapons, chemical/biological defense systems, and flame, incendiary, and smoke munitions systems and battlefield obscurant/smoke testing support to DOD agencies.

b. (U) **Program Accomplishments and Future Efforts:**

Program Element: #65804A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451/Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

(1) (U) FY 1982 Accomplishments: 19 R&D tests, 10 production tests, 2 product improvement and malfunction investigations and 25 other tests of materiel were conducted, including: test, analysis, and evaluation of demilitarization equipment; a Terrain Decontamination Evaluation; and tests of an Infrared-Defeating Grenade System, Advanced Collective Protective Shelters, a broad range of smoke obscurants, and 155mm and 8-inch binary munitions. DPG also conducted foreign biological threat assessments and tri-Service chemical/biological investigations. Improvement and modernization of facilities included: refurbishing physical test chambers, modernizing and replacing chemical and life sources laboratory equipment, and procurement of a Remote Sensing System. Growth in the backlog of maintenance and repair of real property was halted in FY 1982.

(2) (U) FY 1983 Program: Items to be tested include: XM30 Protective Mask, Jet Exhaust Powered Decontamination System, Lightweight Decontamination System, and 155mm binary munitions. Other efforts include: continued range support services to the Navy/Air Force Cruise Missile development; investi[illegible]tions of hazards associated with donning and doffing protective clothing; evaluation of electronic equipment decontamination; and realtime chemical agent sampling. Improvement and modernization of ranges and test facilities will include: upgrading and replacement of obsolete field data acquisition systems and optical equipment, and enhancement of smoke test capability with a universal obscurant/smoke test grid. The backlog of maintenance and repair of real property will again be constrained.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: Items to be tested include: chemical and biological agent detectors, advanced collective protective field shelters, and portable decontamination apparatus for vehicle and shelter interiors. Continued range support services will be provided for the Navy/Air Force Cruise Missile Program. Investigative effort will center on aircraft operations in a toxic environment; effects of a chemical attack on psychological operations; tri-Service chemical/biological investigations; and technical assessments of foreign biologicals. Modernization of facilities will include: upgrade of defensive physical test chambers, and replacement of obsolete chemical life sources, photographic, and calibration equipment. Sufficient effort will be devoted to maintenance and repair of real property to avoid further deterioration.

(4) (U) Program to Completion: This is a continuing program. In FY 1985, a comprehensive modernization program will be initiated. Laboratories, chambers, field and physical test facilities will be modernized to provide a capability fully responsive to expanding user needs at the lowest possible expenditures of resources commensurate with safety. Modernization will include integrating virtually all test activities into an automated data network.

c. (U) Major Milestones: Not Applicable.

4. (U) Project: DE93 — White Sands Missile Range.

Program Element: **#65804A**

Title: **US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities**

DOD Mission Area: **#451/Major Ranges and Test Facilities**

Budget Activity: **#6 — Defense Wide Mission Support**

a. **(U) Project Description:** This project finances all costs of operating and maintaining White Sands Missile Range (WSMR), NM, except those costs that can be directly identified to a user of the facility. WSMR is an installation of the US Army Test and Evaluation Command (TECOM), a major subordinate command of the US Army Materiel Development and Readiness Command. WSMR has three major missions: to operate and maintain a national test range to support missile, aircraft, and space vehicle tests, including modernization of range instrumentation and facilities; to plan, conduct, and evaluate development, production acceptance, and product improvement tests of rocket and missile systems, air defense fire distribution systems, and associated equipment; and to operate a nuclear effects facility and conduct associated tests. This range occupies a land area about 40 miles wide and 100 miles long, and supports 250 to 300 different projects annually. Missiles can be fired from off-range launch sites such as Green River, UT, to impact on White Sands Missile Range, a distance of over 500 miles. Launch sites are available to test missiles, drones, space vehicles, and related technical components. Facilities for performing static tests of rocket motors are also available.

b. **(U) Program Accomplishments and Future Efforts:**

(1) **(U) FY 1982 Accomplishments:** Maintenance and repair projects were accomplished which constrained facility deterioration, although the backlog of maintenance and repair projects continued to grow. Major instrumentation improvements included: replacement of the scientific and engineering computer; modernization of the communication and telemetry systems; replacement by a video sensor of the film camera on the optical tracking mounts used to provide space position measurements; and efficiency improvements on the video conversion range control system. Eighty-seven tests were conducted including: Initial Production Testing of ROLAND II; Maturation Phase testing of the Multiple Launch Rocket System; Initial Production testing of PATRIOT; PERSHING II Prototype Qualification Testing (Contractor); and continued support of the Space Shuttle Program (including a landing).

(2) **(U) FY 1983 Program:** The backlog of maintenance and repair of real property will be constrained in order to protect capital investment in facilities. The OSD-directed Range Signal Security Program to protect weapon systems test data will continue. Limited effort will be devoted to enhancing the quality and quantity of work produced through the use of automation technology. In-house and contractor effort will continue at a level adequate to avoid degradation of the quality of testing and undue delays to customer tests. Improvement and modernizaton of instrumentation will include: surveillance radars to improve moving target detection reliability and reduce maintenance costs, a Video Conversion Range Control System, and telemetry systems modernization. The testing of the ROLAND II is scheduled for completion; Maturation Phase testing of the Multiple Launch Rocket System will continue; production testing of the Cannon-Launched Guided Projectile (COPPERHEAD) and PATRIOT will continue; PERSHING II will proceed into Prototype Qualification Testing; and continued support will be provided to the Air Space Shuttle Program.

Program Element: #65804A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451/Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

(3) (U) FY 1994 Planned Program and Basis for Budget Year Request: Test, Measurement, and Diagnostic Equipment essential to maintaining instrumentation will be procured to avoid downtime and delays. A small reduction will be made in the backlog of maintenance and repair of real property. Effort will continue on the DA-directed Range Signal Security Program to protect data collection transmissions of sensitive weapon systems. New instrumentation acquisitions include a Munitions/Submunitions Tracking System and acquisition of equipment for the Multitarget Tracking Radar and Video Conversion Range Control System. Major tests include: production testing of the Multiple Launch Rocket System; continued production testing of the COPPERHEAD and PATRIOT; post-Development Testing of the PERSHING II; and continued support of the Air Space Shuttle Program.

(4) (U) Program to Completion: This is a continuing program.

c. (U) Major Milestones: Not Applicable.

5. (U) Project: DE94 — Electronic Proving Ground.

a. (U) Project Description: This project finances all costs of operating and maintaining the US Army Electronic Proving Ground (EPG), Ft. Huachuca, AZ, except those costs that can be directly identified to a user of the facility. EPG is a Field Operating Activity of TECOM and a tenant of the US Army Communications Command, Ft. Huachuca, AZ. EPG is unique within DOD because of the naturally quiet electromagnetic environment, expansive real estate, low annual rainfall, and special facilities to accomplish its mission of planning, conducting, evaluating, and reporting on the results of development/developmental-type tests for the following types of materiel: communications, command and control, optical/electro-optical, signal intelligence, and electronic warfare equipment and systems; and other systems and materiel as directed. EPG operates an Electro-Magnetic Environmental Test Facility (EMETF), an electronic countermeasures vulnerability test facility, a systems test facility, a systems interoperability and computer software testing facility, an electronic realistic battlefield environment facility, and an electro-optical systems test facility.

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1992 Accomplishments: 33 Research and Development tests, 13 Production and Post-Production tests, 2 Product Improvement tests, and 34 other tests were conducted, including tests of: B-52 Offensive Avionics Support; Joint Services Intrusion Detection System; Mobile Subscriber Equipment; Position Location Reporting System; Remotely Piloted Vehicles; Single-Channel Ground and Airborne Radio System; and C3I Interoperability. Modernization of facilities included: replacement and modernization of range instrumentation radars' IFF Interrogation System; technology improvements for electronic countermeasure, electro-optical, infrared and radiological instrumentation; and automation procurements for the Electromagnetic Environmental Test Facility and for field data acquisition.

Program Element: #65804A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451/Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

(2) **(U) FY 1983 Program:** A technology improvement for antenna measurement test instrumentation is planned to extend the existing frequency range to 150GHz to accommodate state-of-the-art requirements, including millimeter wave. Workload is projected to exceed test capability by 20%. Some items scheduled for test are: ROLAND II first article/initial production tests; Sgt York Gun (durability and mobility tests); Remotely Piloted Vehicles; Space Shuttle Support; Single-Channel Ground and Airborne Radio Systems (DT I); Tactical Satellite Communications Terminal; TRI-TAC Circuit Switch (AN/TTC-39); Position Location Reporting System; and Facility Intrusion Detection System.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** Modernization of test facilities will include procurement of Electronic Countermeasure (ECM) instrumentation to extend present transmitter van capabilities and the development of ECM capabilities needed to conduct field tests of electronic warfare intelligence (EWI) and communications systems. Projected test workload will exceed projected test capability by approximately 20%. Some tests scheduled for this timeframe are: First article test of ROLAND II; TRI-TAC Subscriber Equipment; Remotely Piloted Vehicles; Position Location Reporting System; Single-Channel Ground and Airborne Radio System.

(4) **(U) Program to Completion:** This is a continuing program. Starting in FY 1985, substantial funding will be requested for this project (DE94) to operate and maintain the Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE) capability being established under PE 65807A, MAINSITE.

c. **(U) Major Milestones:** Not Applicable

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65806A

Title: Munitions, NATO Standardization, Effectiveness, and Safety

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7086	7028	5810	8519	Continuing	Not Applicable
DF21	NATO Munitions Standardization	393	390	370	396	Continuing	Not Applicable
D620	DOD Munitions Effectiveness	6036	5721	4503	7156	Continuing	Not Applicable
M857	Explosive Safety Standards	657	917	937	997	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element consists of three projects. Project D620 provides a coordinated tri-Service mechanism for the collection and free exchange of technical data on the performance and effectiveness of all nonnuclear munitions and weapon systems in a realistic operational environment. D620 is primarily concerned with determination of munitions effectiveness data and the publication of that data in Joint Munitions Effectiveness Manuals (JMEM) for surface-to-surface (SS), air-to-surface (AS), and antiair (AA) munitions. These manuals provide the Services a uniform basis for munitions and weapons planning and employment and assist in the determination of future munition concepts and requirements. D620 also supports DOD agencies in the determination of vulnerabilities/survivabilities of selected systems and relative effectiveness analyses of current and developmental systems. Project M857 supports explosion effects research and testing to quantify hazards in all DOD manufacturing, testing, maintenance, storage, and disposal of ammunition and explosives. Results are essential to development of quantity-distance standards and cost-effective, explosion-resistant facilities designs. Project DF21 assures complete interchangeability of small caliber and automatic cannon-caliber ammunition and weapons among all NATO countries with all of the associated logistic, strategic, and tactical advantages. This is achieved by developing, implementing, and maintaining NATO Standardization Agreements (STANAGs) and by periodic inspection of compliance through structured batteries of standardized interchangeability tests at specially equipped and calibrated test centers. Included in this project is the development of standard test procedures and test equipment and their codification into standard NATO Manuals of Proof and Inspector Procedures, as well as the staffing and operation of the North American Regional Test Center (NARTC) monitored by the US Army Armament Research and Development Command (ARRADCOM), Dover, NJ.

AD-A126 681 DESCRIPTIVE SUMMARIES OF THE RESEARCH DEVELOPMENT TEST & EVALUATION ARMY..(U) DEPUTY CHIEF OF STAFF FOR RESEARCH DEVELOPMENT AND ACQUISITIO.. FEB 83 6/6

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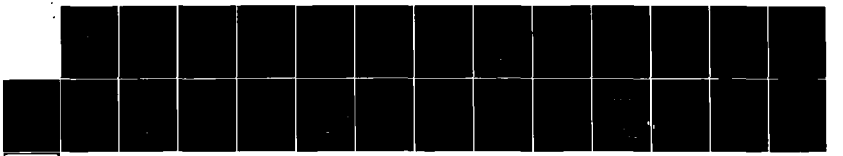

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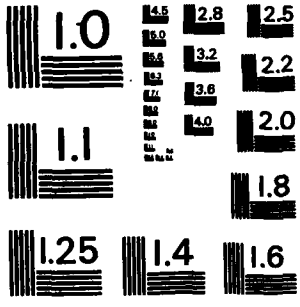

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Program Element: #65805A

Title: Munitions, NATO Standardization, Effectiveness, and Safety

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	7086	7028	5810	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	7476	8047	10734	Continuing	Not Applicable

Funding changes in FY 1982 reflect Army reprograming of $390 thousand for an urgent need in PE #64726, Project D511 (Meteorological Data System). The funding decrease in FY 1983 of $1019 thousand is a result of reprograming of funds for the High Technology Light Division. The substantial reduction in FY 1984 is a result of priorities to remain within total obligational authority. Although this is a joint Service program, it is funded by the Army.

D. (U) OTHER APPROPRIATION FUNDS: ($ in Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: Projects under this program element maintain close liaison and a free flow of information among the Services through regular meetings of the individual working groups which are composed of representatives from Service laboratories, Service schools, and tactical units. Unwarranted duplication is precluded by active participation in interagency working groups. NATO Munitions Standardization was previously funded in Program Element #64808A (Army Small Arms Program), Project #DF21A (NATO Small Arms Evaluation).

F. (U) WORK PERFORMED BY: Approximately 75% of Project D620 work is accomplished by the following in-house organizations: US Army Materiel Systems Analysis Activity, the Ballistic Research Laboratory, and Chemical Systems Laboratory of Aberdeen Proving Ground, MD; US Army Missile Command, Redstone Arsenal, AL; US Army Armament Research and Development Command, Dover, NJ; US Army Armament Materiel Readiness Command, Rock Island, IL; Dugway Proving Ground, UT; the Air Force Armament Laboratory, Eglin Air Force Base, FL; Air Force Flight Dynamics Laboratory, Wright Patterson Air Force Base, OH; Oklahoma City Air Logistics Center, Tinker Air Force Base, OK, Naval Research Laboratory, Washington, DC; Naval Surface Weapons Center at White Oak, MD, and Dahlgren, VA; Pacific Missile Test Center, Pt Mugu, CA; Naval Weapons Test Center, China Lake, CA.

Program Element: #65805A

Title: Munitions, NATO Standardization, Effectiveness, and Safety

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

The project contractors are: Oklahoma State University at Eglin Air Force Base, FL, and Stillwater, OK; Falcon Research and Development, Inc., at Denver, CO, and Albuquerque, NM; Armament Systems, Inc., of Anaheim, CA; Booze-Allen Applied Research, Bethesda, MD; Denver Research Institute, Denver, CO. Approximately 80 percent of Project M857 work is accomplished by the following DOD organizations: Navy Civil Engineering Laboratory, Port Hueneme, CA; Naval Surface Weapons Center, Dahlgren, VA; Army Large Caliber Weapons Systems Laboratory, Dover, NJ; and Army Ballistic Research Laboratory, Aberdeen Proving Ground, MD. A project contractor is IIT Research Institute, Chicago, IL. Project DF21 work is accomplished at ARRADCOM facilities located at Dover and Fort Dix, NJ.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. **(U) DF21 — NATO Munitions Standardization:** In FY 1982, Project DF21 operated the North American Regional Test Center. The Test Center conducted five US production tests, four monthly controlled tests for 7.62mm ammunition from Lake City Ammunition Plant, a qualification test of a Canadian tracer design, an evaluation of Squad Automatic Weapon (SAW) ammunition, and ten propellant analysis sample evaluations. Project DF21 will continue to operate the North American Regional Test Center on behalf of NATO, represent the US on NATO AC/225 (Panel III, Sub-Panel I), conduct NATO interchangeability tests and conduct NATO propellant hazard tests.

2. **(U) D620 — DOD Munitions Effectiveness:** From 1963 to the present time, D620 Project has produced Joint Munitions Effectiveness Manuals on air-to-surface (JMEM/AS), surface-to-surface (JMEM/SS), and antiair (JMEM/AA) munitions as well as manuals addressing weapon accuracy, characteristics, vulnerability, methodology, and joint testing procedures. This project will continue to update and revise existing manuals and to add new manuals as vulnerability, weapons characteristics, and delivery accuracy data become available.

3. **(U) M857 — Explosive Safety Standards:** In FY 1982, Project M857 developed an analytical model using Monte Carlo techniques to predict fragment hazards from stacks of mass detonating projectiles. Work was initiated on the second phase of a study of thermal effects from ammunition fires, and to scale those effects up to a magazine-size quantity. Also, continued preparation of a coordination draft of a revised edition of TM 5-1300 (Structures to Resist the Effect of Accidental Explosions). In FY 1983 confirmatory tests of fragmenting ammunition to validate theory will be conducted. Studies for quick-load ammunition storage concepts and explosion propagation between above-ground magazines will be initiated. The revised TM 5-1300 will be circulated for coordination. In FY 1984 the studies initiated in FY 1983 will be extended. Tests will be conducted on fragmenting ammunition to fill gaps in the data base, and a fragment hazard classification scheme will be developed. Revised TM 5-1300 will be issued.

Program Element: #65806A

Title: Munitions, NATO Standardization, Effectiveness, and Safety

DOD Mission Area: #440 — Technical Integration/Studies and Analyses

Budget Activity: #6 — Defensewide Mission Support

H. (U) PROJECTS OVER $10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65806A

Title: DOD High Energy Laser Systems Test Facility (HELSTF)

DOD Mission Area: #461 — Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	40224	33933	36880	39995	Continuing	Not Applicable
DE97	DOD High Energy Laser System Test Facility	40224	33933	36880	39995	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element supports the establishment and operation of a facility that, when completed, will support Army, Navy, and Air Force generic high-energy laser (HEL) testing (i.e., technology testing, subsystems and component verification, integrated system verification, system lethality testing, full-scale weapon system verification and evaluation, and operational system development and support). This program element provides for acquisition, installation, and checkout of instrumentation and facility support equipment and for recurring operating costs not specifically identified with a particular laser system or project.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	40224	33933	36880	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	40224	34030	32177	Continuing	Not Applicable

The funding decrease of $97 thousand in FY 1983 is a result of the pro rata application of general Congressional reductions to the RDTE,A appropriation. The funding increase of $4703 thousand in FY 1984 resulted from the decision to increase the power level of the Multi-Purpose Chemical Laser to provide appropriate support of the SEA LITE program and for Damage and Vulnerability tests.

Program Element: #65806A

Title: DOD High Energy Laser Systems Test Facility (HELSTF)

DOD Mission Area: #451 — Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Defense Funds (current requirements)	36449	- 0 -	- 0 -	16700	Continuing	Not Applicable

Military Construction for the Air Force Mid Range Applied Technology (MRAT) Program has been deferred to FY 1985. FY 1982 Military Construction funds were reprogramed here by DOD to meet a forthcoming DOD test.

E. (U) RELATED ACTIVITIES: Not Applicable.

F. (U) WORK PERFORMED BY: Contractors include: Sperry Systems Management, Great Neck, NY; United Technologies Research Center, Hartford, CT; Science Applications Incorporated, Atlanta, GA; McDonnell Douglas Astronautics, Huntington Beach, CA; Dynalectron, Albuquerque, NM; Physical Sciences Laboratory, New Mexico University, Las Cruces, NM; Westech Construction, Kansas City, MO; and Lockheed Engineering Management, Houston, TX. Other Government agencies that are involved include: US Army Corps of Engineers, Fort Worth, TX; US Army Communications Command, WSMR, NM; US Army Missile Command, Huntsville, AL; US Naval Sea Systems Command, Washington, DC; US Air Force Weapons Laboratory, Kirtland Air Force Base, NM; National Aeronautics and Space Administration, White Sands Annex, Las Cruces, NM; and the US Army Atmospheric Sciences Laboratory, White Sands Missile Range, NM. Federal Contract Research Centers at Lincoln Laboratories, Lexington, MA, and Aerospace Corporation, El Segundo, CA, also support the program.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: DE87 — DOD High Energy Laser System Test Facility**

Program Element: #65808A

Title: DOD High Energy Laser Systems Test Facility (HELSTF)

DOD Mission Area: #451 — Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

a. (U) Project Description: This project finances the establishment and operation of a broad-based high-energy laser test capability at White Sands Missile Range, NM, capable of supporting Army, Navy, and Air Force tests of high-energy laser systems. Specific emphasis is being directed towards obtaining this capability in time to support the Navy's SEA LITE Program. This program provides funds for acquisition, installation, and checkout of instrumentation and facility support equipment and for recurring operating costs not specifically identified with a particular laser system or project. This includes the improvement and modernization of HELSTF common-use instrumentation to insure that the test capabilities are commensurate with the state-of-the-art and appropriate to the systems being tested.

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: In preparing for High-Energy Laser Test activity, White Sands Missile Range (WSMR) continued to acquire specialized instrumentation and major supporting facilities, provide engineering support, and acquire equipment necessary to interface and integrate systems and subsystems, initiate procurement of the midpower Multi-Purpose Chemical Laser (MPCL), plan new test facilities, and provide operational support for the existing HELSTF Program. Portions of this equipment and instrumentation were used at the Capistrano test site in support of testing of the Navy Mid-Infrared Advanced Chemical Laser (MIRACL) and for support to the joint (Army/Navy) Hot Spot Tracking Program. In March 1981, a Military construction contract for the High-Energy Laser Systems Test Facility (HELSTF) was awarded to provide the physical plant for HEL testing at WSMR. At the end of FY 1982, construction was approximately 94% complete. Effort during FY 1982 included completion of the design of the Fluid Supply System (FSS) and assignment of construction responsibility for that system to the National Aeronautics and Space Administration (NASA), Johnson Test Center, White Sands Test Facility. A contract was awarded for the Pressure Recovery System (PRS) to provide the low-pressure gas collection and treatment facility needed by the Navy MIRACL device. A contract was awarded to obtain a Multi-Purpose Chemical Laser (MPCL) to be used in support of systems test, damage and vulnerability studies, etc., and for the initial engineering effort required to integrate, install, and interface all of the various systems and subsystems. During FY 1982, the facility computer was delivered and installed for initial test and preparation of application software to be used at HELSTF. The requirements, documentation, and design of the test cell to house the Multi-Purpose Chemical Laser and Auxiliary Beam Director and of the Effects Test Area were completed during FY 1982.

(2) (U) FY 1983 Program: Phase I construction of the High-Energy Laser Systems Test Facility will be completed early in FY 1983. Fabrication, installation, leakproof and check test, software integration and system tests of the Fluid Supply System (FSS) and associated control and safety systems will be completed by the NASA White Sands Test Facility. The Pressure Recovery System for the Mid-Infrared Advanced Chemical Laser (MIRACL) will be completed and installed late in FY 1983. A contract for operation and maintenance of the HELSTF will be awarded in FY 1983 as will a contract to construct the test cell housing the Multi-Purpose Chemical Laser. This latter contract will be completed early in FY 1984. A contract to construct a protective barrier for test cells, to provide facilities for the Instrumented Target Vehicle, to provide additional facilities for effects

Program Element: #65806A

Title: DOD High Energy Laser Systems Test Facility (HELSTF)

DOD Mission Area: #451 — Major Ranges and Test Facilities

Budget Activity: #6 — Defense Wide Mission Support

testing, and to provide deionized water for the Multi-Purpose Chemical Laser Test cell will be awarded in FY 1983 and completed in late FY 1983 or early FY 1984. A contract to provide integration, installation, and interface services and hardware will be definitized in FY 1983 with delivery of major systems integration support occurring during FY 1983 and completing during FY 1984. The Navy will install the Mid-Infrared Advanced Chemical Laser device and the remainder of the High-Energy Laser Experimental Test System (HELETS) during FY 1983 and early FY 1984. The Multi-Purpose Chemical Laser development activity will continue through FY 1983 and will be completed in FY 1984. System validation and verification testing, leading to cold flow testing, will occur during FY 1983 to support the SEA LITE Test.

(3) **(U) FY 1984 Planned Program and Basis for Budget Year Request:** WSMR will continue to acquire, install, and check out instrumentation and facility support equipment and to fund for recurring operating costs not specifically identified to a customer test. Recurring costs include a cadre of civilians required in conjunction with contractor services for operation and maintenance of facilities required to maintain an operating capability to support DOD customers. The Optical Train for the Multi-Purpose Chemical Laser and the Beam Expander for the Auxiliary Beam Director constitute the major instrumentation systems to be procured this fiscal year. Initial operating capability of the High-Energy Laser Systems Test Facility will occur by the end of FY 1984. During FY 1984, characterization testing of the High-Energy Laser Experimental Test System and major components will begin. The initial phases of the Navy Sea Lite test program will commence.

(4) **(U) Program to Completion:** WSMR will continue to develop and maintain the operating capability necessary to meet HELSTF test requirements of DOD customers. This includes in-house and contractor effort planned to meet a level-of-effort for customer testing in FY 1985 and outyears.

c. **(U) Major Milestones:** Not Applicable.

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FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65807A

Title: Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE)

DOD Mission Area: #461 — Major Ranges and Test Facilities

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ in Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0* -	2992	17680	23637	70576	115285
D616	Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE)	- 0* -	2992	17680	23637	70576	115285

*Funded in the amount of $2300 thousand under project #DE94 (Electronic Proving Ground), PE #65804A (DARCOM Ranges/Test Facilities).

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The program element establishes a capability for effective and efficient development testing of advanced command, control, communications, and intelligence (C³I) systems, prior to production, and deployment. The new test capability will be integrated with existing instrumentation and test facilities.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ in Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	- 0 -	2992	17680	94413	115285
Funds (as shown in FY 1983 submission)	- 0 -	17119	36595	52456	106170

The funding decrease of $14127 thousand in FY 1983 is a result of Congressional direction in the FY 1983 Appropriations Act. Prior to proceeding further with MAINSITE, the Army is to develop and present to Congress a detailed plan, refined cost estimates, and an assessment of technical complexity. Remaining funding differences (i.e., in FY 1984, in "cost to completion", and in "total estimated cost") are based on current planning and cost estimates, assuming Congressional approval of the Army plan.

UNCLASSIFIED

Program Element: #65807A

Title: Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE)

DOD Mission Area: #451 — Major Ranges and Test Facilities

Budget Activity: #6 — Defensewide Mission Support

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable. MAINSITE makes use of an existing facility (Hayes Hall) and will share use of a facility to be built for the Electromagnetic Environmental Test Facility at the Army Electronic Proving Ground.

E. (U) RELATED ACTIVITIES: MAINSITE will be integrated with other facilities and instrumentation at the Army's Electronic Proving Ground, Fort Huachuca, AZ, to provide a unique national capability to fully stress C³I systems in an intense electromagnetic battlefield environment truly representative of the full spectrum of Army, other Service, allied, and enemy emissions. Operation of MAINSITE in support of Army and joint Service tests will be funded by Project #DE94 (Electronic Proving Ground), Program Element #65804A (DARCOM Ranges/Test Facilities). MAINSITE will have the capability to support other Army operational and developmental test activities involved in C³I development. These include the US Army Intelligence and Security Board, Ft. Huachuca, AZ, and the US Army Communications-Electronics Board, Ft. Gordon, GA. Both boards are US Army Training and Doctrine Command activities funded under Project #DV02 (Test Boards), Program Element #65712A (Support of Operational Testing). Equipment specifically aimed at enhancing productivity of C³I test personnel is being acquired under Program Element #65872A (Productivity Investment Funding) in FY 1982 and FY 1983. The Army Staff directs close and continuous coordination between MAINSITE and related activities. The Office of the Director of Defense Test and Evaluation carefully reviews the management, operation, and maintenance not only of MAINSITE, but also of all Department of Defense test facilities, to avoid unnecessary duplication of capabilities and to insure that the highest priority capabilities are established expeditiously and suitably maintained.

F. (U) WORK PERFORMED BY: The work is performed by in-house personnel (civilian and military) assigned to the Army Electronic Proving Ground. Significant contractor effort will be involved. A program support contract has been awarded to Jet Propulsion Laboratory, Pasadena, CA. This contract provides technical support for reviewing software proposals and writing system specifications.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. **(U) Project: D616 — Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE)**

a. (U) Project Description: MAINSITE is a major test instrumentation and modernization program designed to improve automated testing of battlefield system, in particular those tests pertaining to interoperability with other Command, Control, Communications, and Intelligence (C³I) Systems while such systems are being developed or product improved. The US Army Test and Evaluation Command has validated the feasibility of this concept by using interim hardware and software at the Army's Electronic Proving Ground. It will provide the tester with a system capable of either

Program Element: #65807A

Title: Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE)

DOD Mission Area: #451 — Major Ranges and Test Facilities

Budget Activity: #6 — Defensewide Mission Support

individualized or centralized control and repeatability of test or portions of test in order to maintain positive control over the test process. MAINSITE will also be capable of supporting operational tests by creating realistic signal environments and monitoring operational test environments, as well as supporting contractor in-plant design and developmental test to insure that C²I System problems can be found early. MAINSITE does not provide instrumentation for field testing of deployed C²I systems. Such testing is accomplished using automatic test equipment or test, measurement, and diagnostic equipment.

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: (Funded under Project #DE94 (Electronic Proving Ground) program element #65804A (DARCOM Ranges/Test Facilities) in FY 1982.) A contract was awarded in October 1981 to Jet Propulsion Laboratory, Pasadena, CA, for program support, including technical review of specifications, configuration management, and verification and validation of system software. The MAINSITE system contract Request for Proposal was released to industry in December 1981. High industry interest has resulted. During FY 1982 detailed cost analyses and management plans were completed and the concepts for testing large computer-based C²I systems were refined.

(2) (U) FY 1983 Program: The planned date for MAINSITE system contract award is early CY 1983. The contractor will then prepare detailed hardware and software design specifications. After approval of the design specifications by the Army, the contractor will begin procurement of the Phase I, or basic, system at an estimated cost of $44 million, subject to Congressional approval of the acquisition plan.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: Completion of contractor procurement and acceptance testing of the Phase I basic MAINSITE system are planned for May 1984. Government system testing will be conducted, and test results will be independently evaluated by the US Army Materiel Systems Analysis Activity (AMSAA). The Army has approved acquisition of the basic system only. A procurement decision regarding acquisition of additional MAINSITE system (Phase II) equipment will be made in the fourth quarter FY 1984 based on projected workload. The Phase II system will be fully capable of testing advanced large-scale computer-based C²I systems. Consideration will be made towards Phase II subsystems providing the capability to support operational tests and tests at locations other than the Electronic Proving Ground.

(4) (U) Program to Completion: MAINSITE is expected to have a limited (i.e., partial) capability for testing of C²I systems, using the Phase I basic system, in FY 1985. Award of the Phase II system contract for procurement of additional portions of a complete MAINSITE system, if required, is planned for early FY 1985. Completion of this procurement is planned for end FY 1987.

Program Element: #65807A

Title: Modular Automated Integrated Systems Interoperability Test and Evaluation (MA' ITE)

DOD Mission Area: #451 — Major Ranges and Test Facilities

Budget Activity: #6 — Defensewide Mission Sr- rt

c. (U) Major Milestones: Not Applicable

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: **#65808A** Title: **Manufacturing Methods and Technology**

DOD Mission Area: **#480 — Production Base Support** Budget Activity: **#6 — Defensewide Mission Support**

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	- 0 -	50858	- 0 -	- 0 -	Not Applicable	Not Applicable
DE86	Manufacturing Methods and Technology/ Military Adaption of Commercial Items (Procurement Appropriation Transfer) (MMT/MACI(PAT)).	- 0 -	50858	- 0 -	- 0 -	Not Applicable	Not Applicable

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: The Manufacturing Methods and Technology (MMT) program provides improvements to manufacturing processes, techniques, and equipment to bridge the gap between research and development and full-scale production, reduces US reliance on foreign tehnology, and assists in rebuilding the Defense Industrial Base. These projects are expected to result in a "factory floor" application of productivity enhancing technologies and are viewed as seed money investments necessary to reduce the technical/fiscal risks of follow-on implementation of the results by the private sector. The Military Adaptation of Comercial Items (Procurement Appropriation Transfer) (MACI(PAT)) program conducts operational evaluation of commercial items which are to be used as a replacement for standard items in the Army inventory when the standard item is no longer available to meet the need and/or significant savings can be realized. MACI (PAT) projects were procurement appropriation funded prior to the FY 1983 Appropriations Act and will again be procurement funded in FY 1984. MACI projects designed to either meet new or increased performance requirements are identified according to the specific requirement and are funded by the RDTE,A appropriation. The only MACI project for a new or increased performance requirement under this program element is a FY 1983 $1000 thousand reprograming action which will allow the Fast Attack Vehicle (FAV) to undergo: a full range of technical feasibility and RAM tests, development of a performance specification, and weapons systems interface definition to support a future competitive procurement. In addition, this program element was subjected to a pro rata application of the general Congressional reduction to the RDTE,A appropriation in the amount of $142 thousand. The completion of this planned reprograming and the application of the general reduction results in the FY 1983 estimated funding level of $50,858 thousand.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: MMT/MACI efforts are included in the FY 1984 Procurement Budget Request. FY 1983 RDTE funding of the MMT/MACI effort was a result of the FY 1983 Appropriations Act which deleted all MMT/MACI funding ($120.0 million) from the procurement appropriations and provided $50.0 million in the RDTE appropriation for this purpose. This action was a result of the markup of the FY 1983 Defense Appropriations Bill by the Defense Subcommittee of the House Appropriations Committee, which deleted all MMT/MACI funding.

Program Element: **#65808A** Title: **Manufacturing Methods and Technology**

DOD Mission Area: **#480 — Production Base Support** Budget Activity: **#6 — Defensewide Mission Support**

The action is inconsistent with the findings of the House Appropriations Committee Surveys and Investigations Staff Report of March 1960. Furthermore, the very similar Navy and Air Force MMT programs were and continue to be procurement funded, as the Army's MMT program had been. The issue of whether the MMT Program should be funded from RDTE or procurement appropriations is a longstanding issue which formed the basis for the Surveys and Investigations Staff Report noted above. The basis for continuing funding MMT under procurement appropriations is as follows:

1. The Congressional Survey and Investigations Staff report, previously noted, states: "The Investigative Staff believes under the present funding arrangements there is less likelihood that MMT-type efforts will be undertaken indiscriminately or randomly because current production funding mandates that these efforts be tied to a target procurement. One of the clearest advantages of continuing to fund the MMT program with procurement money is that it forces the manufacturing segment to participate in the design and development of the manufacturing process and encourages MMT program managers to be responsive in taking the lead in the aquisition forces in the production/procurement system."
2. MMT is a production-oriented program directly supporting the industrial base.
3. MMT is "return on investment" oriented and investments are directly linked to known weapon system procurements
4. MMT exploits techniques demonstrated to be feasible on a laboratory basis, but which have not yet been reduced to an economical production process.
5. By showing a first case, factory-floor application, MMT projects reduce the fiscal and technical risks of follow-on implemention of the same technology on the production line with private sector funds.

FY 1994 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65872A

Title: Productivity Investment Funding

DOD Mission Area: #473 — Defense System Cost-Effectiveness/Improvement

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1992 Actual	FY 1993 Estimate	FY 1994 Estimate	FY 1995 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3889	19945	21098	6681	Continuing	Not Applicable
ME88	Resource Self-Help/Affordability Planning Effort—US Army Materiel Development and Readiness Command, RESHAPE-DARCOM	- 0 -	9007	11785	2883	Continuing	Not Applicable
DE89	Quick Return on Investment Program and Productivity Enhancing Capital Investment Program, QRIP & PECIP	- 0 -	3949	3791	3798	Continuing	Not Applicable
DE98	Office of Secretary of Defense Productivity Investment Funding—US Army Materiel Development and Readiness Command, OSD PIF-DARCOM	3889	6717	5522	- 0 -	Continuing	Not Applicable
DW01	Office of Secretary of Defense Productivity Investment Funding — Ballistic Missile Defense, OSD PIF-BMD	- 0 -	272	- 0 -	- 0 -	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element finances Army research and development support of productivity improvements through investment in productivity-enhancing capital equipment and productivity-enhancing management initiatives in accordance with DODI 5010.35, Department of Defense (DoD) Productivity-Enhancing Capital Investment Program; DODD 3201.1, Management of DoD Research and Development Laboratories; and DODI 3201.3, DoD Research and Development Laboratories.

Program Element: #65872A

Title: Productivity Investment Funding

DOD Mission Area: #473 — Defense System Cost-Effectiveness/Improvement

Budget Activity: #6 — Defensewide Mission Support

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	3889	19945	21098	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	3889	34139	21658	Continuing	Not Applicable

The funding decrease of $14194 thousand in FY 1983 is primarily a result of Congressional direction in the FY 1983 Appropriations Act. The funding decrease of $560 thousand in FY 1984 is a result of a combination of the additional funds provided by OSD for OSD PIF-DARCOM efforts ($5966 thousand), and two decreases: one in funding for RESHAPE-DARCOM due to internal Army adjustments ($5400 thousand), and the other a reduction of anticipated inflation in the proposed Army RDTE budget ($1126 thousand).

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: The DOD Productivity Enhancing Investment program encompasses efforts in all three Services and selected Defense agencies in the following appropriations: Military Construction, Operations and Maintenance, Procurement, and RDTE.

F. (U) WORK PERFORMED BY: This project provides for procurement of equipment by contract and for overhire and overtime to provide peak demand labor hours on an economical basis. Contractors have not been selected.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1984:

1. (U) DESG — QRIP & PECIP: These productivity enhancing capital investment programs provide "seed money" to finance fast payback (4 years or less) capital tools, equipment, and facilities. Projects are prioritized and approved for funding based on the greatest internal rate of return, savings-to-investment Ratio, and rate of investment per manpower spaces saved. In order to validate savings/benefits from these investments, a post-investment analysis of each project is conducted six months subsequent to the operational date of the equipment, and reports are made to Congress annually. QRIP and PECIP have been expanded from one appropriation category (Other Procurement, Army) to three others (RDTE, Ammunition Procurement, and Operation and Maintenance, Army). An example of an FY 1984 effort is the installation of heat recovery units at the Kwajalein Missile Range in order to use hot waste gases for water heating. Projected annual savings are $156 thousand in electric utility costs.

Program Element: #65872A

Title: Productivity Investment Funding

DOD Mission Area: #473 — Defense System Cost-Effectiveness/Improvement

Budget Activity: #6 — Defensewide Mission Support

2. *(U) DE98 — OSD PIF-DARCOM:* The Department of Defense (DOD) established a Productivity Enhancing Investment Program, which was begun in FY 1982, for the express purpose of improving personnel productivity through expanded capital investment in productivity-enhancing equipment. Funds identified to projects within this program cannot be reprogramed without Office of the Secretary of Defense (OSD) approval. Fiscal management controls have been established to insure that projects are funded as planned. Post-investment analysis is conducted to identify the benefits achieved, to include the impact on productivity of the organizations involved and the disposition of manpower savings. DE78, Productivity Investment Funding was originally established in FY 1982 to aggregate those productivity-enhancing investments managed by OSD. For 1983 Project #DE78 was redesignated as #DE98, OSD PIF-DARCOM to emphasize the fact of OSD management. The following projects are included in the FY 1984 effort: Project No. 84006D/Heavy Duty Steerable Pedestals (for Big Crow), increases capabilities of electronic warfare testing platforms for a projected annual savings of $803 thousand. Project No. 84008D/In Air Refueling (Big Crow), decreases number of flights required and range time for electronic warfare test platform for a projected annual savings of $1132 thousand. Project No. 84010D/AURORA Modernization, upgrades capability of AURORA facility to simulate nuclear weapon effect/electromagnetic pulse and thereby reduce costly underground nuclear testing requirements. Project No. 84022D/Electronic Imaging Camera, upgrades munitions and weapons testing electronic imaging high speed event camera equipment for a projected annual savings of $191 thousand in operational and film processing costs. Project No. 84024D/RFSS Array Improvement, reduces calibration time required by missile simulation testing for a projected annual savings of $9316 thousand in missile flight testing.

3. (U) DW01 — OSD PIF-BMD: This project is similar to project DE98, OSD PIF-DARCOM, the only difference being that the efforts are accomplished by BMD activities. It is reported separately from project DE98 to facilitate better fiscal control. Current plans provide for a window energy loss reduction project at Kwajalein Missile Range in FY 1983.

H. (U) PROJECTS OVER $10 MILLION IN FY 1984:

1. (U) Project: ME88 — RESHAPE-DARCOM

a. (U) Project Description: Resource Self-Help/Affordability Planning Effort (RESHAPE) is the central productivity improvement program of DARCOM. As such it is the pivotal program to enhance productivity in the wholesale logistic base of the Army. Implementation has been underway since 1981. It is an intensive management effort to attain more productivity from the current workforce. Under the concept of RESHAPE, the headquarters and each subordinate command have established productivity goals measured in man-years to be accomplished through overtime, overhire, capital investment, organizational streamlining, and other management initiatives. Beginning in FY 1983, project ME88 funds the R&D part of RESHAPE's management initiative program and that part of RESHAPE's productivity-enhancing capital investment program not funded under existing productivity investment programs. The results of this program are audited in a series of semiannual budget submissions. RESHAPE will assist

Program Element: #65872A

Title: Productivity Investment Funding

DOD Mission Area: #473 — Defense System Cost-Effectiveness/Improvement

Budget Activity: #6 — Defensewide Mission Support

DARCOM's workforce, which is stabilized at 117,000, in meeting an expected Army wholesale logistic requirement for a 143,000-man-year effort in FY 1984.

b. (U) Program Accomplishments and Future Efforts:

(1) (U) FY 1982 Accomplishments: The FY 1982 total ($77829 thousand) effort, which was funded with core resources (all appropriations), resulted in a man-year gain of 2,614.

(2) (U) FY 1983 Program: This RDTE-funded FY 1983 effort is expected to result in a man-year gain of 105 in the first year and an additional man-year gain of 33 in each of the succeeding five (5) years.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: Approximately 60% of FY 1984 funding will be devoted to capital investment. The expected result of this effort is a man-year gain of 500.

(4) (U) Program to Completion: Capital investment will continue. Overhire and overtime are not funded after FY 1984.

c. (U) Major Milestones: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65899A

Title: Installation Audiovisual Support (Research and Development)

DOD Mission Area: #471 — General Management Support

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3040	2342	6037	6781	Continuing	Not Applicable
MM80	Installation Audiovisual Support	3040	2342	6037	6781	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This continuing program will provide resources for management and operation of audiovisual offices/activities at Research, Development, Test, and Evaluation (RDTE)-operated installations/commands.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	3040	2342	6037	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	2278	2344	2408	Continuing	Not Applicable

Budgeted funding levels (as shown in FY 1983 submission) were based on original program element definition which required identification of resources necessary to provide audiovisual support to Army RDTE-operated installations. Prior to FY 1982, all Army RDTE audiovisual support was charged to and reported as part of the total cost of each RDTE project. Initial identification of FY 1982, FY 1983, FY 1984 Army RDTE audiovisual costs was incomplete. The FY 1984 request is considered to be the first complete estimate of the actual costs that should be reflected in this Program Element. Changes in funding as reflected above are as follows: (1) During the execution of the FY 1982 program, $762 thousand was reprogramed into this program element to identify additional resources used to provide audiovisual support to RDTE-operated installations/commands. (2) The funding decrease of $2 thousand in FY 1983 is a result of pro rata application of general Congressional reductions to the RDTE,A appropriation. (3) The increase of $3.6 million in the FY 1984 funding level results from transfers from other program elements within the RDTE appropriation to properly identify and program resources required to manage and operate audiovisual offices/activities at RDTE-operated installations/commands in accordance with revised program element definition guidelines.

Program Element: #65890A

Title: Installation Audiovisual Support (Research and Development)

DOD Mission Area: #471 — General Management Support

Budget Activity: #6 — Defensewide Mission Support

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable.

E. (U) RELATED ACTIVITIES: None.

F. (U) WORK PERFORMED BY: Subordinate Research, Development, Test and Evaluation (RDTE) commands of The US Army Material Development and Readiness Command (DARCOM).

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1994: MM80 — Installation Audiovisual Support: Provides for direct expenses of offices/activities engaged in rendering audiovisual services or production of audiovisual products, including in-house or contract operations pertaining to management and administration of audiovisual activities; still and motion picture photography; television; audio recording; audiovisual production; replication and distribution activities; presentation systems; graphic arts; visually based multimedia materials; and the fabrication, storage, and loan of training aids and devices in support of research, development, testing, and evaluation. Excludes funds for audiovisual products and services which are directly programed and budgeted as a part of RDTE projects.

H. (U) PROJECTS OVER $10 MILLION IN FY 1994: Not Applicable.

FY 1984 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #65602A

Title: Management Headquarters (Research and Development)

DOD Mission Area: #471 — General Management Support

Budget Activity: #6 — Defensewide Mission Support

A. (U) RESOURCES (PROJECT LISTING): ($ In Thousands)

Project Number	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	41622	45304	43725	44228	Continuing	Not Applicable
HH02	Management Headquarters (Research & Development) (AMHA)	41622	45304	43725	44228	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element was established at the direction of the Office, Secretary of Defense, for the purpose of uniformity in programing, reporting, and justifying Management Headquarters Activities. This program provides the funding for those elements of the US Army Corps of Engineers headquarters, US Army Medical R&D Command, the US Army Materiel Development and Readiness Command headquarters, and six subordinate R&D command headquarters that (1) develop policy and guidance; (2) perform long-range planning, programing, and budgeting; (3) provide the management and distribution of resources; and (4) conduct program performance review and evaluation for the Research, Development, Test and Evaluation, Army appropriation. The requested resources for this program element will provide salaries and related personnel benefits for authorized civilian personnel and the necessary administrative support (temporary duty travel, operating supplies, and equipment).

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: ($ In Thousands)

	FY 1982	FY 1983	FY 1984	Additional to Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	41622	45304	43725	Continuing	Not Applicable
Funds (as shown in FY 1983 submission)	43007	45304	49007	Continuing	Not Applicable

Changes from the FY 1983 submission are as follows: (1) Decrease in FY 1982 reflects reprograming during the year of execution, to the companion program (Programwide Activities) Program Element #65601; (2) decrease in FY 1984 is a result of the reorganization of the US Army Tank-Automotive Readiness and Research & Development Commands into a single command. This reorganization included the formation of a Research and

Program Element: #65899A

Title: Management Headquarters (Research and Development)

DOD Mission Area: #471 — General Management Support

Budget Activity: #6 — Defensewide Mission Support

Development Center, a non Army Management Headquarters Activity. Spaces and dollars to support this R&D Center were transferred from this program element to Program Element #65801 (Programwide Activities) ($-3.4 million). In addition, there was a realignment of the US Army Materiel Development and Readiness Command headquarters, which resulted in a decrease to RDTE AMHA requirements, and an increase in OMA requirements ($-3.3 million). These decreases are partially offset by an increase to the US Army Medical R&D Command ($+1.7 million) required to execute the expanded Chemical-Biological program. The remainder ($-.3 million) is a result of a revision of the anticipated inflation in the proposed Army RDTE budget.

D. (U) OTHER APPROPRIATION FUNDS: ($ In Thousands) Not Applicable

E. (U) RELATED ACTIVITIES: Management headquarters activities perform policy and guidance development; long-range planning, programing, and budgeting; management and distribution of resources; and program performance review and evaluation. These activities support research and development effort conducted at RDTE laboratories, test facilities, and activities.

F. (U) WORK PERFORMED BY: US Army Materiel Development Readiness Command, Alexandria, VA; six subordinate R&D commands; the US Army Corps of Engineer Headquarters; and the US Army Medical R&D Command.

G. (U) PROJECTS LESS THAN $10 MILLION IN FY 1994: Not Applicable.

H. (U) PROJECTS OVER $10 MILLION IN FY 1994:

1. **(U) Project: H992 — Management Headquarters (Research & Development) (AMHA)**

a. **(U) Project Description:** This project provides for salaries and related benefits for civilian personnel and the necessary administrative support for operation of designated RDTE commands. This is a continuing level of effort project.

b. **(U) Program Accomplishments and Future Efforts:**

(1) (U) FY 1992 Accomplishments: Funding provided was utilized to pay civilian salaries and related benefits for assigned personnel, and provide the necessary administrative support for operation of nine headquarters designated as RDTE AMHA.

Program Element: #65999A

Title: Management Headquarters (Research and Development)

DOD Mission Area: #471 — General Management Support

Budget Activity: #6 — Defenseswide Mission Support

(2) (U) FY 1983 Program: The FY 1983 planned program will continue the operation of the RDTE command headquarters.

(3) (U) FY 1984 Planned Program and Basis for Budget Year Request: The FY 1984 request represents the minimum essential requirements for operation of the RDTE command headquarters. The funding reflects the reorganization of the US Army Tank-Automotive Readiness and R&D Commands into a single command, designed to provide unity of command over the acquisition process for tank-automotive equipment; the realignment of the US Army Materiel Development and Readiness Command headquarters, and an enhanced Medical R&D Command needed to execute and support the expanded R&D efforts in chemical and biological programs. All of these changes were accomplished within existing Army resources.

(4) (U) Program to Completion: This is a continuing program.

DEPARTMENT OF THE ARMY
RESEARCH, DEVELOPMENT, TEST AND EVALUATION, ARMY
MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDTE, ARMY APPROPRIATION

PART 1. UTILIZATION OF SECTION 2353, TITLE 10 AUTHORITY

Specialized R&D facilities and/or equipment determined to be necessary for the performance of a contract for a Military Department for research and development may be constructed by or furnished to the contractor and funded from appropriations available for research, development, test and evaluation. The Congress enacted this legislation, now 10 USC 2353, in 1956. This policy is executed through DOD Directive 4275.5. Under this policy, the Secretaries of the Military Departments or their designees, and the Directors of Defense Agencies may approve facilities projects up to $3,000,000; the Under Secretary of Defense Research and Engineering approves projects exceeding $3,000,000. The Congress is notified in advance of starting any project involving construction, regardless of the dollar amount. The table below provides a summary listing of all such projects accomplished in FY 1982 and planned in FY 1983 and FY 1984.

Facility/Equipment	RDTE Project Number	Contractor	Location	Total Obligational Authority (Thousands of Dollars) FY 1982	FY 1983	FY 1984
SECTION I						
Projects Accomplished or Underway						
Negative						
SECTION II						
Projects Planned or Projected						
Negative						

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDTE, ARMY APPROPRIATION

PART 2. UTILIZATION OF RDTE APPROPRIATION FOR FACILITIES AT GOVERNMENT-OWNED/GOVERNMENT-OPERATED INSTALLATIONS

The RDTE appropriation may finance the development, design, purchase, and installation (including directly related foundations, shielding, environmental control, weather protection, structural adjustments, utilities and access) of equipment or instrumentation required for research, development, test and evaluation activities. The table below provides a summary listing of all such projects for the installation of equipment, where the cost of installation is $200,000 or more, accomplished in FY 1982 and planned in FY 1983 and FY 1984.

Facility/Equipment	RDTE Project Number	Location	Total Obligational Authority (Thousands of Dollars) FY 1982	FY 1983	FY 1984
SECTION I					
Projects Accomplished or Underway					
Negative					
SECTION II					
Projects Planned or Projected					
Negative					

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDTE, ARMY APPROPRIATION

PART 3. UTILIZATION OF RDTE APPROPRIATION FOR MINOR CONSTRUCTION

For in-house installations, construction projects in support of R&D for $200,000 or less are funded from RDTE appropriations. Such expenditures are authorized by 10 USC 2674 and the applicable provisions of the current DOD Appropriations Act. Under this procedure, project approval at this level is authorized by the Major Command concerned, or delegated to R&D installation commanders as appropriate. The table below provides a summary total of such minor construction accomplished in FY 1982, and the estimated amounts planned for FY 1983 and FY 1984. All minor construction must result in a complete and usable facility. In no event are two or more minor construction projects or minor and major construction projects to be contrived to form a usable facility.

SUMMARY OF MINOR CONSTRUCTION FUNDED BY RDTE, ARMY

FY 1982	FY 1983	FY 1984
$3,600	$6,300	$6,700

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The proponent agency of this pamplet is the Office of the Deputy Chief of Staff for Research, Development and Acquisition. Users are invited to send comments and suggested improvements to HQDA (DAMA-PPR-B), Washington, DC 20310.

By Order of the Secretary of the Army:

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