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DESCRIPTIVE SUMMARIES OF THE RESEARCH DEVELOPMENT TEST & EVALUA--ETC(U)
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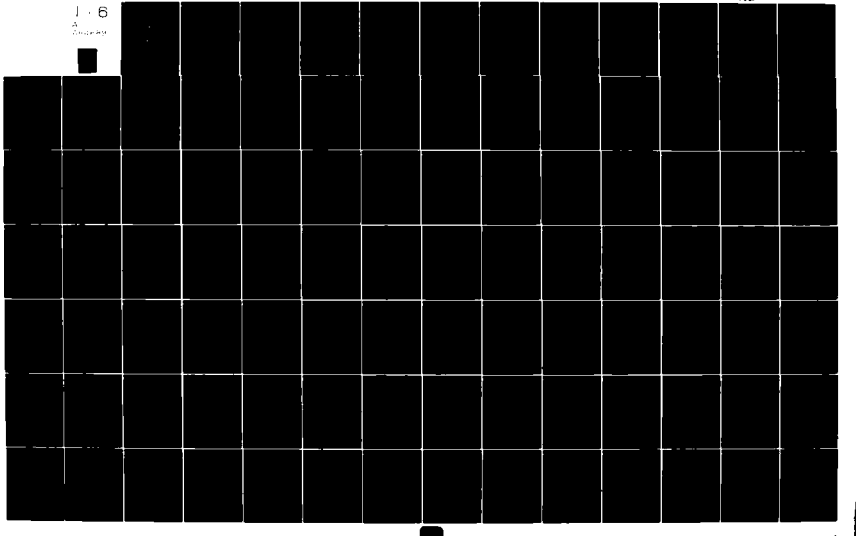

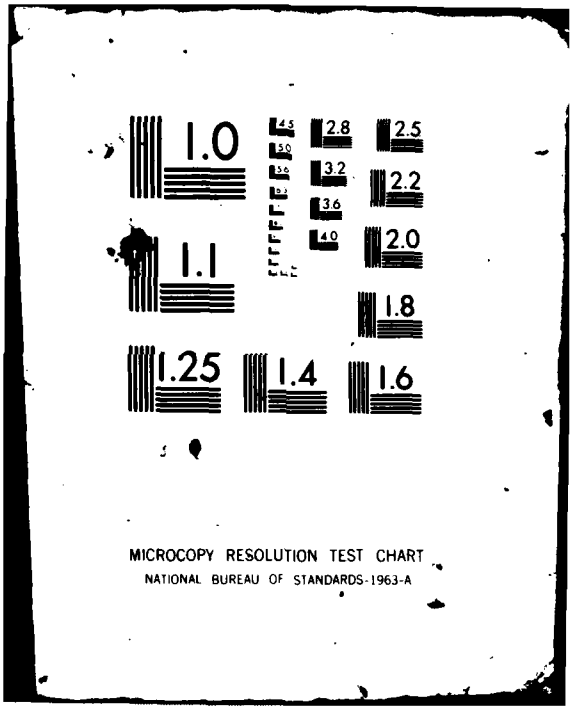
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DA PAM 5-6-1

VOLUME III

Supporting Data FY 1983
Budget Estimate

Submitted to CONGRESS February 1982

Descriptive Summaries Of The

RESEARCH DEVELOPMENT TEST & EVALUATION

Army Appropriation FY 1983 (U)

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

VOLUME III

DESCRIPTIVE SUMMARIES FOR PROGRAM ELEMENTS

OF THE

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, ARMY PROGRAM

FY 1983 (U)

FEBRUARY 1982

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

FORWARD

These volumes have been prepared to provide information on the US Army Research, Development, Test and Evaluation Program for Congressional Committees during the Fiscal Year 1983 budget hearings. This information supplements the testimony given by US Army witnesses.

In recent years the Army RDTE program has concentrated on the development of a new generation of major weapons systems across the entire spectrum of Army mission areas. Most of these systems are now completing development and will be transitioning to procurement in the next few years. In FY 1983 and beyond, increased emphasis will be placed on the technology base in areas such as advanced surveillance and target acquisition; improved command, control, communications, and intelligence; self-contained munitions; biotechnology; and the soldier-machine interface. New technology which is advancing from exploratory development to advanced development in areas such as laser weapons systems and lightweight air defense and armor/antiarmor systems will be demonstrated. Efforts will be accelerated in research for microelectronics, millimeter wave technology, fire control, and development of medical, chemical, and life support materiel for use in chemical/biological defense. Product improvement programs on fielded systems such as the Cobra helicopter's engine, M1 Abrams Tank, and Bradley Fighting Vehicle System will be aggressively pursued in the future. The development of the Ballistic Missile Defense System will have high priority in this program to support the President's strong commitment to developing a viable ballistic missile defense. The Congressional Descriptive Summaries address these and other thrusts in detail.

These volumes contain a descriptive summary for each program element to be financed during FY 1983. Descriptive Summaries for projects within the program elements to be financed during FY 1983 for $5.0 million or more appear immediately following the applicable program element. Where there are several items under development within a project, a separate summary has been provided for each item that exceeds $5.0 million during FY 1983. A Test and Evaluation Section is provided for all major weapon systems. Major weapon systems are identified by an asterisk in the Table of Contents. The format and contents of these volumes are in accordance with guidelines and requirements of the Congressional Committees.

A direct comparison of FY 1981, FY 1982, and FY 1983 data in the Program Element Listing with data shown in the Program Element Listing dated March 1981 will reveal differences. Major procedural causes for differences are attributable to the following factors:

a. Restructuring of the FY 1983 program to provide greater visibility for certain efforts and to improve the effective management of the RDTE program.

b. Restructuring of the FY 1981 and FY 1982 programs for comparability to the FY 1983 program structure.

Procurement data are shown where applicable for items in engineering or operational development. Military construction data are also provided where applicable. Classified information is identified by the use of brackets [ ].

TABLE OF CONTENTS

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME I

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME I

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME I

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME I

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME I

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME I

VOLUME II

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT 'SCIENTIFIC AREA/TECHNICAL AREA

VOLUME II

TACTICAL PROGRAMS (con't)

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME II

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME II

TACTICAL PROGRAMS (con't)

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME II

x

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME III

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME III

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME III

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME III

BUDGET ACTIVITY
PROGRAM ELEMENT
PROJECT/SCIENTIFIC AREA/TECHNICAL AREA

VOLUME III

DEFENSEWIDE MISSION SUPPORT (con't)

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.01.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4853	11707	5601	4870	Continuing	Continuing
	QUANTITIES						
D029	Lightweight Company Mortar Systems (LWCMS)	214	1106	1342	931	-	-
D030	Multipurpose Ammunition	134	1337	1371	3939	-	-
D144	*Smoke Mortar Rounds*	1528	2488	1675	0	-	-
D227	Battalion Mortar System	2607	4131	0	0	-	-
D031	25mm Ammo PIPS	0	2645	64	0	-	-
D032	High Explosive Antiarmor Grenade	370	0	1149	0	-	-

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 at the company and battalion levels with their own responsive, high-angle, indirect fire support capability. The 60mm Lightweight Company Mortar System (LWCMS) provides the company commander in nonmechanized infantry units with a lightweight, responsive, easily transportable indirect fire weapon capable of delivering both high explosive (HE) and illumination fires in offensive and defensive missions. The 81mm battalion mortar system will provide the battalion commander in nonmechanized units and the company commander in mechanized units 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 cartridges for the 81mm mortar and 4.2" battalion heavy mortar, in use since the 1940's, are 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

Program Element: #6.46.01.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Infantry Support Weapons
Budget Activity: #4 - Tactical Programs

effects against light armor and aircraft targets at a reduced cost. Rights to produce this ammunition have been obtained to facilitiate application of the technology to US weapons. This fuzeless ammunition technology will be developed in 25mm and 40mm sizes for triservice application. Project D031, a new start in FY82, will provide an APDS-T practice round, and modify the XM758 fuze for the 25mm BUSHMASTER family of ammunition.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: The request for Project D029, Lightweight Company Mortar System, will permit continuation of engineering development (ED) of the XM721 illumination round. Project D030 will permit the engineering development of multipurpose fuzeless technology in 25mm and 40mm ammunition. The request for Project D032, High Explosive Antiarmor Grenade (HAG), will support DT/OT and type classification. The 81mm XM819 smoke mortar round will complete preliminary and commence DT/OT.

Project	Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
D029	Type Classification for XM745 Gutted Multioption Fuze	1Q FY 1983	None Shown
D029	Type Classification XM721 Illum (60mm)	4Q FY 1985	None Shown
D030	Type Classification (25mm)	4Q FY 1983	FY 1983
D030	Type Classification (40mm)	FY 1984	None Shown
D144	Type Classification XM819 Smoke (81mm)	2Q FY 1984	4Q FY 1983
D227	Acquire 18 Test Weapons	1Q FY 1979	1Q FY 1979
	Codevelopment (US/UK)	4Q FY 1981	None Shown
	Begin Development Test/	3Q FY 1982	4Q FY 1981
	Operational Test (DT/OT)	4Q FY 1982	2Q FY 1982
	Complete DT, OT	4Q FY 1982	2Q FY 1982
	Development Acceptance IPR	1Q FY 1983	3Q FY 1982
	Type Classification XM853 (81mm Illum)	4Q FY 1985	3Q FY 1982
	Initial Operational Capability (system)	2Q FY 1987	1Q FY 1985

Program Element: #6.46.01.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Infantry Support Weapons
Buiget Activity: #4 - Tactical Programs

Project	Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
D032	Type Classification	4Q FY 1983	None Shown

Difference in D144 is due to a six-month delay in initiating full-scale engineering development. Initiation of development testing in D227 is due to a restructuring of the program based on a March 1981 successful demonstration of a solution to wet performance problems and a 21 July 1981 program review. IOC for this system is delayed to insure fielding of total system (weapon and ammunition).

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	4853	11707	5601	Continuing	Continuing
Funds (as shown in FY 1982 submission)	3835	11740	6183	Continuing	Continuing

The increase in FY81 is due to a restructuring of the program element and a reprograming of funds to D144 Smoke Mortar Rounds. The decrease in FY82 is a result of the application of revised inflation and civilian pay pricing indices. The decrease in FY83 is due primarily to a restructuring of the program element in project D031 and D032.

Program Element: #6.46.01.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Infantry Support Weapons
Budget Activity: #4 - Tactical Programs

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Weapons and Tracked Combat Vehicles, Army						
Mortar, 81mm, XM252						
Funds (current requirements)	0	1900	10600	37900	198800	249200
Funds (as shown in FY 1982 submission)	0	8300	18500	-	27400	54200
Quantities (current requirements)	0	60	352	1204	5443	7059
Quantities (as shown in FY 1982 submission)	0	300	636	-	883	-

Differences due to an additional one-year slip in proposed procurement of the UK 81mm mortar because of overpressure and wet efficiency problems in testing. Cost increases are due to increase in sales price from UK and devaluation of the dollar against the British pound and a requirement for an increase in quantity. Increased requirement due to revised acquisition objective based on replacement of all 4.2-inch mortars and 81mm mortars (except those replaced by the 60mm mortars).

Program Element: #6.46.01.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Infantry Support Weapons
Budget Activity: #4 - Tactical Programs

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Procurement Ammunition, Army						
Cartridge, 60mm, LWCMS, All types						
Funds (current requirements)	8600	16300	26000	33200	Continuing	Continuing
Funds (as shown in FY 1982 submission)	0	17100	0	0	Continuing	Continuing
Quantities (current requirements)	73000	130000	214000	320000	Continuing	Continuing
Quantities (as shown in FY 1982 submission)	0	16400	0	-	-	-
Cartridge, 81mm, Improved (all types)						
Funds (current requirements)	0	0	0	62800	*	*
Funds (as shown in FY 1982 submission)	0	All types not shown in 82 submission 0	-	-	-	-
Quantities (current requirements)	0	0	0	393000	*	*
Quantities (as shown in FY 1982 submission)	-	-	-	-	-	-

Cost to completion not estimated for ammunition since procurement is continuous based on usage.

Program Element: #6.46.01.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Infantry Support Weapons
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The Lightweight Company Mortar System (LWCMS) consists of an improved 60mm mortar, conventional-style fire control, high explosive ammunition fuzed with a new M734 multioption electronic fuze, and the XM745 training fuze (gutted M734 multioption fuze). Illuminating ammunition will be developed. The Lightweight Company Mortar System fulfills the requirement to provide a manportable fire support system at the company level for nonmechanized units and will replace the 81mm mortar in all infantry units except mechanized infantry. Even though the 47-pound mortar and 3.75-pound round of ammunition weigh less than half the present 95-pound 81mm mortar and nine-pound round of ammunition, the lethality of the LWCMS equals about 70% of the 81mm mortar per round. The mortar can be fired out to 1000 meters using a small baseplate and no bipod, or out to 3500 meters using the standard baseplate and bipod. The new illuminating round will have a sufficient range to illuminate targets being engaged with the high explosive (HE) cartridge at maximum range (3500 meters). The 81mm smoke screening cartridges will provide greater screening capability. The Battalion Mortar System will provide an improved 81mm mortar capability of increased range, increased lethality, greater accuracy, and a higher sustained rate of fire than the current 81mm mortar. The improved 81mm mortar will fire newly developed ammunition to a range of approximately 5700 meters, and can fire all current ammunition. The United Kingdom (UK) L16A2 81mm mortar is being modified to fill the Improved 81mm mortar requirement. The system includes a UK L16A2 barrel and L5A5 mount, US M3 baseplate and M64 sight, and UK XL31E2 HE projectile with the US M734 multioption fuze. The illumination round under development in the US will provide improved illumination through increased burn time and greater candlepower. Multipurpose gun ammunition, developed by Raufoss Ammunisjonsfabrikker, Norway, in 20mm and .50 caliber sizes will provide a major increase in light armor and aircraft kill capabilities. This ammunition uses a fuzeless technology to delay detonation and enhance incendiary effects at a cost reduction over fuzed cartridges. The Army negotiated for technology and production rights to support tri-Service requirements. The Army will develop ammunition in 25mm and 40mm sizes. The High Explosive Antiarmor Grenade (HAG) will enhance the infantry close-in antiarmor capability.

G. (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) 6.36.08.A, Weapons and Ammunition, Lightweight Company Mortar System (LWCMS), supported advanced development of the LWCMS except for the multioption fuze. PE 6.36.13.A, Advanced Fuze Design, supported the advanced development of the multioption fuze, XM734. PE 6.46.02.A, Field Artillery Ammunition, supported engineering development of the fuze initially until it was transferred to this PE in FY 1974. PE 6.36.13.A, 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 illuminating round. PE 6.36.27.A, Combat Support Munitions, supported advanced development of 81mm smoke mortar round. The UK L16A2 evaluation has undergone feasibility testing under PE 6.57.09.A, Exploitation of Foreign Weapons. The multipurpos

Program Element: #6.46.01.A Title: Infantry Support Weapons
DOD Mission Area: #211 - Direct Fire Combat Budget Activity: #4 - Tactical Programs

ammunition has been evaluated under PE 6.26.17, Small Caliber and Fire Control Technology, and PE 6.57.14D, International Materiel Evaluation.

H. (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; Watervliet Arsenal, Watervliet, NY; 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.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Lightweight Company Mortar System (LWCMS): The basic LWCMS, high-explosive round, and revolutionary new multioption fuze were fully developed and type classified standard in July 1977. Engineering development work was completed on the subcaliber training round and it was type classified in June 1980. In FY78 producibility Engineering and Planning (PEP) on the M734 multioption fuze was completed and resulted in lower procurement costs. In FY79 engineering development was initiated on the XM745 multioption training round fuze. Smoke Mortar Rounds: Advanced development on the 81mm smoke round was completed in Combat Support Munitions, Program Element (PE) 6.36.27.A, Combat Support Munitions, Project DE82, and full-scale engineering development was initiated in April 1981. A draft requirements document for a 4.2-inch smoke screening round was approved. Battalion Mortar System: A US Army Test and Evaluation Command (TECOM) feasibility test of the UK 81mm L16A2 mortar system, in the October 1976-April 1977 timeframe, supported a full test and evaluation of the UK system as a candidate to fulfill the Improved 81mm Mortar Required Operational Capability (ROC). Eighteen mortars and 16,700 rounds were procured from the UK to conduct development and operational testing (DT/OT). Harry Diamond Laboratories (HDL) contracted with Eastman Kodak to buy M734 multioption fuzes (MOF) to test their adaptation to both the US and UK 81mm cartridges. Two UK mortars and 600 rounds of UK XL31E2 ammunition were acquired for the compatibility tests, which demonstrated the adaptation of the M734 to the UK 81mm mortar cartridge. Four M125A1 81mm mortar carriers, modified versions of the M113 armored personnel carrier, were converted to carry the UK system tested. Analysis of the mortar tube design and material was conducted by Benet Weapons Laboratory of the Armaments Research and Development Command (ARRADCOM). Development Testing (DT) was commenced in October 1978 at Aberdeen Proving Ground, MD, and the Cold Regions Test Center, Alaska. Problems with misfires and short rounds developed with the ammunition at temperature extremes, and testing was suspended in January 1979. A Special In-Process Review and a General Officers' Review evaluated the program and recommended that the UK correct the deficiencies and the program be resumed. This was accomplished, and DT was resumed in

Program Element: #6.46.01.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Infantry Support Weapons
Budget Activity: #4 - Tactical Programs

August 1979 at Aberdeen Proving Ground, MD. DT II was again suspended in January 1980, due to excessive blast overpressure and wet efficiency. A special review in May 1980 recommended a codevelopment contract be negotiated with the UK to resolve the blast overpressure problem. Development of the 81mm illumination round was initiated with acquisition of components for testing. The United Kingdom demonstrated solutions for wet efficiency/overpressure in March 1981. Subsequently, a program decision on the feasibility of a codevelopment effort, DT II/OT II, and type classification was made on 21 July 1981. The codevelopment contract was signed on 12 August 1982. Development of the High Explosive Antiarmor Grenade was initiated. Multipurpose ammunition: The ammunition technology was translated and test cartridges in 20mm, 25mm, and .50 caliber were fabricated to support initial engineering design tests.

2. (U) FY 1982 Program: Lightweight Company Mortar System: Engineering Development of the XM721 illumination round will be initiated along with the M65A1E1 fuze. Multipurpose ammunition: Engineering design test of the 25mm ammunition will be conducted. Testing will include alternate explosive fill interoperability and tracer improvement. Engineering development of a 40mm multipurpose round for DIVAD. High Explosive Antiarmor Grenade: Prototypes will be fabricated and ballistically tested, and procurement of DT II/OT II hardware will be initiated. Smoke Mortar Rounds: Engineering development will continue, and propellant/ignition cartridge redesign will be completed. Hardware will be procured to initiate preliminary government testing. Battalion Mortar System: The codevelopment effort will result in the design, fabrication, and test of the overpressure attenuation device and water-resistant propellant system and conduct of selected portions of Development Test II (DT II). Mounts for vehicle application will be fabricated and tested. Integrated logistic support items will be updated. DT II/OT II and operational climatic testing will be conducted to evaluate technical data and performance characteristics. The technical data package will be prepared, and a producibility engineering and planning effort undertaken for US production of the 81mm high explosive round. A Development Acceptance In-Process review will be held to determine whether the mortar and HE ammunition meet the requirements and should be type classified. Component testing of the 81mm illumination round will be continued.

3. (U) FY 1983 Planned Program: Lightweight Company Mortar System: Engineering Development will be continued on the XM721 illumination round. Multipurpose ammunition: Continue with fabrication of hardware and conduct DT II for 25mm ammunition and type classify late in the fiscal year. Conduct engineering development of a 40mm multipurpose round for DIVAD. Work includes definition of a projectile body which optimizes fragmentation and light armor penetration maximizing incendiary and delay effects and self-destruct capability. Smoke Mortar Rounds: Preliminary testing will be completed, and DT/OT II will be initiated. High Explosive Antiarmor Grenade: DT/OT II testing will be completed, and a Development In-Process Review will be held to type classify the grenade.

Program Element: #6.46.01.A Title: Infantry Support Weapons
DOD Mission Area: #211 - Direct Fire Combat Budget Activity: #4 - Tactical Programs

4. (U) FY 1984 Planned Program: Lightweight Company Mortar System: The XM721 illumination round will complete engineering development and be type classified during the fourth quarter. The training round with XM745 gutted multioption fuze will be type classified. Multipurpose ammunition: Continue with fabrication of hardware, and conduct DT II for the 40mm multipurpose ammunition.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.03.A Title: Nuclear Munitions

DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

A. RESOURCES (PROJECT LISTING): ($ in thousands)

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	13163	33920			Continuing	Not Applicable
	QUANTITIES	*	*	*	*	*	*
385	Improved 155mm Nuclear Projectile	11352	32898				
D584	Command Control and Security Systems	1	1022	1685	4342	Continuing	Not Applicable
D663	Improved 8-in Nuclear Projectile	1810	0	0	0	0	

* Warhead quantities exceed the classification of this document.

B. 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 th

Program Element: #6.46.03.A Title: Nuclear Munitions
DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

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 8-inch artillery-fired atomic projectiles (AFAP) currently available for NATO forces. This PE 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 to evaluate and identify the best combination of subsystems to improve the security of forward deployed Army nuclear weapons.

C. BASIS FOR FY 1983 RDTE REQUEST: Test and evaluate fully configured fuze setters. Complete Engineering Development (ED) testing with full function projectile firings, materials compatibility testing, and ordnance trainer evaluation. Initiate Development Testing II/Operational Testing II (DT II/OT II) (D385). Examine prototype denial systems for igloos containing nuclear weapons. Closely coordinate with user agencies to insure hardware developed is suitable for application on the various different igloo configurations (D584).

Program Element: #6.46.03.A 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 1982 Submission
Improved 155mm Nuclear Projectile Initial Operational Capability		
Command, Control and Security System Initial Operational Capability	See below	None specified, see below
Improved 8-inch Nuclear Projectile Initial Operational Capability		

The Command, Control, and Security Systems project objective supports weapon access denial system hardware development. The time schedule for incorporating this hardware in NATO storage sites is not yet defined.

D. COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	13163	33920			
Funds (as shown in FY 1982 submission)	11379	34024			

(U) The $1784 thousand increase in FY 1981 is a result of:
(U) D385 - Increase $1999 from other programs to level the project effort following the sharp OSD-directed reduction in the FY 1981 effort.
(U) D584 - Decrease of $215 thousand due to other higher priority Army requirements.
(U) The $104 thousand decrease in FY 1982 is a result of inflation adjustments.

Program Element: #6.46.03.A Title: Nuclear Munitions
DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

E. OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Ammunition Procurement, Army 155mm						
Funds (current requirements)	0	0				
Funds (as shown in FY 1981 submission)	0	0				
Quantities (current requirements)	**	**				
Quantities (as shown in FY 1981 submission)	**	**				
Ammunition Procurement, Army - 8-inch:*						
Funds (current requirements)	24600	16100				
Funds (as shown in FY 1981 submission)	19700	16500				
155mm nuclear nuclear Projectile	***	***	***	***	***	***
8-inch Projectile	***	***				

* Department of Defense Nuclear Weapon Components only.
** Warhead quantities exceed classification of this document.
*** DOE-DP budget figures exceed classification of this document.

The $223200 thousand increase in total estimated procurement costs for the Improved 155mm Nuclear Projectile from FY 1982 to FY 1983 is due to a and large increases in the cost of a number of DOE-developed components. The $4300 thousand increase in total estimated procurement costs for the Improved 8-inch Nuclear Projectile from FY 1983 to FY 1982 results from new requirements for a hand-cranked generator to power the system when engine-driven generator power is not available, and a contractor adjustment of the fuze production learning curve from 85% to 90%.

Program Element: #6.46.03.A Title: Nuclear Munitions
DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

F. DETAILED BACKGROUND AND DESCRIPTION: The objective of this program is modernization of the Army's battlefield theater nuclear weapons to improve their real warfighting capability against the growing Soviet-Warsaw Pact armored forces and thereby improve their deterrent value. Deterrence of armed aggression results from the enemy offensive planners' net assessment that their military operations will not succeed. The potent reserve of combat power provided by battlefield nuclear weapons, particularly artillery-fired atomic projectiles (AFAP), and the linkage to strategic systems they imply are two of the most important elements in deterring Warsaw Pact attack in Central Europe and Soviet military adventurism around the world. By their presence and possible use on the battlefield, US battlefield theater nuclear weapons can defeat massed enemy force concentrations or force the enemy to deploy his forces in a reduced mass posture that will disrupt their attack schedule and decrease their effectiveness in conventional combat. The Army modernization program improves the deterrent value of Army nuclear weapons and reduces the likelihood of a conflict that would lead to nuclear war. The nuclear capability for the Lance missile and 8-inch howitzer was modernized in preceding years, and these weapons are being produced. The major effort required in FY 1983 and outyears is the modernization of the 155mm nuclear capability. The current 155mm AFAP is due to (see paragraph A, D385 Project Descriptive Summary). It uses early 1950's nuclear technology that , and has an . The modernized 155 mm AFAP will be a lighter projectile, stressed for twice the launch setback forces and, with rocket-assist, will achieve ranges that allow standoff from of the Soviet cannon artillery. The modernized weapon will have a yield times greater than the old 155mm projectile, and will provide times the lethal coverage. The new projectile will have a radar fuze to produce a precise height-of-burst with greater assurance of precluding fallout. Firing data corrections derived from the conventional ammunition being fired will reduce delivery probable errors by or more as compared to the calculated corrections for the current 155mm AFAP. Finally, command and control on the new weapon will be provided by an electromechanical multiple-code permissive action link (PAL) instead of a mechanical lock, and weapon security will be improved by an integral, nonviolent command disable system. The command, control, and security system project is to develop and evaluate security system components and their integration into improved nuclear weapon access delay systems to improve the security of overseas nuclear weapon storage sites. The purpose of these systems will be to impose a guaranteed minimum delay to allow security backup forces to react to engage unauthorized site intruders. These systems will consist of active and passive devices functioning in synergism to impede the access to or removal of nuclear weapons in storage. This program is in response to a theater requirement to increase security beyond that provided in the Long-Range Security Program (LRSP)(storage site upgrade).

G. (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

Program Element: #6.46.03.A Title: Nuclear Munitions
DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

the rocket motor developed for the M650 conventional 8-inch projectile (SSN E66600). The M650 is the conventional ballistic mate that will be used to derive firing data corrections for the XM753. The command, control, and security systems project is being done in coordination with and was sponsored in FY 1981 by the Defense Nuclear Agency, Theater Nuclear Forces, Security, and Survivability (TNFS^2) Program. 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.

H. (U) WORK PERFORMED BY: US Army Research and Development Command (ARRADCOM), Dover, NJ; Harry Diamond Laboratories, Adelphi, MD; Army Materiel 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. (See also D385 Project Descriptive Summary.)

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Production of Lance warhead adaption kits to support the ongoing DOE build of enhanced radiation warheads was completed in FY 1979. The eight-inch nuclear projectile completed development and was type classified in FY 1981. Testing the structural integrity of field interchangeable projectile aft body/rocket motor joint and process engineering for rotating band attachment to the titanium projectile body of the 155mm AFAP was done in FY 1981. Flight testing of the 155mm AFAP design for ballistic performance was continued in FY 1981.

2. (U) FY 1982 Program: D385 - Joint DOD/DOE ballistic and full-function projectile testing will be initiated. The ballistic firings will provide data for preliminary firing tables for Development Test II/Operational Test II. Fuze structural and functional tests, shipping and storage container tests, and rocket motor safety and ground safety tests will continue. DT II/OT II hardware will be procured for the joint DOD/DOE system structural and functional testing and will be provided to DOE. D584 - Analyze impact of enhanced security concepts on user operations. Examine automatic, remote control security and delay systems. Coordinate weapon access delay developments with the user for interface and possible incorporation in the ongoing site-upgrade program.

3. (U) FY 1983 Planned Program: D385 - The first fully configured fuze setters will be tested and evaluated. The Engineering Development test phase will be essentially completed with full-function projectile firings, fuzing test firing, materials compatibility testings, and ordnance trainer evaluations. The DT II/OT II phase will begin in late FY83.

D584 - Evaluate prototype storage site access delay systems for hardware suitability and operational impact. Fabricate test hardware and conduct DT I.

4. (U) FY 1984 Planned Program: D385 - The DT II/OT II phase will be continued. A series of Development Acceptance In-Process Reviews for type classification of Army components will be conducted. D584 - Finalyze technical data package and conduct DT II.

5. Program to Completion: Training Initial Operating Capability will be achieved 3QFY85. DOD first production hardware will be delivered to the DOE. Complete DT/OT II testing, firing table flights, type classification, production, and training required to achieve Initial Operational Capability (IOC) with the modernized 155mm nuclear projectile in . Finalize weapon access denial system design and initiate military construction and other procurement as required to upgrade theater storage sites. Complete procurement of DOD hardware to support deployment of the improved 8-inch nuclear projectile, M753/W79.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D385 Title: Improved 155mm Nuclear Projectile
Program Element: #6.46.03.A Title: Nuclear Munitions
DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

A. DETAILED BACKGROUND AND 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. AFAP's give NATO forces an additional battlefield fire support capability to counter the massive Soviet-WP forces and force them to disperse their combat formations. A credible AFAP warfighting 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-in 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 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

Project: #D385 Title: Improved 155mm Nuclear Projectile
Program Element: #6.46.03.A Title: Nuclear Munitions
DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

will have a yield times greater than the 1950's 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) RELATED ACTIVITIES: The Department of Energy, Defense Programs (DOE-DP) is developing the nuclear warhead. A joint DOE/DOD project officers group is coordinating the integrated DOE/Army development effort. The XM785 will attempt to match the ballistic characteristics of the M549 conventional rocket-assisted 155mm projectile. It will also employ fuze technology developed and engineered for the 8-inch projectile. England, Germany, and Italy have completed development and are now beginning production on a new 155mm howitzer, the SP/FH70, with which the new 155mm nuclear projectile will be compatible.

C. (U) WORK PERFORMED BY: US Army Armament Research and Development Command (ARRADCOM), Dover, NJ; Harry Diamond Laboratories, Adelphi, MD; Army Materiel and Mechanics Research Center, Watertown, MA; ARRADCOM, Aberdeen, MD; Department of Energy, Defense Programs facilities, Lawrence Livermore Laboratory, Livermore, CA; Sandia Laboratories, Livermore, CA; Denver, CO; Aiken, SC; Chamberlain Corporation, Waterloo, IA; Motorola Incorporated, Scottsdale, AZ.

Project: #D385 Title: Improved 155mm Nuclear Projectile
Program Element: #6.46.03.A Title: Nuclear Munitions
DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

D. PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1981 and Prior Accomplishments: Subsequent to the Public Works Subcommittee hearings on the FY 1977 Energy Research and Development Agency (now Department of Energy-Defense Programs (DOE-DP)) Appropriation Act, the Department of Energy and Defense were directed by Congress to jointly reassess the 155mm nuclear projectile requirement because the Army already had a program for an improved 8-inch nuclear projectile and the LANCE Mod 3 warhead. The "155mm Artillery Fired Atomic Projectile Modernization Analysis" report, which supported a new 155 development, was provided to Congress in February 1977. The Army requested DOE-DP participation in a joint engineering development program for an improved 155mm projectile in May 1977 and DOD forwarded the request to DOE in October 1977. DOE accepted the program and began engineering development (Phase 3 for DOE) in February 1978. The Army and DOE pursued an aggressive development program that resulted in for the 155mm projectile. This test assured that the Army could modernize the 155mm in the event of a Comprehensive Test Ban Treaty. It was also a proof test for design changes that produced a yield greater than Full Engineering Development was initiated in FY 1979. Electronic packaging of fuze functions, test firing of high energy rocket propellants, ballistic characterization analyses, interface iteration with DOE, and metallurgical manufacturing processes were all emphasized. Ballistic characterization flight tests and structural integrity flight testing of DOE components were conducted. The design of the field joint between the DOE weapon in the projectile main body and the projectile aft body that provides for interchangeability of the range-extending rocket motor was finalized. Process engineering for the attachment of high-pressure obturating bands/rotating bands to the titanium aft projectile body/rocket motor was developed in an Army laboratory and transferred to the Chamberlin Corporation. Radar fuzes were flight tested, and the validity of ballistic similitude with the conventional round was established.

Project: #D385 Title: Improved 155mm Nuclear Projectile
Program Element: #6.46.03.A Title: Nuclear Munitions
DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

2. (U) FY 1982 Program: Joint DOD/DOE ballistic and full-function projectile testing will be initiated. The ballistic firings will provide data for preliminary firing tables for DT II/OT II. Fuze structural and functional tests, shipping and storage container tests, and rocket motor safety and ground safety tests will continue. Procurement of DT II/OT II hardware for the joint DOD/DOE system structural and functional testing will be provided to DOE.

3. (U) FY 1983 Planned Program: The first fully configured fuze setters will be tested and evaluated. The Engineering development test phase will be essentially completed with full-function projectile firings, f zing test firings, materials compatibility testings, and ordnance trainer evaluations. The DT II/OT II phase will begin in ate FY83.

4. (U) FY 1984 Planned Program: The DT II/OT II phase will be continued. A series of Development Acceptance In-Process Reviews for type classification of Army components will be conducted.

5. Program to Completion: DT/OT II testing and firing table flights will be completed. Training IOC will be achieved 3QFY84. DOD first production hardware will be delivered to the DOE. The XM785 nuclear projectile with XM749 radar fuze and all remaining ancillary and support equipment will be type classified and will enter production. New materiel training will be completed and initial operational capability (IOC) will be achieved in

Project: #D385 Title: Improved 155mm Nuclear Projectile
Program Element: #6.46.03.A Title: Nuclear Munitions
DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

6. Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 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 FY1983	January 1983
Development Acceptance (DEVA) IPR (DOD components only)	2Q FY1985	February 1984
First DOE Production Unit		
Type Classify Total System (DOD & DOE components)	2Q FY1986	2Q FY1985

Project: #D385 Title: Improved 155mm Nuclear Projectile
Program Element: #6.46.03.A 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 1982 Submission
First War Reserve Hardware Available for DOD		
Initial Operational Capability (IOC)		

Slippage in the current milestone dates results from (1) Congressional reductions in the FY82 Department of Energy (DOE) capital equipment and long-leadtime procurement budget requests and (2) a four-month delay associated with new start prohibitions under the FY82 continuing resolution act of Congress for the DOE appropriation.

7. Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	11352	32898				
Funds (as shown in FY 1982 submission)	9353	33000				
Quantities (current requirements)	*	*	*	*	*	*
Quantities (as shown in FY 1982 submission)	*	*	*	*	*	*

The $1999 thousand increase in FY 1981 is the result of reprograming from other programs to level the project effort following the sharp OSD-directed reduction in the FY 1981 program. This management action was anticipated in FY 1981 and

Project: #D385 Title: Improved 155mm Nuclear Projectile
Program Element: #6.46.03.A Title: Nuclear Munitions
DOD Mission Area: #241 - Battlefield Theater Nuclear Warfare Budget Activity: #4 - Tactical Programs

reported in the FY 1982 Congressional Descriptive Summary. The $102 thousand decrease in FY 1982 reflects inflation adjustments.

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
Other Appropriations:**						
Procurement Ammunition, Army						
Funds (current requirements)	0	0				
Funds (as shown in FY 1982 submission)	0	0				
Quantities (current requirements)	0	0	0	*	*	*
Quantities (as shown in FY 1982 submission)	0	0	0	0	*	*

*Warhead quantities and production rates exceed the classification of this submission. Overall quantity changed from FY 1982 to FY 1983 (see below).

**Department of Defense-procured components only; Department of Energy-Defense Programs (DOE-DP) budget figures exceed classification of this document.

The $223200 thousand increase in total estimated procurement costs is due to a more than
together with large increases in the costs of a number of DOE-developed components.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.09.A Title: Combat Support Systems
DOD Mission Area: #275 - Retaliatory Chemical Warfare Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	707	3037	2640	4431	Continuing	Not Applicable
D191	Smoke Munitions and Material System	541	3037	2640	4431	Continuing	Not Applicable
D638	Civil Disturbance Control System	166	0	0	0	0	5959

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the Engineering Development (ED) of new and improved smoke munitions and systems. Adequate tactical protection of armored vehicles requires that they possess the means to rapidly and effectively obscure the enemy's surveillance and thus interfere with his weapons acquisition, aiming, and guidance capabilities. Armored vehicle on-board smoke screening systems being developed will provide rapid-response protection systems that meet this requirement.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Funds are required to continue application of the rapid smoke grenade launcher to the FIST-V, DIVAD gun, and self-propelled VULCAN and to initiate programs to apply the rapid smoke grenade launcher to the M60, M60A2, and M48A5 tanks, Armored Vehicle Launch Bridge (AVLB), M728 Combat Engineering Vehicle (CEV), and M88A1 Medium Recovery Vehicle (MRV). Funds are required to initiate full-scale development on the XM76 infrared (IR)-defeating grenade and to initiate adaption of the vehicle engine exhaust smoke system to the Cummins VT 903 Engine.

Program Element: #6.46.09.A Title: Combat Support Systems
DOD Mission Area: #275 - Retaliatory Chemical Warfare Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	707	3037	2640	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	545	3045	2701	Continuing	Not Applicable

The increase of $162 thousand in FY 1981 is primarily a result of reprograming in order to reinstate project D638 for FY 1981 so that a technical data package could be prepared for the XM742 Soft Ring Airfoil Grenade projectile. The $8 thousand decrease in FY 1982 results from the application of revised inflation indices. The decrease of $61 thousand in FY 1983 is a result of program realignments.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands): Not Applicable

Program Element: #6.46.09.A Title: Combat Support Systems
DOD Mission Area: #275 - Retaliatory Chemical Warfare Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: This program supports the development of rapid smoke protection for US armored vehicles to include the following: application of the M239 or M250 rapid smoke grenade launcher to M60A2, M1, and M48A5 tanks, M728 Combat Engineer Vehicle, DIVAD Gun, and M88A1 Medium Recovery Vehicle, development of a 4-tube discharger, grenade launcher system for application to the Infantry Combat Vehicle, Improved TOW Vehicle, SLUFAE, M113 Squad and TOW Carrier, and other combat vehicles. Additionally, a vehicle engine exhaust smoke system (VEESS) for M60A1/A3 tanks and other US diesel-driven armored vehicles is being developed which will complement the rapid smoke grenade launcher system. Ultimately, both the rapid smoke system and VEESS will dispense infrared-defeating materials.

G. (U) RELATED ACTIVITIES: The Army is the Department of Defense (DOD) Executive Agent for development of smoke and multispectral obscurant. The other Services sponsor engineering development for materiel unique to each service. Liaison personnel from each Service monitor the developing agencies programs, and joint committees meet regularly to review Service needs and insure development programs are oriented to satisfy joint needs. This program is supported by Program Elements 6.26.22.A, Chemical Munitions and Chemical Combat Support, and 6.36.27.A, Combat Support Munitions.

H. (U) WORK PERFORMED BY: The Smoke Systems program is managed by the Project Manager-Smoke/Obscurants. Approximately 60 percent of the armored vehicle rapid smoke protection systems effort will be in-house by US Army Chemical Systems Laboratory, Edgewood, MD; 20 percent will be the test effort of the US Army Test and Evaluation Command, Aberdeen Proving Ground, MD; and 20 percent will be contractor effort. Fifty percent of the vehicle exhaust smoke-generating system will be in-house by the US Army Chemical Systems Laboratory, Edgewood, MD, and 50 percent will be contractual effort with Teledyne Continental Motors Corporation, Muskegon, MI. Other efforts supporting this program will be conducted by US Army Test and Evaluation Command, Aberdeen, MD; Project Manager-Fighting Vehicle Systems (FVS), Project Manager-M113A1 Armored Personnel Carrier; Project Manager-Light Armored Vehicle (LAV); and US Army Armament Materiel Readiness Command, Rock Island, IL.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Concept feasibility testing, user testing, and type classification of the M239 launcher (6-tube) and L8A1 Smoke Grenade for M60A1/A3 Tanks were completed in FY76 along with the initiation of design for a 4-tube launcher for other types of armored vehicles. During FY 1978, the US Tank Units in Europe received approximately 600 of the recently type classified M239 rapid smoke grenade launcher systems. The initial fielding plan, which called for issuing 1291 M239 systems to US Army forces in Europe for application to M60A1 tanks, was completed in December 1978. In FY 1979, type classification of the M243 and M250 rapid smoke grenade launchers was completed. A value engineering program to redesign the M239 launcher dischargers to reduce the weight, develop interchangeable bases, and lower the

Program Element: #6.46.09.A Title: Combat Support Systems
DOD Mission Area: #275 - Retaliatory Chemical Warfare Budget Activity: #4 - Tactical Programs

cost was initiated. Coordination with Project Manager-M60 was initiated for fielding of the vehicle engine exhaust smoke system (VEESS) on M60A1/A3 tanks. Validation and adaption programs of the VEESS to the M60, M60A2, M48A5 tanks, AVLB, M728 CEV, and M88A1 Medium Recovery Vehicle (MRV) and artillery were initiated. In FY 1980 the M257 smoke grenade launcher designed for use on the Infantry Fighting Vehicle (IFV) was type classified. In FY 1981 the XM259 grenade launcher was type classified, and validation was completed for the adaptation studies of the VEESS to the M60, M60A2, and M48A5 tanks, AVLB, M728 CEV and M88A1 MRV. A feasibility study of a VEESS for the Detroit Diesel 6V53 engine was completed. Project D638 was reinstated and a technical data package prepared for the XM742 Soft Ring Airfoil Grenade projectile.

2. (U) FY 1982 Program: Development and adaption of rapid smoke grenade launcher systems for the M113A1, SLUFAE and the LVT Vehicles will be completed. The feasibility study of a VEESS for the 6V53 Detroit diesel engine will also be completed and a program initiated to apply rapid smoke systems on the FIST-V, DIVAD gun and self-propelled VULCAN. Fielding programs of the vehicle engine exhaust smoke system (VEESS) will be coordinated with PM-M60 for the M60, M60A2, and M48A5 Tanks, Armored Vehicle Launch Bridge (AVLB), and M728 Combat Engineer Vehicle (CEV). A program will be initiated to adapt the VEESS for generating a fog oil screen.

3. (U) FY 1983 Planned Program: Engineering Development effort on rapid smoke launcher adaptation for the FIST-V, DIVAD gun, and self-propelled VULCAN will continue. A program will be initiated to apply the rapid smoke grenade system to the M60, M60A2, M48A5 tanks, Armored Vehicle Launch Bridge (AVLB), M728 Combat Engineer Vehicle, and M88A1 Medium Recovery Vehicle. Development will be initiated on a vehicle engine exhaust smoke system (VEESS) for the 6V53 Detroit diesel engine and other tracked vehicle engines as required. Full-scale engineering development (ED) will be initiated on the XM76 infrared-defeating smoke grenade. Plans for DT/OT II on the XM76 will be prepared and fabrication initiated on DT/OT II hardware.

4. (U) FY 1984 Planned Program: Engineering development will continue on adapting the rapid smoke launcher to other Army vehicles requiring an obscurant capability. Development will continue for application of the vehicle engine exhaust smoke system (VEESS) to applicable tracked vehicle engines. Development Test II/Operational Test II (DT/OT II) will be completed on the XM76 IR-defeating smoke grenade. Type classification is scheduled for 4th quarter FY 1984.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.10.A
Title: Lethal Chemical Munitions
DOD Mission Area: #275 - Retaliatory Chemical Warfare
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	75	2169	0	3616	Continuing	Not Applicable
DF94	Lethal Chemical Ground Munitions	75	2169	0	3616	Continuing	Not Applicable
DF95	Lethal Chemical Missile Warhead	0	0	0	0	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF PROJECT: The Soviet Union has developed and continues to maintain a formidable offensive chemical warfare capability which presents a threat to the survival of United States (US) and North Atlantic Treaty Organization (NATO) forces. In contrast, the US has not manufactured any chemical weapons since 1969. Consequently, the current stockpile is deteriorating and becoming obsolete. National defense policy requires the development and maintenance of a credible deterrent/retaliatory chemical warfare capability. This Program Element supports that requirement by providing for the Engineering Development of agent/munition prototypes completing Advanced Development. Work accomplished under this program supports all Engineering Development needs of the Army, and the ground forces of the Marine Corps for the development of a chemical capability for artillery, rocket, and tactical missile warheads.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: Funds are not programed for work in project 6.46.10.A, DF94, Lethal Chemical Ground Munitions, in FY 1983 due to a decision to direct effort to other projects having a higher priority. Engineering Development (ED) on the 155mm binary Intermediate Volatility Agent (IVA) Projectile will be resumed and ED initiated on the 8-inch IVA projectile in FY 1984. Funds are not programed for work in project 6.46.10.A, DF95, Lethal Chemical Missile Warheads, until FY 1986, when a chemical warhead for the Multiple Launch Rocket System (MLRS) is scheduled to transition from Advanced to Engineering Development.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.12.A 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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1999	2974	6192	7677	Continuing	Not Applicable
	QUANTITIES						
D021	Explosive Demolitions	0	207	0	0	0	Not Applicable
D145	Surface-Launched Unit, Fuel-Air Explosive (SLUFAE)	1247	0	0	0	0	27049
D300	Countermine and Barrier (NATO)	0	0	0	0	0	
D415	Mine Neutralization/ Detection	752	2767	6192	7677	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This PE provides for engineering development of a group of mutually supporting 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 offense and defense 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) BASIS FOR FY 1983 RDTE REQUEST: Initiate engineering development (ED) on a manportable line charge mine neutralization system (POMINS), fabricate DT/OT II hardware for a vehicle magnetic signature duplicator system (VEMASID), and complete ED on the vehicle-mounted road mine detector, the ANVR55, and type classify; continue ED of the Cleared Lane Working System and complete development of the USMC mine-clearing line charge and type classify.

Program Element: #6.46.12.A Title: Countermine and Barriers
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITh FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1999	2974	6192	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	1780	2961	5272	Continuing	Not Applicable

The small increase in FY61 reflects reprograming to higher priority Army requirements. The FY82 decrease is the result of the application of revised inflation and civilian pay pricing indices. The increase in the FY83 program reflects a restructuring of this PE to fully fund engineering development efforts on the Portable Mine Neutralization System (POMINS) and the Vehicle Magnetic Signature Duplicator (VEMASID) under D415.

Program Element: #6.46.12.A Title: Countermine and Barriers
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Ammunition Procurement, Army (Blasting Agent)						
Funds (current requirements)	0	0	0	0	0	0
Funds (as shown in FY 1982 submission)	2500	0	0	Not Shown	0	2500
Quantities (current requirements)	0	0	0	0	0	0
Quantities (as shown in FY 1982 submission) (1000 # kits)	1650	0	0	Not Shown	0	1650

Procurement of Blasting Agent (BA) is deleted due to changes in the Army priority for this system. Funds have been reprogramed to higher priority ammunition requirements.

Program Element: #6.46.12.A Title: Countermine and Barriers
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: This program provides development for a family of mutually supporting mine detection and neutralization systems designed to permit US forces to maintain ground mobility in a battlefield environment of extensive threat mine obstacles. Providing effective countermeasures to these obstacles continues to present a significant challenge to the Army developer. In recent years, efforts have been directed towards devices to perform both hasty and deliberate breaches of minefields. Since breaching must take place while under fire as well as in a more benign environment, two distinct activities must be addressed: mine detection and neutralization. The preponderance of developmental effort has been directed towards hasty minefield neutralization and breach with minimum impact on the momentum of the attack. The Surface-Launched Unit, Fuel-Air Explosive (SLUFAE) mine neutralization system has been designed to provide a rapid standoff breach of a minefield up to 240 meters in depth. Development of this system is complete, and it has been recommended for type classification standard at such time as it is funded for procurement. Follow-on systems in this program include a USMC-developed trailer-mounted projected mine-clearing line charge which will provide an explosive mine neutralization capability and a vehicle-mounted road mine detector to support rapid clearance of lines of communication, a vehicle-mounted magnetic signature duplicator to cause premature magnetic actuation of influenced mines, and a manportable line charge mine neutralization system capable of clearing antipersonnel mines, and barbed wire, and a rapidly emplaced Cleared Lane Marking System, and other barrier devices.

G. (U) RELATED ACTIVITIES: Countermine developments in this program element (PE) follow advanced development (AD) efforts in PE 6.36.19.A, Countermine and Barrier Systems. Army countermine efforts are closely coordinated with the Development Project Office for Selected Ammunition, Dover, New Jersey, who is responsible for the development of mine fuzes, sensors, kill mechanisms, and logic in PE 6.36.06.A, Landmine Warfare and Barrier Development, 6.36.19.A, Landmine Barrier Systems, and 6.46.19.A, Landmine Warfare. The US continues to monitor RDTE efforts of foreign nations for technological breakthroughs in the detection and neutralization of landmines. The procurement and testing of the Israeli Portable Mine Neutralization System (POMINS) and the Cleared Lane Marking System (CLAMS) are examples. 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: #6.46.12.A Title: Countermine and Barriers
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

H. (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; Chrysler Corporation, Detroit, MI; Cubic Corporation, La Jolla, CA; and Martin Marietta, Orlando, FL.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: In FY 1975 a track-width mine plow was developed from a Soviet design, but was terminated because of blast vulnerability. During FY 1976, development of a Soviet design tracked width mine-clearing roller was initiated and initial surface-Launched Unit, Fuel-Air Explosive (SLUFAE) prototype items were fabricated, and engineering design tests were conducted against a live minefield. IN FY 1977, the M122 remote firing device was type classified and limited production initiated. The vehicle-mounted explosive container for transport of hazardous explosive items to safer areas and the Hard Overpack to contain leaking chemical munitions were initiated. In FY 1977, SLUFAE Development Test (DT) II/Operational Test (OT) II launcher hardware and initial prototype rounds with electronic fuzes were procured. Surface-Launched Unit, Fuel-Air Explosive (SLUFAE) reliability, availability, and maintainability (RAM) tests and logistic support concept tests were conducted. During FY 1978, the mine-clearing roller was type classified standard limited and production initiated; engineering development (ED) was initiated on the vehicle-mounted road mine detector; ED was initiated on an overhead prototype shelter for troop positions. During 1979, Developmental Testing (DT II) on the blasting agent was completed, and development and operational testing (DT/OT II) on the overpack was conducted; DT/OT II was completed on SLUFAE and OT IIA directed to resolve operational problems with defining the target and ranging to it; and an International Materiel Evaluation (IME) of the British Giant Viper mine-clearing system was initiated. During FY80, conducted OT IIA for the surface-launched unit, fuel-air explosive (SLUFAE) mine neutralization system. In FY81, determined SLUFAE was qualified for type classification, conducted DT II/OT II of the Vehicle-Mounted Road Mine Detector. Terminated evaluation of the British Giant Viper System, and typed classified the chemical munition container, Hard Overpack.

2. (U) FY 1982 Program: Complete OT II, follow-on evaluation, and propose for type classification of vehicle-mounted road mine detector ANVRS5. Initiate ED on the portable mine neutralization system (POMINS), the cleared Lane Marking System (CLAMS), and the USMC Mine-Clearing Line Charge (MICLIC).

Program Element: #6.46.12.A Title: Countermine and Barriers
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

3. (U) FY 1983 Planned Program: Type classify the vehicle-mounted road mine detector, continue ED (fabricate OT hardware) of the Portable Mine Neutralization System, initiate ED of the vehicle magnetic signature duplicator, and continue ED of CLAMS; complete testing of MICLIC and type classify.

4. (U) FY 1984 Planned Program: Continue ED of POMINS and VEMASID and complete ED of CLAMS and type classify.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D415 Title: Mine Neutralization/Detection
Program Element: #6.46.12.A Title: Countermine and Barriers
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

A. (U) DETAILED BACKGROUND AND DESCRIPTION: This project provides for engineering development of improved Army countermine systems evolving from program element 6.36.19.A, Countermine and Barrier Systems. Threat mine warfare is well developed for both offensive and defensive operations. In the offense, threat doctrine calls for resolute offensive operations with the intent of driving through defending force formations and penetrating deep into rear areas. Mines will be employed extensively along the attacking force flanks to disrupt or prevent counterattacks. Mines are expected to be laid as economy of force measures to concentrate forces at another location and in rear areas to block lines of communication. In the defense, the threat forces are expected to employ mines extensively in fields or belts in depth to delay, disrupt, and canalize attacking forces into kill zones. Minefields are expected to be encountered throughout the threat defensive zones. To win on the next battlefield, US Army maneuver elements must be capable of maintaining freedom of movement and be able to minimize the effects of mined obstacles to that capability. Current fielded systems represent WWII technology and do not support this requirement. Providing effective countermeasures to landmines continues to present a significant challenge to the Army developer. In recent years, efforts have been directed towards devices to perform both hasty and deliberate breaches of minefields. Since breaching must take place while under fire as well as in a more benign environment, two distinct activities must be addressed: mine detection and neutralization. The preponderance of developmental effort has been directed towards hasty minefield neutralization and breaching with minimum impact on the momentum of the attack. The project entails tasks designed to provide the Army with a family of mutually supporting countermine devices including the following: An interim Mine-Clearing Line Charge (MICLIC) will be expeditiously constructed by mounting a USMC-projected line charge on a standard Army trailer; a Portable Mine Neutralization System (POMINS) and a Cleared Lane Marking System (CLAMS) will exploit Israeli-developed systems; a Vehicle-Mounted Road Mine Detector, AN/VRS-5, will continue engineering development; and a Vehicle Magnetic Signature Duplicator (VEMASID) will begin engineering development.

B. (U) RELATED ACTIVITIES: This project is supported by advanced development (AD) efforts in program element (PE) 6.36.19.A, Countermine and Barrier Systems. Army countermine efforts are closely coordinated with the Armament Systems Directorate, USAARRADCOM, Dover, New Jersey, which is responsible for the development of mine fuzes, sensors, kill mechanisms, and logic in PE 6.36.06.A, Landmine Warfare and Barrier Development, 6.36.19.A, Landmine Barrier Systems, and 6.46.19.A, Landmine Warfare. As a result, there has been no unnecessary duplication of effort within the Army or Department of Defense. The US continues to monitor RDTE efforts of foreign nations, particularly NATO, for technological breakthroughs in the detection and neutralization of landmines. The past procurement and testing of the British Giant Viper Mine-Clearing

Project: #D415 Title: Mine Neutralization/Detection
Program Element: #6.46.12.A Title: Countermine and Barriers
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

Line Charge and present programs involving the Israeli Portable Mine Neutralization System (POMINS) and Cleared Lane Marking System (CLAMS) are examples.

C. (U) WORK PERFORMED BY: The US Army Mobility Equipment Research and Development Command (MERADCOM), Fort Belvoir, VA, is assigned responsibility for the Army Countermine program. In-house support is provided by: US Army Armament Research and Development Command, Dover, New Jersey; US Army Test and Evaluation Command, Aberdeen, Maryland; Yuma Proving Ground, Yuma, Arizona; US Army Missile Command, Huntsville, Alabama; and US Marine Corps Development Command, Quantico, VA. Contractors include: Honeywell Corporation, Hopkins, Minnesota; Cubic Corporation, La Jolla, California; and Israeli Military Industries of Israel.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: A track-width mine plow was developed, but was terminated because of blast vulnerability. Subsequently, a track-width mine-clearing roller was developed and type classified for limited production. Engineering Development (ED) was initiated and development testing (DT II) completed on the Vehicle-Mounted Road Mine Detector, AN/VRS-5. An International Materiel Evaluation (IME) of the British Giant Viper mine-clearing system was completed, and as a result, was rejected as a candidate for a Mine-Clearing Line Charge (MICLIC). The Surface-Launched Unit, Fuel-Air Explosive (SLUFAE) mine neutralization system completed engineering development in Project #D145 and was found to be qualified for type classification standard at such time as it is funded for procurement.

2. (U) FY 1982 Program: Continue engineering development of the Vehicle-Mounted Road Mine Detector, AN/VRS-5. Initiate development of a Mine-Clearing Line Charge (MICLIC) based on a trailer-mounted US Marine Corps projected line charge, M58A1. Transition from advanced development a Cleared Lane Marking System (CLAMS) based on an Israeli design, and a Portable Mine Neutralization System (POMINS) based on an Israeli man-carried projected line charge device.

3. (U) FY 1983 Planned Program: Continue engineering development of the CLAMS and POMINS, complete development of the MICLIC and AN/VRS-5 and type classify. Initiate engineering development of the Vehicle Magnetic Signature Duplicator (VEMASID).

4. (U) FY 1984 Planned Program: Continue engineering development of VEMASID and POMINS, and complete development of CLAMS and type classify.

Project: #D415 Title: Mine Neutralization/Detection
Program Element: #6.46.12.A Title: Countermine and Barriers
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

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

6. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Vehicle-Mounted Road Mine Detector, AN/VRS-5	Complete ED	1QFY83	New Submission
Mine Clearing Line Charge (MICLIC)	Complete ED	1QFY83	New Submission
Portable Mine Neutralization System (POMINS)	Complete ED	4QFY85	New Submission
Vehicle Magnetic Signature Duplicator (VEMASID)	Complete ED	1QFY86	New Submission
Cleared Lane Marking System (CLAMS)	Complete ED	3QFY84	New Submission

Project: #D415 Title: Mine Neutralization/Detection
Program Element: #6.46.12.A Title: Countermine and Barriers
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	752	2767	6192	7677	Continuing	Not Applicable
Funds (shown in FY 1982 submission)	692	2774	3814	Not Shown	Continuing	Not Applicable
Quantities (current requirements)		Not Applicable				
Quantities (shown in FY 1982 submission)		Not Applicable				

(U) Changes to the funding profile reflect the following: In FY 1981, the increase in actual results from reprograming of funds into the vehicle-mounted road mine detector effort. The decrease in FY 1982 is attributed to inflation index adjustment. The increase in FY 1983 results from restructuring this project to fully fund Engineering Development effort for the Vehicle Magnetic Signature Duplicator (VEMASID) and Portable Mine Neutralization System (POMINS) effort.

Other Appropriation Funds: ($ in thousands): Not Applicable.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost**
	TOTAL FOR PROGRAM ELEMENT	41651	103393	50488	33512	31419	467012
	QUANTITIES						
	M2, Infantry Fighting Vehicle						16*
	M3, Cavalry Fighting Vehicle						5
D258	Bradley Fighting Vehicles (BFV)	41651	103393	50488	33512	31419	467012

*includes one automotive test rig.
**includes FY80 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. In opposition to the numerically superior Warsaw Pact forces is the NATO Combined Arms team. In the 1980's, 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 IFV and CFV feature a two-man turret which mounts a stabilized, dual-feed 25mm weapon (BUSHMASTER), a 7.62mm coaxial machinegun and the

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

Tube-Launched, Optically Tracked, Wire-Guided Missile (TOW) system. The IFV carries a nine-man squad with an adaptation for six Firing Port Weapons (FPW). The CFV carries a five-man squad and 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) BASIS FOR FY 1983 RDTE REQUEST: Funds requested are to support the continued development of Test Measurement and Diagnostic Equipment (TMDE), Maintenance and training manuals, integrated logistics support, development of training devices, and modification for incegration of TOW 2.

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
• Complete OT II on IFV	Nov 79	Nov 79
• Army Systems Acquisition Review Council III (ASARC III)	Dec 79	Dec 79
• Complete Prototype Qualification Test - Government (PQT-G) on IFV	Jun 80	Jun 80
• Start Unit Handoff (SUH)	2QFY83	
• Initial Operational Capability (IOC)	3QFY83	2QFY83

The equipping of the first unit slipped three months due to extended production time resulting from a machinist union strike at FMC. The IOC slipped one calender quarter because of the strike and a redefinition of IOC which requires the Major Commander to validate the completed fielding of the first battalion.

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	41651	103393	50488	64931	467012
Funds (as shown in FY 1982 submission)	41651	106721	TBD	TBD	TBD

The FY82 variance is attributable to reductions in the Army's overall budget prorated over the major programs. Budget estimates for FY83 and beyond were not determined in the previous submission and therefore changes are not applicable. Estimates in these years are to cover the following: development of TMDE, expanded logistic requirements for technical manuals, physical teardown and maintenance evaluation, and depot maintenance work requirements; modification of missile guidance electronics for TOW 2; and nuclear hardening development efforts.

Program Element: 6.4t.16.A

Title: Bradley Fighting Vehicles (BFVS) (Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981	FY 1982	FY 1983	FY 1984	Additional To Completion	Total Estimated Cost*
Weapons and Tracked Combat Vehicle Procurement, Army:						
Funds (current requirements)	627700	868000	842500	796500	7777600	11178300
Funds (as shown in FY 1982 submission)						
FVS	627700	809800	TBD	TBD	TBD	TBD
Quantities (current requirements)	400	600	600	555	4627	6882
Quantities (as shown in FY 1982 submission)	400	600	600	829	4353	6882

*Includes FY80 and prior years; does not include initial spares.

The above procurement program combines IFV and CFV under the FVS program. The current procurement requirements as shown are based on a sole-source procurement strategy. Although a competitive second-source program has been initiated with preliminary efforts ongoing to analyze the business sense of a second-source strategy, the above program does not include funds to fully implement a second-source strategy.

- The FY82 requirement in the current submission includes the advanced procurement of $59.1M and a $1.1M inflation adjustment not shown in the previous year's submission. The funding requirements for FY83 and beyond have factored in reductions in quantities due to recent reductions in the Army's Total Obligational Authority. A production rate of 50 vehicles per month will be achieved during the FY82 funded delivery period.

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The Bradley Fighting Vehicle Systems (BFVS) program has a twofold objective. The first objective is to develop a full-tracked, lightly armored Infantry Fighting Vehicle (IFV) which provides the mechanized infantry with protected cross-country mobility and vehicular-mounted firepower necessary to accomplish assigned missions. The second objective is to provide a Cavalry Fighting Vehicle (CFV) for the armored cavalry and the mechanized and tank battalion scout squads which allows them to accomplish reconnaissance and security missions. The IFV, with its TOW antitank guided missile system, stabilized 25mm cannon and 7.62mm machinegun, and six firing port weapons, will provide a large volume of firepower at close and long ranges during both day and night operations. Its armor protection is significantly increased over the current M113 armored pesonnel carrier due to spaced laminate steel armor shielding its aluminum hull. Its mobility is comparable to that of the M1. The CFV is the IFV with a different ammunition storage configuration, seating for a 5-man team and no firing port weapons. A unique capability of the IFV and CFV is the stabilized turret drive which permits the main gun and machinegun to be fired accurately even when the vehicle is moving rapidly over rough cross-country terrain. The TOW antitank missile is fired from a double-tube, armored launcher which is attached to the turret weapon station. The TOW can defeat any currently known enemy tank at ranges out to 3,750 meters. The system is being modified to adapt the TOW 2 capability for improved performance and lethality. The FVS Primary Weapon, 25mm automatic cannon, with an effective range in excess of 2500 meters, delivers both armor-piercing and high-explosive fire with extreme accuracy. An M240C 7.62mm machinegun is coaxially mounted within the weapon station and supplements the firepower of the other weapons.

G. (U) RELATED ACTIVITIES: Program Element (PE) 6.46.17.A, Vehicle Rapid Fire Weapon System (VRFWS BUSHMASTER), supports the Fighting Vehicle Systems program by providing for a 25mm automatic gun for use with both vehicles. Funds are provided to IFV from the Multiple Launch Rocket System, Program Element 6.33.03.A, for development of the MLRS chassis. The Firing Port Weapon (FPW) project was formerly funded in PE 6.36.07.A, Army Small Arms Program, and the CFV development effort was funded in PE 6.46.29 DH65 in FY80 and prior. The FVS Product Improvement Program under PE 2.37.36 D332 was activated in FY80 and is funded starting in FY82 to begin PIP developments.

H. (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; and Hughes Aircraft Co. and Hughes Helicopter Inc., both of 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; and the Project Manager, TOW/DRAGON, Huntsville, AL.

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The Mechanized Infantry Combat Vehicle (MICV) program was approved by the Defense Systems Acquisition Review Council (DSARC) in April 1972. Following the source selection process, a cost-plus-incentive-fee contract was awarded to FMC in November 1972 for Engineering Development and Advanced Production Engineering. During the final quarter of FY 1976, the Army organized a Special MICV Task Force to review the total MICV program and make recommendations on vehicle configuration in view of the operational requirements. The Task Force recommended a redirection of the program to develop a single fighting vehicle for the infantry and scout roles which would mount a two-man turret with a 25mm gun and TOW launcher. On 3 November 1976, the Secretary of the Army approved the development of a new fighting vehicle with the award of the sole-source contract to FMC Corporation. The Army terminated the 20mm MICV program in March 1977, and applied remaining resources to the development of the new infantry and cavalry fighting vehicles. On 30 July 1977, the MICV Systems Office was officially redesignated the Fighting Vehicle Systems (FVS) Office. The MICV was renamed the infantry fighting vehicle (IFV), M2, and the MICV/Scout became the cavalry fighting vehicle (CFV) M3. The PEP contract was awarded in June 1978. Initial TOW firings were successfully conducted in July 1978. A Congressionall, directed study (Crizer Task Force) confirmed the requirement for and the current design of the IFV and CFV. As directed by the Office of the Secretary of Defense, a study of less costly derivatives and force structure changes was conducted by the Mahaffey Study Group which concluded that the current IFV/CFV program was the best in terms of cost and operational effectiveness among all derivative-type vehicles considered. First Engineering Development vehicles were received in November 1978. Formal contractor testing began in December 1978 and government testing in June 1979. The IFV Operational Test II (OT II) training began in July 1979. The test, utilizing four IFV's and a mechanized infantry platoon with appropriate support from Fort Carson, CO, verified the operational capability of the system. Operational testing (OT II) was completed in November 1979. The final report was published in February 1980. Development Test (DT II) began in July 1979 and was completed in July 1980. A Force Development Test & Experimentation (FDTE) effort was conducted at Fort Knox during the February-June 1980 timeframe with five CFV's to demonstrate the operational capability of the vehicles in the cavalry role. Follow-on development and fix verification testing of two prototype vehicles was initiated in September 1980. Development testing (DT II) began in July 1979 and was completed in June 1980. A detailed discussion of testing is included in paragraph J. Full Production of the Fighting Vehicle Systems (FVS) was approved by the DSARC III in January 1980. A letter contract was signed in February 1980 with FMC Corporation for the production of 100 vehicles. The Army has launched a cost reduction campaign which includes initiatives in value engineering, manufacturing methods, and analysis of a possible second-source procurement strategy. The Army is currently in its third production year. The current facilitization, tooling, and vendor structure will achieve and

Program Element: 6.46.16.A
Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)
DOD Mission Area: #211 - Direct Fire Combat
Budget Activity: #4 - Tactical Program

sustain a production rate of up to 50 per month. The first vehicle was delivered to the Army in May 1981. A machinist union strike occurred at FMC Corporation during April-June 1981, which slowed the program by about two months. The Army expects deliveries to be back on schedule by the middle of the FY81 funded delivery period. The FY81 budget was supplemented and the FY82 budget amended to bring the program to the economic production levels originally planned for the 688-vehicle buy. To address the issue of a second-source alternative, the Army awarded three production analysis contracts in June 1981 to investigate the cost reduction benefits of a second-source strategy.

2. (U) FY 1982 Program: Engineering development will continue on Test, Measurement, and Diagnostic Equipment (TMDE), maintenance and training manuals, depot maintenance work requirements, and integrated logistics support. Physical teardown and logistic demonstration, development of training devices, and modification for TOW missile guidance electronics to integrate TOW 2; initiation of study for nuclear hardening of the IFV/CFV System and the start for development of extension training manuals will be accomplished as part of the FY82 program. The first battalion set will be fielded in the United States in March 1983. A follow-on test and evaluation effort will be initiated concurrently with fielding to test the suitability of the entire logistic package to include maintenance manuals and Test Measurement Diagnostic Equipment (TMDE). TRADOC will conduct an FDTE prior to declaring IOC to insure adequate maintainability and supportability in the field. Comparison testing will be performed on two vehicles from the November 1981 and April 1982 production runs to verify performance and quality standards. Initial production testing will be performed with eight production models during June 1982-April 1983. During this period, skill performance aids validation will be achieved as part of the maintenance evaluation.

3. (U) FY 1983 Planned Program: Engineering development will continue on TOW 2, test measurement and diagnostic equipment, extension training manuals, nuclear hardening, and other logistics support efforts; completion of depot maintenance work requirements, physical teardown and logistic demonstration, and training devices.

4. (U) FY 1984 Planned Program: Engineering development will continue on nuclear hardening, extension training manuals and logistics support efforts; completion of Test Measurement and Diagnostic Equipment and TOW 2 modification.

5. (U) Program to Completion: In FY85, Extension Training Manuals and logistics support will be completed; nuclear hardening will continue through FY86; Turret Maintenance Training Device and Driver's Trainer development will be completed in FY86.

Program Element: 0.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Programs

J. (U) TEST AND EVALUATION DATA

1. (U) Development Test and Evaluation:

a. (U) Development testing (DT) began in January 1974 with the Mechanized Infantry Combat Vehicle (MICV) and was interrupted in March 1976 for seven months due to unsatisfactory transmission performance. Transmission redesign was achieved and testing resumed in October 1976 continuing through January 1977. 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. Subsequently, all resources remaining were applied to the development of the Infantry Fighting Vehicle (IFV) and the Cavalry Fighting Vehicle (CFV). Results of MICV contractor testing were based on completion of 142,000 RAM miles and 140,000 rounds of 20mm ammunition fired. Subsequent contractor testing on the IFV/CFV was comprised of 18,000 RAM miles traveled, 118,000 rounds of 25mm ammunition fired, and 66 TOW missiles fired. Contractor testing revealed only minor deficiencies which were all correctable. The IFV/CFV test and evaluation program has made maximum use of prior MICV/20mm test data and reentered the development test program at the DT II milestone. The extensive effort since 1974 on the MICV assured concept validation sufficient to warrant committing resources to full-scale development.

b. (U) Development Testing II (DT II) began in June 1979 at Aberdeen Proving Ground (APG), MD. DT II provided the final technical data for determining the IFV/CFV system readiness for transition into the full-production phase of the acquisition cycle. Developmental 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: DT II started Jun 79, 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; DT II completed Jun 80; Final Report - Dec 80.

c. (U) Two Infantry Fighting Vehicles (IFV) and one Cavalry Fighting Vehicle (CFV) have undergone DT II at APG. Vehicles were used as weapon-mounted fighting stations as well as troop carriers. Vehicles have two-man turrets which incorporate the 7.62mm Coaxial Machinegun; The Tube-Launched Optically Tracked, Wire-Guided (TOW) Missile System and the

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (3FVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

25mm Automatic Cannon. Except for minor design changes, the configuration tested will also be procured. An improved TOW subsystem (TOW 2), designated Test Measurement and Diagnostic Equipment (TMDE), and the Integrated Logistics Support (ILS) System are 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-Transitional (STE-T), 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. A complete ILS package will be tested during IPT and also during a logistics follow-on evaluation scheduled for late FY83.

d. (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 279 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. Organizational and DS/GS maintenance performance is expected to improve with the appropriate TMDE and adequate spare parts provisioning. A number of problem areas were recorded in test on the Integrated Sight Unit (ISU). These included image flutter, a problem noted during previous OT testing; detent mechanism failure of boresight knobs; effect of electromagnetic interference; reticle brightness; faulty thermal switch rheostat control; and vertical wavy lines in sight picture. Corrective action has been identified for each and will be verified during IPT. Other problems cited during 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 ISU backup sight; inadequate test equipment and technical manuals. Corrective action has been identified for each problem area. In nearly all cases, corrections will be incorporated into the production vehicles and ancillary equipment.

e. (U) The Program Manager for the Bradley Fighting Vehicle Systems Program is BG Donald P. Whalen, assigned 2 July 1980. The prime contractor is FMC Corporation, San Jose, CA. Some of the major subcontractors include Hughes Aircraft Corp., Hughes Helicopter Corp., General Electric, and Cummins Engine Co. The US Army Tank-Automotive Command (USATACOM) and contractors are preparing qualification test procedures to environmentally test the IFV/CFV and armament. A copy of the Prototype Qualification Test - Contractor (PQT-C) final report, dated June 1980, was received from the contractor. The developmental tester was the US Army Test and Evaluation Command (TECOM), and the test evaluator was the US Army Materiel Systems Analysis Agency (AMSAA).

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

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 Automatic Cannon exceeded the stated requirements for all rounds and all rates. Reliability, durability, and maintainability requirements for the XM231 Firing Port Weapon have been demonstrated. Results are tabulated in paragraph 3.

2. (U) Operational Test and Evaluation:

a. (U) A combined Operational Climatic Test/Force Development Test and Experimentation (OCT/FDTE) was conducted during January-March 1976 for the MICV/20mm program. The test was conducted at Fort Knox, KY, using US Army Forces Command (FORSCOM) personnel as player participants. The OCT provided limited data on capabilities, limitations, and safety aspects of the Mechanized Infantry Combat Vehicle (MICV) system in European winter thaw conditions. The FDTE developed mobility/movement rate data on the MICV. The initial Operational Test was conducted by the US Army Operational Test and Evaluation Agency (OTEA) at Fort Benning, GA, using mechanized infantry troops as player participants. 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 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 Testing II (OT II) for the IFV was accomplished during October-November 1979 at Fort Carson, CO, by the Army's Operational Test and Evaluation Agency (OTEA). The purpose of the test was to provide data and associated analyses on the operational effectiveness of the Infantry Fighting Vehicle (IFV), Firing Port Weapon (FPW), and the 25mm Cannon for consideration in determining a full-scale production decision. The objectives of testing were to provide information on the effectiveness, survivability, reliability, availability, maintainability and integrated logistics support system (ILS) 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). Systems used in DT II were similar, but not all had the HALON fire extinguishers and the upgraded Phase II sights. Organizational and direct support maintenance was performed by military personnel; general support maintenance was accomplished by FMC. Results of OT II were presented to the Army System 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 was available in February 1980.

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

c. (U) OT II testing was comprised of the following: 8,919 miles traveled; 30,528 rounds fired; and 39 TOW missiles fired. Results of OT II indicated that the Army's requirements have been met in all of the critical areas of test. The test vehicles demonstrated the Army's Materiel Need (MN) requirements for all mobility and transportability characteristics in contractor tests, DT and OT. Also, critical firepower requirements were met. In each performance area, the requirement was either met or exceeded for the 25mm Automatic Cannon, the Firing Port Weapon, 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 System is summarized in paragraph 3. These estimates are based on 21,495 RAM miles for firepower, 20,982 RAM miles for mobility and support and 49,778 primary weapon rounds fired normalized to a combat mission profile. All technical problems were isolated and appropriate fixes defined. Among the significant technical problems surfaced during test were the following: vibrations in the integrated sight unit with vertical lines in the night mode; universal joint/final drive failures due to cracked materials and improper installation: coaxial machinegun failure due to bad ammunition lots, damaged feed chutes and mounts and poor weapon maintenance; inefficient 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 have been identified for each problem, and are being applied and tested during production.

d. (U) The Armor and Engineer Board, Fort Knox, KY, conducted a CFV Force Development Test and Experimentation (FDTE) during April-August 1980. This evaluation was accomplished to provide data to determine the adequacy of organization, doctrine, tactics, means of employment, and institutional/exportable training and organizational maintenance training programs envisioned for implementation upon fielding of the CFV System. The Test was completed on schedule with all major objectives met.

e. (U) Survivability testing to include full-up ballistic nondestructive and destructive testing was accomplished during November 1980-November 1981.

f. (U) The Initial Production Test (IPT) will be accomplished at Aberdeen Proving Ground (APG), Yuma Proving Ground (YPG), and the US Army Cold Regions Test Center (CRTC) between June 1982 and 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 will have a total of eight vehicles--five vehicles will be used for RAM testing, two for

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

performance testing and one for environmental testing (YPG and CRTC). RAM vehicles will accumulate the aggregate mission profile of 6,000 miles and 12,000 rounds of ammunition. The M240 coaxial machine gun, firing port weapons, 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. During IPT, all TMDE and draft validated, verified technical manuals will be available to support vehicle maintenance. Additionally, the Army Materiel Systems Analysis Agency will conduct an Independent Maintainability Assessment at APG. Two Comparison Test vehicles will be taken from the first-year production run and accrue 2,000 miles each 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) The logistics support package, complete with TMDE, will be evaluated in an extensive follow-on evaluation (FOE) involving a TRADOC Force Development Test and Evaluation. OTEA will conduct a directed maintainability assessment of the FVS in conjunction with TRADOC's FVS IOC FDTE tentatively scheduled for 3d quarter FY83, and a dedicated Sample Data Collection (SDC) effort planned and programed by the Tank Automotive Command (TACOM). Coordination for this is in process. The collection and evaluation of the logistic data will be administered by TACOM. Specific interest will be directed toward the adequacy of technical manuals, maintenance procedures, logistic task allocations, repair times, the adequacy of new training, and maintainability/availability data.

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS) (Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

3. (U) System Characteristics:

OPERATIONAL/TECHNICAL CHARACTERISTIC	REQUIREMENT	DEMONSTRATED TO DATE	STATUS	WHERE DEMONSTRATED
Reliability (DT/OT II)				
- Mobility (mean miles between failure)	600	636	MET	PQT-G/OT II
- Firepower (mean miles between failure)	290	706	MET	PQT-G/OT II
- System (mean miles between failure)	195	289	MET	PQT-G/OT II
Maintainability (System)				
- Maximum-Time-To-Repair Organizational, (time *not to exceed 4 hrs*)	95%	88%	LOW	PQT-G
- Maximum-time-to-Repair Direct Support, (time not to exceed 12 hrs)	90%	96%	MET	PQT-G
- Maximum-Time-to-Repair General Support (DS backup) (time not to exceed 12 hrs)	90%	86%	LOW	PQT-G

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

OPERATIONAL/TECHNICAL CHARACTERISTIC	REQUIREMENT	DEMONSTRATED TO DATE	STATUS	WHERE DEMONSTRATED
Firepower				
a. 25mm Gun				
- Muzzle Velocity (feet per second)				
. Armor Piercing (APDS-T)	4300-4500	4390	MET	PQT-C
. High Explosive (HEIT)	3000	3573	MET	PQT-C
- Rate of Fire				
. MAXIMUM (rounds per minute)	450-600	Motor Depend.	MET	PQT-G
. Controlled (shots per minute)	200/100	200/100	MET	PQT-G
. Lethal Area -	[redacted]	[redacted]	MET	PQT-G
- Reliability[1]				
. Mean rounds - between stoppage (MRBS)[2]	2000	7264	MET	PQT-G
. Mean Rounds between clearable stoppage (MRBCS)[3]	500	6226	MET	PQT-G
- Maintainability				
. Mean time to repair - (MTTR)	15 min	12 min	MET	PQT-G/OT II
. Max time of repair - (MXTTR)	60 min	30 min	MET	PQT-G/OT II

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

OPERATIONAL/TECHNICAL CHARACTERISTIC	REQUIREMENT	DEMONSTRATED TO DATE	STATUS	WHERE DEMONSTRATED
- Availability	.90	.99	MET	PQT-G/OT II
- Durability (25 min)				
. Barrel life (rds)	4000	5000	MET	PQT-G/OT II
. Receiver life (rds)	25000	30000	MET	PQT-G/OT II
- APDS-T Ammunition				
. Penetration 1" @1000m			MET	PQT-G
. Velocity (M/Sec)	1100	1270	MET	PQT-G
. Tracer Rng (meters)			LOW4/	PQT-G
- HEIT Ammunition				
. Velocity (m/sec)	1000	1050	MET	PQT-G
. Tracer Rng (meters			---	PQT-G
b. (U) Firing Port Weapon				
- Sustained Firing Rate (rounds per minute)	60 rpm intervals	5 min	MET	PQT-G
- Min Range (meters)	3-5			TBT
- Length (in)	15-27	28.5	Long	PQT-G
- Protrusion (in)	3-5	7	Long	PQT-G
- Weight (lb)	4-8	8.5	OVER	PQT-G
- Reliability1/				
. Mean Rounds Between Stoppage (MRBS)2/	2000	4701	MET	PQT-G/OT II
. Mean Rounds between failure (MRBF)5/	4500	5289	MET	PQT-G/OT II

Program Element: 6.46.16.A

Title: Bradley Fighting Vehicles (BFVS)
(Previously Fighting Vehicles Systems)

DOD Mission Area: #211 - Direct Fire Combat

Budget Activity: #4 - Tactical Program

OPERATIONAL/TECHNICAL CHARACTERISTIC	REQUIREMENT	DEMONSTRATED TO DATE	STATUS	WHERE DEMONSTRATED
- Durability				
. Receiver life (rds)	10000	10000	MET	PQT-G/OT II
. Barrel life (rds)	10000	Exceeded 10000	MET	PQT-G/OT II
Mobility				
- Range (mi) (Ave 25 mph)	300 mi	303 mi	MET	PQT-C
- Acceleration	0-30 mph in 18-22 sec	19.7 sec	MET	PQT-G
- Fwd Speed	40-45 mph	41.8 mph	MET	PQT-G
- Cbt Weight (lb)	35-40,000	50,000	MET	PQT-G
- Reverse Speed	5-10 mph	13 mph	MET	PQT-G
- Braking Deceleration	35 feet (from 25 mph)	24 feet	MET	PQT-G
- Ascend Slope	60%	YES	MET	PQT-C
- Min Speed	2.5 mph	YES	MET	PQT-C
- Turning Radius	30'	19.7'	MET	PQT-C
- Water Speed	4.5 mph	4.4 mph	LOW	PQT-G

1/ Reliability data was 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.

Independent Evaluation Report was published in March 1980.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.19.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	11133	4943	9701	7459	Continuing	Not Applicable
	QUANTITIES						
D016	Mine Systems	0	0	4891	6336	Continuing	Not Applicable
D088	Modular Pack Mine System	8599	4943	4810	1123	0	35665
D407	Antitank Artillery Mine XM718	223	0	0	0	0	17640
D568	Ground-Emplaced Mine Scattering System Antitank/Antipersonnel Mines	2311	0	0	0	0	39600

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) BASIS FOR FY 1983 RDTE REQUEST: Continue engineering development (ED) on the Modular Pack Mine System (MOPMS) and initiate ED of the off-route antitank mine system (ORATMS).

Program Element: #6.46.19.A Title: Landmine Warfare
DOD Mission Area: #212 - Indirect Fire Support Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	11133	4943	9701	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	9464	8146	9940	Continuing	Not Applicable

The FY81 increase reflects the requirement for additional RDTE funds for GEMSS user manuals. The FY82 decrease reflects the application of a directed Congressional reduction in mine systems. The FY83 decrease reflects minor restructuring within the program element.

Program Element: #6.46.19.A
DOD Mission Area: #212 - Indirect Fire Support

Title: Landmine Warfare
Budget Activity: #4 - Tactical Programs

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Ammunition Procurement, Army:						
Funds (current requirements) (Artillery AT mines)	60700	84600	98600	103600	334800	783600
Funds (as shown in FY 1982 submission)	62800	57100	62300	Not Shown	82000	294100
Quantities (current requirements) (rounds)	24000	37000	58000	57000	181000	396000
Quantities (as shown in FY 1982 submission)	25000	25000	28000	Not Shown	39000	152000
Ammunition Procurement Army:						
Funds (current requirements) (GEMSS XM74/XM75 mines)	12700	34500	29200	30900	123000	238900
Funds (as shown in FY 1982 submission)	13200	34900	18600	Not Shown	46800	1214
Quantities (current requirements) (mines)	22000	61000	67000	80000	340000	579000
Quantities (as shown in FY 1982 submission)	26000	70000	37000	Not Shown	105000	250000

Program Element: #6.46.19.A
Title: Landmine Warfare
DOD Mission Area: #212 - Indirect Fire Support
Budget Activity: #4 - Tactical Programs

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement Army:						
Funds (current requirements) (GEMSS dispensers)	0	12000	11500	23800	60100	115200
Funds (as shown in FY 1982 submission)	0	12400	9100	Not Shown	30400	190000
Quantities (current requirements) (each)	0	23	23	54	72	232
Quantities (as shown in FY 1982 submission)	0	23	24	Not Shown	78	379

The FY81 decrease in artillery-delivered AT mines is the result of increased procurement unit costs and slippage in prior year production deliveries beyond the normal procurement leadtimes. FY82 and beyond quantity and cost increases result from significant increase in Army requirement for this system. The FY81 decrease in GEMSS funding results from a reduction in quantity of the AP mine for the first production run. The increase in GEMSS funding for mines in FY83 and beyond reflects significant increase in the requirement for these mines. GEMSS FY83 dispenser cost increase is due to increased production costs and the small quantity. The Additional To Completion has increased due to increased user requirement. The total cost decrease is due to a reduction in the total expected buy.

Program Element: #6.46.19.A
DOD Mission Area: #212 - Indirect Fire Support

Title: Landmine Warfare
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The minefield is one of the most effective, efficient, and adaptable obstacles to threat armor mobility. Conventional mechanically laid and hand-emplaced antitank (AT) and antipersonnel (AP) mines in the inventory do not support the Commander's requirement for minefield support. To overcome this deficiency, the Army has pursued development of a Family of Scatterable Mines (FASCAM). FASCAM features modern technology in packaging, size, kill mechanisms, target sensing and discrimination, response times, and self-destruction. The members are packaged for delivery by multiple means. The first scatterable mine, the M56 helicopter-delivered AT mine, is fielded in US Army, Europe. Production has commenced on both the M692 artillery-delivered AP mine and the companion M718 artillery-delivered AT mine. The Ground-Emplaced Mine Scattering System with both AT and AP mines has completed development and is in production. The manportable Modular Pack Mine System is in Engineering Development and will complete this generation of Army-developed scatterable mines. Scatterable mine systems utilize extensive component commonality during manufacture. The option to emplace minefields when and where desired in a matter of minutes provides the tactical commander with extreme flexibility not now available and a unique capability to bring additional combat power to bear at decisive moments which will affect both friendly and enemy tactics.

G. (U) RELATED ACTIVITIES: This program follows from advanced development (AD) Program Elements (PE) 6.36.06.A, Land Warfare/Barrier Development, and 6.36.19.A, 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 PE is the US Air Force-managed joint-Service development of air-delivered scatterable mines, GATOR, also a member of 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 systems 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.

H. (U) WORK PERFORMED BY: 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 Army Materiel Systems Analysis Agency, Aberdeen, MD; and Yuma Proving Ground, Yuma, AZ. Principal contractors are: Aerojet Ordnance and Manufacturing Company, Downey, CA; Hughes Aircraft Company, Fullerton, CA; Honeywell, Inc., Hopkins, MN; RCA Solid State Division, Sommerville, NJ.

Program Element: #6.46.19.A
DOD Mission Area: #212 - Indirect Fire Support

Title: Landmine Warfare
Budget Activity: #4 - Tactical Programs

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Scatterable mine development was initiated in the late 1960's with emphasis on the XM56 helicopter-delivered antitank mine system and the XM692E1 artillery-delivered antipersonnel mine system. During FY 1973, the XM56 and the XM692E1 systems entered developmental testing (DT) and the XM718 artillery delivery AT mine system entered engineering development (ED). In FY 1974, the M56 helicopter antitank (AT) mine system was type classified standard. During FY 1975, the M56 AT mine system went into production; Development Test II/Operational Test II (DT II/OT II) continued on the XM692E1 antipersonnel (AP) mine system, and engineering design tests continued on the XM718 AT mine system. Design and testing of the Ground-Emplaced Mine Scattering System (GEMSS) and its associated XM75 AT mines and XM74 AP mines continued. Efforts continued on the joint-Service GATOR air-delivered mines in coordination with the Navy and Air Force. During FY 1976, the M692 artillery-delivered AP mine was type classified standard and entered initial production. In FY 1977, the M56 helicopter AT mine was fielded; initial production continued on the M692 artillery AP mine; DT II/OT II was completed on the XM718 artillery AT mine and initiated on the GEMSS; advance development on the Modular Pack Mine System (MOPMS) was completed. In FY 1978, DT II/OT II continued on the GEMSS; the M718 artillery AT mine was type classified standard and production initiated; OT III was conducted on the M692 artillery AP mine, and MOPMS entered engineering development. In FY 1979, initiated full-scale production on the M692 artillery AP mine; conducted DT III on the M718 artillery AT mine, and completed GEMSS OT II. In FY80 full-scale production of the M718 AT mine was initiated; GEMSS DT II was completed, type classification accomplished, and production initiated; MOPMS Force Development Test and Experimentation FDTE was completed, and an in-process review conducted to determine future program direction. Production of the ADAM M692 AP mines continued. During FY81, the M718 AT mine completed DT III and was recommended for full-scale production by the validation IPR; continued production of GEMSS dispenser and AT mine and entered production of AP mine. Conducted MOPMS System Engineering Development test and procured long-lead DT/OT II hardware; initiated development of training aids and manuals, and continued ADAM M692 production; completed ADAM DT III, and conducted production validation IPR.

2. (U) FY 1982 Program: Continue GEMSS production and RDTE of manuals. Conduct final Engineering Development tests for MOPMS and procure Developmental Testing II/Operational Testing II hardware and initiate DT II.

3. (U) FY 1983 Planned Program: Initiate engineering development (ED) of the off-route antitank mine system (ORATMS), to include the evaluation of design-approved materials, new/weapons interface studies, development of engineering models for evaluation of alternative approaches that will lead to selection of the most cost effective hardware. GEMSS production will continue and RDTE of manuals will be completed. MOPMS development will continue. Continue ED on the off-route Antitank Mine System.

Program Element: #6.46.19.A Title: Landmine Warfare
DOD Mission Area: #212 - Indirect Fire Support Budget Activity: #4 - Tactical Programs

4. (U) FY 1984 Planned Program: Continue ED on the off-route Antitank Mine System. Complete ED of MOPMS, type classify and enter production; initiate ED of an auxiliary dispenser for GEMSS, and a Pursuit Deterrent munition for use by Special Forces.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.20.A
Title: Tank Systems
DOD Mission Area: #211 - Direct Fire Combat
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	51540	28407	11961	0	0	693179
	QUANTITIES						13
DG20	Tank, M1	51540	28407	11961	0	0	693179

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This element supports the development of the M1 tank, a four-man, highly mobile, fully tracked combat vehicle with significantly improved survivability, mobility, and firepower. The M1 mounts a 105-millimeter (mm) main gun and three machine guns. The M1's improved day/night fire control and shoot-on-the-move capabilities assure a high probability of first-round hits at engagement ranges. High acceleration and cross-country speeds provided by a 1500-horsepower turbine engine and improved suspension system make the M1 tank a more difficult target for opposing ground and air forces. The M1 is required to counter ever-improving enemy armor threats of the 1980's and 1990's. It will replace the M60-series tank as the primary ground combat offensive weapon in the Army's combined arms team.

C. (U) BASIS FOR FY 1983 RDTE REQUEST:

1. (U) The final phases of the third Development Test (DT III) will be completed in February 1982 when nuclear effects blast testing and validation of equipment publications are finished. The ten M1's which accrued high mileage during development and operational testing will be refurbished as needed prior to redistribution to meet Army inventory requirements. The refurbishment of these tanks will assist in the development and validation of the Army's overhaul program for the tank.

2. (U) The funds requested are necessary to accomplish the developmental work scope required to provide a fully developed M1 tank system capable of being operated and maintained by Army units.

Program Element: #6.46.20.A Title: Tank Systems
DOD Mission Area: #211 - Direct Fire Combat Budget Activity: #4 - Tactical Programs

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Complete Development Test/Operational Test (DT/OT) II	December 1979/ February 1979	September 1979
Defense Systems Acquisition Review Council (DSARC) III	April 1979	February 1979
Award-Low Rate Initial Production (LRIP) Contract	May 1979	May 1979
Delivery of First LRIP Tank	February 1980	February 1980
Complete OT III/DT III	May 1981/ February 1982 (estimate)	Not Shown
Management Review #1	February 1980	February 1980
Initial Operational Capability (IOC) *(Tank Company)*	January 1981	January 1981
Decision to Start Full Production	September 1981	December 1981
Award Full-Production Contract (3rd-year buy)	November 1981	October 1981
European Operational Capability (Tank Battalion)	March 1982	March 1982

Office of the Secretary of Defense cancelled the requirement for Management Reviews #2 and #3 based on the successful demonstration of M1 mission reliability and power-train durability growth during the extended engineering tests at Fort Knox, KY, in June-December 1979. An Office of the Secretary of Defense Program Review on 15 September 1981 reviewed the status of the M1 production capability and operational/development test results. Based on this review and the recommendations of the OSD staff, Secretary of Defense Decision Memorandum, 19 November 1981, authorized the Army to begin full production of the M1 tank.

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Tank Systems
Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	51540	28407	11961	0	693179
Funds (as shown in FY 1982 submission)	50985	28495	13602	0	697034

Decreases in FY 1981, FY 1982, and FY 1983 funds over those previously reported resulted from minor adjustments to the RDTE budget.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Weapons and Tracked Combat Vehicles Procurement:						
Funds (current requirements)	1482200	1659800	2025000	2634900	824900	18160300
Funds (as shown in FY 1982 submission)	1147500	1346800	1448000	Not Shown	12474700	17710200
Quantities (current requirements)	569	665	776	1080	3569	7058
Quantities (as shown in FY 1982 submission)	360	569	627	Not Shown	5103	7058

Program Element: #6.46.20.A
Title: Tank Systems
DOD Mission Area: #211 - Direct Fire Combat
Budget Activity: #4 - Tactical Programs

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Military Construction, Army:						
Funds (current requirements)	-	12060	10080	2450	-	43500
Funds (as shown in FY 1982 submission)	-	-	9700	-	-	15500

PROCUREMENT: The increases in tank buy quantities in FY 1981 through FY 1984 are a result of the Administration's desire to increase the modernization rate of the Army. Therefore, the Army was provided the funds to buy M1 tanks as rapidly as possible up to a rate of 90 tanks per month. The additional quantities and dollars were added to the M1 tank procurement line to support the Administration's defense priorities.

- Military Construction: The funds provide for M1 institutional training facilities at Aberdeen Proving Ground, MD, Fort Knox, KY, and 7th Army Training Center, Grafenwohr, FRG.

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Tank Systems
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Congress terminated the XM803 Main Battle Tank program in FY 1972 as unnecessarily complex, excessively sophisticated and too expensive, and directed initiation of a new tank development program. The objective of the M1 tank program was to produce a qualitatively superior tank for use as the primary ground combat system in a highly mobile, sustainable, combined arms force designed to counter the quantitatively superior and increasingly sophisticated ground forces of the Warsaw Pact. The M1 will be superior to the M60 tank in the areas of survivability, firepower, and mobility, thereby providing a dramatic increase in combat capability. The ballistic protection offered by special armor coupled with the tank's inherent agility and fuel and main-gun ammunition compartmentalization makes the M1 significantly more survivable than the M60 tank. Firepower is provided initially by a 105mm gun and will be significantly improved by the integration of the 120mm tank gun with the tank in late FY85. This will be the M1E1 tank. The 1500-horsepower package coupled with the high-performance suspension system provides superior cross-country mobility. The M1 Tank Program was approved on 18 January 1973 and contracts awarded to General Motors and Chrysler for competing prototype designs. Evaluation of the prototypes was completed on schedule (July 1976); however, the Defense Systems Acquisition Review Council (DSARC) delayed the selection of the prototype for engineering development 120 days until a resolicitation to consider a standardized version of the M1 could be evaluated. Testing of the LEOPARD 2 (Americanized Version (AV)) tank in accordance with agreements reached with the Federal Republic of Germany was conducted from September to December 1976. On 11 November 1976, Chrysler Corporation was selected to fabricate eleven pilot-model M1's for development and operational testing in 1978-1979. The Deputy Secretary of Defense in May 1979 authorized the Army to proceed with the first year's production of 110 M1's, but constrained FY 1980 and subsequent-years production pending the outcome of extended engineering development testing. An Office of the Secretary of Defense Program Review on 15 September 1981 reviewed the status of the M1 production capability and the emerging results of the OT III and DT III tests. Based on the review and recommendation of the OSD staff, Secretary of Defense Decision Memorandum, 19 November 1981, authorizes the Army to begin full production of the M1 tank.

G. (U) RELATED ACTIVITIES: There is no other program being conducted by other Services that meets the M1 requirements. The Marine Corps is closely monitoring the M1 development in relation to their requirement for a main battle tank in a high-intensity combat environment. Related and nonduplicatory Army activities are being conducted in Program Element (PE) #6.46.30.A, M1E1 Development Program.

H. (U) WORK PERFORMED BY: The prime contractor for the M1 is Chrysler Defense Incorporated, Detroit, MI. Major subcontractors to Chrysler are: Detroit Diesel Allison, Indianapolis, IN; Hughes Aircraft Corporation, Culver City, CA; AVCO-Lycoming, Stratford, CT; and Cadillac Gage, Detroit, MI. In-house work is managed by the Office of the Program Manager, M1 Tank System with work being accomplished by the US Army Tank-Automotive Command, Warren, MI; the US Army Armament Research and Development Command, Dover, NJ; and the Ballistics Research Laboratory, Aberdeen Proving Ground, MD.

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Tank Systems
Budget Activity: #4 - Tactical Programs

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Based on the recommendations of the M1 Defense Systems Acquisition Review Council (DSARC) III, the Deputy Secretary of Defense, on 8 May 1979, authorized the Army to proceed with the first production-year buy of 110 M1's, the majority of which are being used in Development and Operational Test III (DT/OT III), now ongoing. Extended engineering development testing at Fort Knox, KY, demonstrated that previous shortfalls in M1 mission reliability and power-train durability discovered during DT/OT II testing had been overcome. The first production tank rolled out of the Lima Army Tank Plant and was delivered to the Army on 28 February 1980 on schedule. DT III started in March 1980 and OT III in September 1980. OT III was completed in May 1981, and DT III testing is scheduled to be completed in February 1982. Emerging results of OT III and DT III tests show that the M1 tank meets or exceeds the key requirements necessary to survive on the modern battlefield. While the M1 tank has not demonstrated the required power-train durability, a panel of industrial experts reviewed the proposed power-train modification, and their finding is that once those modifications are installed, the power-train durability should meet or exceed the Army's requirement. The tank's training devices less the driver trainer will also have completed testing. Integrated logistic support efforts will continue with emphasis on adjustments resulting from lessons learned during testing and development of general support and depot-level repair capabilities. The Army and OSD staffs conducted M1 Program reviews during August and September 1981. Based on the recommendation of the OSD staff, the SECDEF authorized the Army to begin full production of the M1 Tank.

2. (U) FY 1982 Program: Final developmental testing in nuclear effects blast testing and manual validation, driver trainer evaluation, and close-out actions resulting from DT/OT III. Development of depot-level maintenance capabilities for major component overhaul will be completed as well as the software package to permit diagnosis of printed circuit boards using Automatic Test Equipment at the general support maintenance echelon. The near-term reliability and maintainability growth program will continue with emphasis on applying the lessons learned from the test program and developing changes that have long-term operations and support cost savings. PM M1 will conduct a power-train durability demonstration in conjunction with the normal production acceptance testing. This demonstration/test will begin in May 1982 and is scheduled for completion in March 1983.

3. (U) FY 1983 Planned Program: The near-term reliability and maintainability growth programs will be completed. Depot Maintenance Work Requirements (DMWRS) development will be completed. Production tanks used in testing and RAM-D demonstration will be refurbished for reissue to gaining Army units.

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Tank Systems
Budget Activity: #4 - Tactical Programs

4. (U) Program to Completion: All M1 RDTE development work will have been completed in FY 1983. All further testing on the M1 tank will be conducted as part of the M1E1 RDTE program.

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Tank Systems
Budget Activity: #4 - Tactical Programs

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation: The Army's third Development Test (DT III) is being conducted by the US Army Test and Evaluation Command (TECOM) and independently evaluated by the US Army Materiel Systems Analysis Activity. DT III started in March 1980 and should be computed in February 1982. A total of nine production-model M1's are being used by TECOM to technically evaluate the automotive aspects of the tank; its weapons and fire control; Reliability, Availability, Maintainability and Durability (RAM-D); and environmental effects. Testing has been performed at Aberdeen Proving Ground, MD; Yuma Proving Ground, AZ; White Sands Missile Range, NM; and at the Cold Regions Test Center, Fort Greely, AK. The objectives of the test are to determine whether the problems discovered during testing of the pilot-model tank in 1978 and 1979 have been corrected, the production-model M1 meets Army requirements and contract specifications, the system support package (e.g., manuals, test sets, tools) is adequate to support the M1 in the field, the M1's RAM-D requirements have been met, and the M1 is capable of operation in various climatic environments. The assessment of RAM-D performance will support derivation of the M1's maintenance and logistic burden in an operational environment. These estimates will be used to evaluate M1 manpower and logistic burden at the battalion and theater level and as a basis for future M1 RAM-D improvements should such improvements prove to be cost effective. The majority of the DT III test program has been accomplished by Army technical experts. However, those aspects of the test which are highly affected by man-machine interface considerations have been performed using soldiers. In addition to the tank testing, TECOM evaluated the M1's prototype maintenance troubleshooting trainers in December 1980. This was accomplished at the contractor's plant site in Orlando, FL. Results of the development test were considered at the Army and Defense Program Reviews of the M1 tank program conducted in August and September 1981 respectively. Based in part on the results of this development and operational testing, the Office of the Secretary of Defense authorized the Army to enter full production of the M1 tank. Development test results to date indicate that the M1 met its system performance and RAM-D requirements except for power-train durability, maintainability ratio, cruising range, and track durability. In the case of the power-train durability, testing to date has disclosed problems in quality control in the start-up of the production base and transmission clutch design. Progress is being made in improving production-base quality control through both Army and contractor management emphasis on production quality control. Fixes to the transmission clutch problem were determined by the contractor, and in June, the Army conducted a transmission durability experiment that demonstrated a successful correction of the transmission problem. Track durability will not improve until technology advances are made in rubber compounding and track design. By the time the test program is complete, the nine development-test M1's and M1's periodically operated by the contractor will have traveled approximately 30,000 miles and fired 7,000 rounds of main-gun ammunition. The test is structured to provide for periodic tank configuration changes

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Tank Systems
Budget Activity: #4 - Tactical Programs

and validation of these changes. After the test is completed, the nine M1's will be brought to the final test configuration and will be reissued for use by the Army to satisfy tank inventory requirements and distribution plans. The M1 production tank differs from the hand-tooled pilot tank tested during the second Development and Operational Tests (DT/OT II) in that the production tank is an assembly-line product that incorporates changes resulting from lessons learned during DT/OT II (February 1978-September 1979) and the extended Full-Scale Engineering Development testing at Fort Knox, KY (June-December 1979). In regard to training devices, delays in concept definition precluded development testing of all of the prototype M1 training devices concurrent with the tank test program. Development testing of these devices was conducted at the contractors' plant site under the auspices of the US Army Test and Evaluation Command. Two competing prototypes of the M1 Unit-Conduct of Fire Trainer (U-COFT) underwent development testing in April 1981 in Daytona, FL (General Electric Company), and Warren, MI (Chrysler Defense, Incorporated). The objectives of the development tests were to insure that the U-COFT engineering designs are complete and meet contract specifications. The General Electric U-COFT was selected to continue into operational testing. The development test of the prototype driver trainer ran from January to May 1981 at the Sperry Secor Company plant in Fairfax, VA. The objectives of this test were the same as for the competing U-COFT devices. In addition to government testing, AVCO Lycoming Corp has conducted a 1,000-hour endurance test of a production engine during the period June-September 1981. Comments on prior and future M1 development test programs follow:

a. (U) Prior Development Testing: Phase I of the first Development Test (DT I) was conducted by the TECOM at Aberdeen Proving Ground, MD, from February to April 1976 to provide data for selection of either the Chrysler or General Motors M1 prototype vehicle and the decision to enter engineering development. Both prototypes successfully demonstrated the ability to meet or exceed M1 requirements. Selection of the prototype M1 for engineering development, initially scheduled for July 1976, was deferred 120 days by the Secretary of Defense pending the outcome of a resolicitation which considered incorporating standard components in accordance with agreements reached with the Federal Republic of Germany. On 12 November 1976, the Source Selection Authority announced selection of the Chrysler prototype for engineering development. Phase II of the first Development Test (DT I), testing of the Leopard 2 (Americanized Version), ran from September to mid-December 1976. As a result of this test, the Army concluded that the M1 best met Army requirements for a main battle tank. In January 1977, the US and Germany agreed to limit interoperability/standardization efforts to subsystems/components only. The second Development Test (DT II) was run from February 1978 to September 1979. This test was designed to assess the degree to which eleven pilot-model M1's met the Materiel Need statement, to demonstrate that engineering development was reasonably complete, and that engineering solutions to problems were in hand. The test disclosed that M1 performance objectives were met, except for power-train durability and track durability. During June-December 1979, extended Full-Scale Engineering Development testing conducted at Fort Knox, KY, demonstrated that mission reliability and power-train durability

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat
Title: Tank Systems
Budget Activity: #4 - Tactical Programs

problems had been overcome. Track-durability problems were recognized as technology pacing items requiring further technical development before significant improvement can be expected. Finally, in the case of the maintenance ratio assessment, it was recognized that the ongoing development and operational tests will provide the best opportunity to make a detailed evaluation of this requirement. In addition to the Government testing, AVCO Lycoming ran 1,000 hours of endurance testing in the laboratory on each of two engineering-development engines with production modifications. In January 1980, a Blue Ribbon Panel which reviewed the Fort Knox and laboratory engine test results concluded that significant improvements had been achieved, and with further improvement in a few areas, significant long-term operations and support cost savings can be realized. The Army is working to accommodate the improvements recommended by the Panel.

b. (U) Future Testing:

(1) (U) Tropic Testing. The final climatic-region testing of the M1 tank system will be conducted on an M1E1 tank at the Tropic Test Center, Fort Clayton, The Canal Zone. The primary objective of this be test will be assess the effect of high humidity and heat on the tank and ammunition. Funding and schedules for this test have not been definitized.

(2) (U) Production Acceptance Test and Evaluation: Beginning in Fiscal Year 1982, M1 tanks produced at the Detriot Arsenal Tank Plant (DATP) and tanks produced at the Lima Army Tank Plant (LATP) will be subjected to system performance testing at Aberdeen Proving Ground, MD, to insure quality of production. These tanks will also undergo a RAM-D test which will also demonstrate powertrain durability and will consist of each tank being operated at least 6000 miles over mixed terrain and firing 1000 main-gun ammunition rounds. A fifth DATP-produced M1 tank will undergo engineering performance testing. These tests will be conducted by TECOM and are scheduled for completion in mid-1983. As a continuing check on production quality assurance, an M1 tank will be randomly selected each quarter from both tank plants and subjected to a Comparison Test. These tanks will undergo 3000 miles of mobility testing over mixed terrain and will fire 100 rounds of main-gun ammunition.

(3) (U) Two LATP-produced M1 tanks with engine and transmission modifications are undergoing a 4000-mile evaluation at Aberdeen Proving Ground, MD. The purpose of this test is to verify several engine and transmission modifications. An AGT-1500 gas turbine engine will begin the second 1000-hour engine test in March 1982.

2. (U) Operational Test and Evaluation: The third Operational Test (OT III) of the M1 tank was conducted at two test sites by the US Army Armor and Engineer Board at Fort Knox, KY, and by the US Army Training and Doctrine Command Combined

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Tank Systems
Budget Activity: #4 - Tactical Programs

Arms Test Activity at Fort Hood, TX. The tests began on 16 September 1980 and were completed on 29 May 1981. At Fort Knox, a 3500-mile operational mission profile test of each of four production-model M1's was run by Company H, 2d Squadron, 6th Cavalry. The data collected is being used in conjunction with the development test results to assess the M1's RAM-D and the crews' ability to tactically employ the tank. At Fort Hood, OT III was conducted using a three-company battalion (41 production-model M1's in the battalion, plus one M1 in the maintenance support unit). The test started with the handoff of the M1 tanks to the armor unit and continued with individual, crew, and unit training as the unit transitioned from a fully trained, combat-ready M60 tank battalion to an operationally effective M1 unit. The test included crew and small unit maneuver exercises, individual tank and platoon gunnery, and company and battalion-level field training exercises, all conducted under varying operational and environmental conditions in both daylight and night. The test unit was the 2d Battalion, 5th Cavalry, 1st Cavalry Division. The Operational Test and Evaluation Agency managed and independently evaluated the operational tests at both sites. The objectives of the tests were to: assess the RAM-D performance of the production-model M1; determine if the production-model M1 incorporated, without degradation, the improvements made to the pilot-model M1; evaluate the adequacy of institutional training programs for tank crews and maintenance personnel; and provide the data with which to assess the logistic supportability of the M1 in battalion and smaller units. Results to date from the Fort Knox test as with the development test results indicate that M1 tanks can be operated and maintained by the soldiers. The M1 tank is meeting all of its requirements except those previously addressed. During OT III, the M1 tanks accrued of 48,064 miles and fired over 10,458 rounds of main-gun ammunition in the course of testing. In addition to the M1 operational test, the M1 prototype maintenance trainers for the turret, engine, transmission, hull electrical systems, laser rangefinder, and the ballistic computer started operational testing in March 1981 and was completed in July 1981. The test revealed that the organizational level maintenance trainers are very effective and have no significant problems. The DS/GS level maintenance trainers exhibited reliability problems. The contractor has been directed to correct the problems. A demonstration at Aberdeen Proving Grounds, MD, conducted in late 1981, demonstrated that the majority of deficiencies have been corrected in the DS/GS level maintenance trainer. The Army is now satisfied with its performance of the DS/GS level maintenance trainers and will make a final acceptance decision in mid-1982. The test was conducted by the US Army Armor and Engineer Board using personnel from the 1st Advanced Individual Training Brigade, Fort Knox, KY (for the Turret Organizational Maintenance Trainer), and the US Army Ordnance Center and School, Aberdeen Proving Ground, MD (for the other maintenance trainers). The driver trainer operational testing at Ft. Knox, KY, was scheduled from June 1981 to January 1982 due to reliability and design problems. The Director of Training Development, US Army Armor Center, will conduct the independent evaluation to assess each of the trainers' performance characteristics and training contribution; the ability of soldiers to apply skills learned on the trainers to actual M1 hardware; and the reliability, availability, maintainability, safety features, and support aspects.

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Tank Systems
Budget Activity: #4 - Tactical Programs

a. (U) Prior Operational Testing: Phase I of the first Operational Test (OT I) was conducted by the Operational Test and Evaluation Agency (OTEA) at Aberdeen Proving Ground, MD, during April 1976. This test was accomplished in conjunction with the first development test using one prototype vehicle and one automotive test rig from each contractor (Chrysler and General Motors). Both prototypes met the operational effectiveness objectives required for that stage of development. Phase II of OT I tested the the German Leopard 2 (Americanized Version) prototype and was completed in December 1976 at Aberdeen Proving Ground, MD, by OTEA against the same test criteria used to evaluate the US competitive prototype tanks. As a result of this test the Army concluded that the M1 best met Army requirements for a main battle tank. The second Operational Test (OT II) was conducted by OTEA at Fort Bliss, TX, using five pilot-model M1's and personnel from the 3d Armored Cavalry Regiment. The test ran from May 1978 to February 1979 and resulted in ratings of satisfactory in firepower and survivability; marginal in availability, mobility, and fightability; and unsatisfactory in reliability. Satisfactory ratings reflected the superior armor protection of the M1, the compartmentalization of fuel and service ammunition, and significant improvement in M1 main-gun accuracy over that of the M60A1 tank. Marginal assessments reflected the higher fuel consumption of the M1, M1 track retention and reliability problems, some design features having undesirable human factors implications, and vehicle downtime resulting from the poor reliability of the M1. The detailed results of this test in conjunction with the Development Test results were the basis for design changes to preclude recurrence of these shortfalls in the production model M1. Many of the corrections, particularly those affecting reliability and safety, were validated during the extended Full-Scale Engineering Development testing of the three refurbished pilot-model M1's at Fort Knox, KY, from June to December 1979.

b. (U) Future Operational Testing: Operational testing of the General Electric Co. M1 prototype Unit-Conduct of Fire Trainer (U-COFT) was conducted by the US Army Training and Doctrine Command Combined Arms Test Activity at Fort Hood, TX, from July through September 1981, using personnel from the M1 operational test unit, the 2d Battalion, 5th Cavalry, 1st Cavalry Division. The independent evaluation is being accomplished by the Director of Training Development, US Army Armor Center (USAARMC). The evaluation of the U-COFT addressed performance characteristics; the effectiveness of training transfer to the M1; the reliability, availability, and maintainability characteristics; and safety, human factors, and supportability aspects.

c. (U) Summary: During the period June-August 1981, a group of industrial, scientific, and technical leaders was reconvened for the third time to independently assess the current status of the prognosis for the M1 tank power-train durability. The assessment of this Blue Ribbon Panel is that most of the previously identified pattern failures of the

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Tank Systems
Budget Activity: #4 - Tactical Programs

power-train have been corrected in the production-model M1 tank. The panel further states that once the corrective actions identified to date by the Army are implemented, the power-train durability will meet and exceed the Army's requirement. Based in part on this report, the results of the operational and development testing, and the assessment of the Office of the Secretary of Defense staff, Secretary of Defense Decision Memorandum of 19 November 1981 authorized the Army to enter production with the M1 tank above 30 tanks per month.

3. (U) System Characteristics:

Operational/Technical Characteristics	Objectives 1/	Demonstrated Performance 2/
Acceleration (hard surface 0 degree slope, 0 to 20mph) (sec)	6-9	6.7
Speed (mph)		
10% slope	20-25	22.3
60% slope	3-5	4.8
Maximum	40-50	45.9
Cruising range (miles)	275-325	230-245 4/
Horsepower/Weight(tons)	26-30:1	25:1
Height (inches)	90-95	93.5
Width (inches)	120-144	144.13
Stowed ammunition (main gun rounds)	55-65	55
Reliability (Mean Miles Between Failure)		
ASARC/DSARC III	216 (goal)	145
Management Review #1	272/200 3/	326
End DT/OT III	320	350 4/ 5/
Power Train Durability		

Program Element: #6.46.20.A
DOD Mission Area: #211 - Direct Fire Combat

Title: Tank Systems
Budget Activity: #4 - Tactical Programs

Operational/Technical Characteristics (Probability of achieving 4000 miles)	Objectives 1/	Demonstrated Performance 2/
ASARC/DSARC II	.4 (goal)	.2
Management Review #1	.5/.3 3/	.54
End DT/OT III	.5	.37 4/
Maintenance ratio (maintenance man-hours/ operational hours)	1.25	1.34 4/

1/ End Development/Operational Test (DT/OT) III requirements except as indicated.
2/ DT/OT III or prior Development test results.
3/ Values reflect Office of the Secretary of Defense requirements/thresholds for Management Review #1 in February 1980.
4/ Emerging Interim DT/OT III results based on the July Interim assessment conference evaluation following completion of OT III and majority of DT III testing completed. Final DT/OT III assessment conference to be conducted in January 1982. These numbers are based on assessments of demonstrated fixes and were determined by the Interim Assessment Conference IAW AR 702-3.
5/ Mission reliability numbers are 336 for DT and 362 for OT. The combined score is used only for contractual purposes.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.21.A
DOD Mission Area: #212 - Indirect Fire Support

Title: COPPERHEAD (Cannon-Launched Guided Projectile)
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimat.	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	6026	3294	2075	0	0	155000
D073	Copperhead	6026	3294	2075	0	0	155000

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program supports engineering development of the Copperhead semiactive laser-guided projectile. The Copperhead is a 155mm field artillery projectile designed to attack stationary and moving hard, point targets such as tanks with a high probability of achieving first-round kills. The projectile acquires and homes on laser energy reflected from a target which has been illuminated by a laser designator. This projectile will provide an indirect artillery fire capability to effectively attack armored targets of the numerically superior Warsaw Pact forces at ranges beyond the capability of direct fire antitank weapons. The high single-shot kill probability provides a force multiplier that significantly improves the Army's antitank capability within the existing force structure.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: The warhead product improvement program initiated in FY81 will be continued with emphasis on completion of confirmatory tests along with commencement of safety tests and preproduction studies. This warhead improvement achieves the required level of effectiveness for the projectile against the postulated THREAT new technology armor configurations. A hardware configuration will be verified in time to include it into the FY84 production contract. Investigation of range enhancement feasibility will be continued.

Program Element: #6.46.21.A
DOD Mission Area: #212 - Indirect Fire Support

Title: COPPERHEAD (Cannon-Launched Guided Projectile)
Budget Activity: #4 - Tactical Programs

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Initiate Advanced Development	Feb 72	Feb 72
Initiate Engineering Development	Jul 75	Jul 75
Initiate DT II	Mar 78	Mar 78
Defense Systems Acquisition Review Council (DSARC III)	Nov 79	Nov 79
Initial Operational Capability (IOC)	Apr 82	Nov 81

The late delivery of selected *initial production* facility equipment and difficulty in prove-out of manufacturing processes in the initial production facility contributed to a five-month IOC adjustment.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	6026	3294	2075	0	155000
Funds (as shown in FY 1982 submission)	6026	3303	2077	0	159265

The change in FY82 and FY83 is a result of the application of revised inflation pricing indices.

Program Element: #6.46.21.A
DOD Mission Area: #212 - Indirect Fire Support

Title: COPPERHEAD (Cannon-Launched Guided Projectile)
Budget Activity: #4 - Tactical Programs

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
Ammunition Procurement, Army						
Funds (current Requirements)	117600	141100	183600	170000	475100	1209000
Funds (as shown in FY 1982 submission)	122100	115700	129600	Not Shown	635400	1118900
Quantities (current requirements)	3125	4550	7629	7629	20658	44666
Quantities (as shown in FY 1982 submission)	4300	4229	5075	Not Shown	28682	44386

The FY81 decrease is attributable to the application of revised inflation indices. Dollar and quantity changes for FY82 and FY83 are driven by the Army's desire to procure Copperhead at an economically efficient rate. The increase in the total estimated cost is driven by the change in IOC from November 1981 to April 1982.

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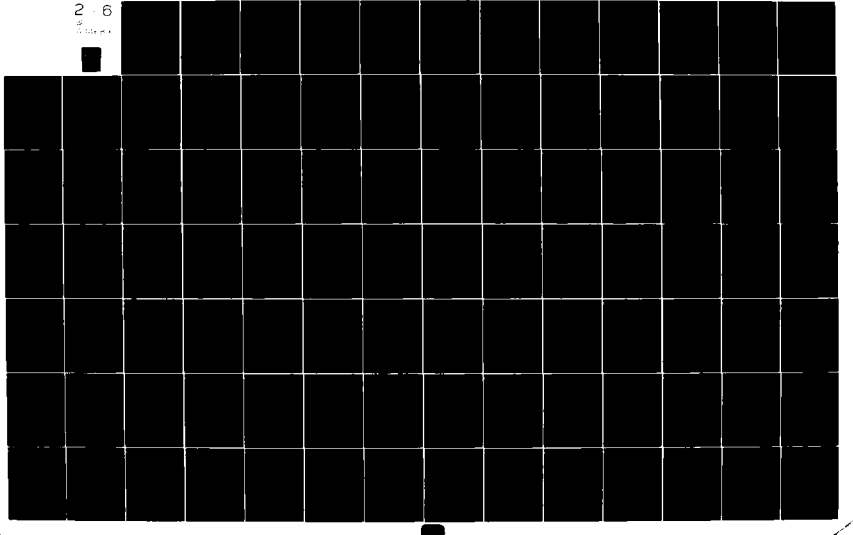

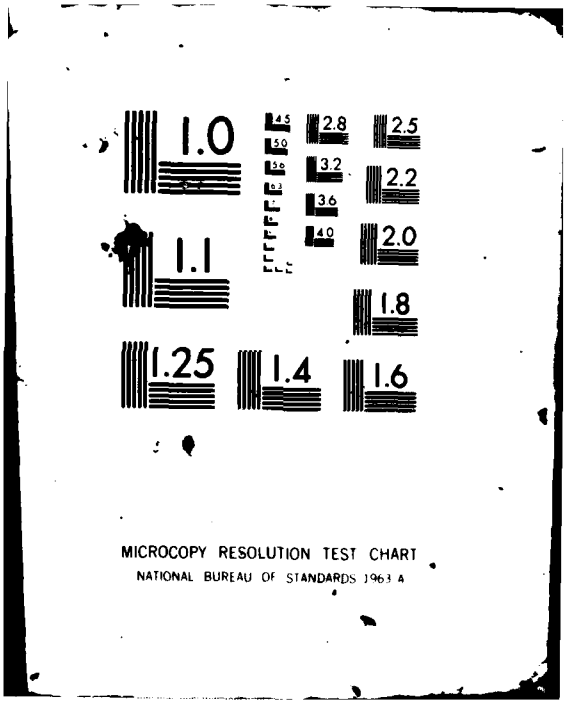
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Program Element: #6.46.21.A
DOD Mission Area: #212 - Indirect Fire Support

Title: COPPERHEAD (Cannon-Launched Guided Projectile)
Budget Activity: #4 - Tactical Programs

F. DETAILED BACKGROUND AND DESCRIPTION: A requirement exists to increase the indirect fire capability of field artillery cannon units by providing terminally guided projectiles that acquire and home on stationary and moving point targets with a high probability of achieving first-round kills. The Copperhead projectile satisfies this requirement. The Copperhead is compatible with standard 155mm howitzers and propelling charges and will be included in the basic ammunition loads of appropriate field artillery units. Copperhead fire missions will be conducted using standard artillery procedures and fire control techniques. Copperhead fire missions have been successfully conducted using the Ground Laser Locator Designator (GLLD), the primary designator as well as the remotely piloted vehicle (RPV), and a helicopter-mounted airborne designator. During the final portion of the trajectory, the observer illuminates the target with a narrow laser beam. The Copperhead acquires the reflected energy and guides to the target using proportional navigation guidance. The Copperhead has a maximum range of 16 kilometers and carries a shaped charge warhead that can penetrate of homogeneous armor. The Copperhead will complement rather than replace available projectiles in field artillery cannon units.

G. (U) RELATED ACTIVITIES: The Copperhead project is related to program elements 6.47.30.A ((RPV) (Remotely Piloted Vehicle)) and 6.43.08.A (Precision Laser Designator) where work is being performed to develop laser designators for use by forward observers. An extensive effort is underway to insure maximum component commonality between the Army projectile and the Navy 5-inch projectile in order to avoid duplication of effort and to achieve maximum possible savings. To facilitate the achievement of this objective, these projectile development programs are jointly managed with the Army established as the responsible service.

H. (U) WORK PERFORMED BY: Martin Marietta Corporation, Orlando, FL, is the contractor responsible for system development. Responsible government activities include: US Army Armament Research and Development Command, Dover, NJ; US Army Missile Command, Huntsville, AL; Project Manager, Cannon Artillery Weapons Systems, Dover, NJ; US Army Test and Evaluation Command, Aberdeen, MD.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The Copperhead program began in 1971 with $1.6 million emergency funds to conduct in-house systems studies. Semiactive laser homing was selected for use during the initial phase of the program because it was the most technically advanced. In February 1972 contracts were signed with Texas Instruments and Martin Marietta to conduct a two-phase competitive prototype demostration. Each contractor fabricated and delivered fully functional prototype projectiles with telemetry to the Army for testing. In January 1975, a Special Commonality Defense Systems

Program Element: #6.46.21.A
DOD Mission Area: #212 - Indirect Fire Support

Title: COPPERHEAD (Cannon-Launched Guided Projectile)
Budget Activity: #4 - Tactical Programs

Acquisition Review Council (DSARC) directed the Army to continue the Advanced Development program. Sixteen of 18 prototype projectiles and six Navy 5-Inch/155mm prototype projectiles were tested and evaluated. DSARC II was conducted in June 1975, and approval to enter Engineering Development (ED) was received. The ED contract was awarded to the Martin Marietta Corporation in July 1975 based on the results of the competitive advanced development phase. The FY 197T funding was reduced by over 31 percent (from $24.8 million to $17.0 million) necessitating a complete program restructure which resulted in a program slip of six months and the initiation of ED at a lower level than initially anticipated. During FY 1976 and FY 1977, design changes to the warhead, fuze, roll-rate sensor, and seeker gyro were tested, and the final two Army prototypes were successfully fired. The first one was fired at a tank illuminated by a designator mounted in a Remotely Piloted Vechicle (RPV), and the second was fired at a moving tank illuminated by a helicopter-mounted designator during darkness. During FY 1977 subsystem testing was completed, and the first series of all-up-round baseline tests was conducted at White Sands Missile Range (WSMR). Producibility Engineering and Planning (PEP) was initiated in December 1976 under Congressionally imposed dollar and time constraints. PEP constraints were lifted in April 1977. During FY 1978 the preliminary Technical Data Package (TDP) was delivered by the contractor and reviewed by government personnel. Naval Avionics Center (NAC) initiated technical data package (TDP) validation efforts in December 1977. Prototype Qualification Tests (POT) were initiated in March 1978. The Initial Production Facilities contract was awarded in 1977. Qualification tests, development test/operational test II were completed in September 1979. An Army Systems Acquisition Review Council (ASARC) was held in September 1979 which recommended the Copperhead guided projectile enter production beginning in FY 1980. The Defense Systems Acquisition Review Council (DSARC) III was held in November 1979, and the Army was permitted to enter production at a rate not to exceed 200 units per month until a threshold reliability has been demonstrated based on production validation test firings. Seeker fixes to provide increased projectile effectiveness under obscured environment conditions were successfully tested in 2QFY80. These fixes and other improvements, which focus on the attainment of enhanced reliability, will be incorporated in the FY81 production program. A container redesign to diminish shock and vibration effects of rough handling was completed. Projectile enhancement was initiated by developing an improved warhead and investigating range extension. An improved warhead will increase effectiveness against future armor threats while range extension will increase the projectile utility for all air and ground modes of laser designation.

2. (U) FY 1982 Program: Continuation of the projectile effectiveness improvement effort to include completion of improved warhead confirmatory tests, commencement of safety tests and preparation studies. Completion of independent validation of the technical data package.

3. (U) FY 1983 Planned Program: Completion of the warhead program and integration of the improved warhead into production hardware.

Program Element: #6.46.21.A
DOD Mission Area: #212 - Indirect Fire Support

Title: COPPERHEAD (Cannon-Launched Guided Projectile)
Budget Activity: #4 - Tactical Programs

4. (U) Program to Completion: Program completed in FY 1983.

Program Element: #6.46.21.A
DOD Mission Area: #212 - Fire Support

Title: COPPERHEAD (Cannon-Launched Guided Projectile)
Budget Activity: #4 - Tactical Programs

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. (U) The COPPERHEAD cannon-launched guided projectile is being developed and produced by the Project Manager, Cannon Artillery Weapons System, Dover, NJ. The contractor is the Martin Marietta Corporation, Orlando, Florida. Advanced development of COPPERHEAD was highlighted by competitive feasibility demonstrations between Martin Marietta and Texas Instruments. The engineering development contract was awarded to Martin Marietta because of superior performance reflected by 8 direct hits out of 12 rounds fired against moving and stationary targets that were designated by airborne and ground-positioned laser designators. Prototype Qualification Testing for the engineering development version, Development Test (DT II), was conducted by the US Army Test and Evaluation Command (TECOM) at White Sands Missile Range (WSMR) between March 1977 and December 1979. In July 1978, DT testing was delayed when it became necessary to incorporate design changes for improved reliability, storage life, and in-flight performance. A titanium gyroscope was substituted for the original plastic gyroscope, and large-scale integrated circuits replaced hybrid electronics. New projectiles were manufactured in August and testing resumed in September 1978.

b. (U) Major subtests included environmental qualification, battlefield environment, cold weather performance, and range performance and reliability. In addition, nuclear effects, nuclear-biological-chemical decontamination, and electromagnetic radiation effects were also tested. 168 rounds were fired during the DT II firing program. During severe environmental qualification firings, the projectile reliability was lower than desired. Design changes were identified and a limited number of projectiles which incorporated the design fixes were reworked in August 1979. These projectiles were fired in September and October 1979, and resulted in a significant improvement in reliability. Overall reliability achieved during DT II was 0.69, which was consistent with the desired reliability level for OT testing. The single-shot kill probability exceeded the required value as shown in paragraph 3 below.

c. (U) Test firings from the Initial Production Facility reflected the need to improve manufacturing processes rather than engineering design to assure desired production reliability. There were no repeats of failures that occurred during Full-Scale Engineering Development. Current production procedures have been modified based upon IPF failure analysis and corrective action.

Program Element: #6.46.21.A
DOD Mission Area: #212 - Fire Support

Title: COPPERHEAD (Cannon-Launched Guided Projectile)
Budget Activity: #4 - Tactical Programs

d. (U) Current and future testing begins with a 30-round First Article Test Program followed by a 125-round Initial Production Test. These tests will measure current production reliability with rounds produced from the actual production line. Any additional corrective action determined from these tests will have occurred before the Special Reliability Demonstration in June 1982. This demonstration will verify sufficient reliability (0.8 minimum) to warrant full-scale production. Other 13-round-per-month Lot Acceptance Tests will begin in January 1982. A follow-on evaluation is planned for FY84.

2. (U) Operational Test and Evaluation:

a. (U) Operational Test I (OT I) was conducted at White Sands Missile Range during 25 March-30 April 1974. Test results indicated that a Forward Observer (FO) section equipped with the Ground Laser Locator Designator (GLLD) would successfully complete an artillery fire mission with the COPPERHEAD. An independent operational test (OT II) was conducted by the Operational Test and Evaluation Agency (OTEA), Falls Church, VA, during March-June 1979 at Fort Carson, CO, using soldiers of the 4th Division. The doctrine and tactics used by the test units were in agreement with the operational concept developed by the Army's Field Artillery School. OT II consisted of two phases. The nonfire phase was conducted under both day and night conditions. Laser designator operators were evaluated for their ability to properly designate for the COPPERHEAD guided projectile. Acquisition, tracking, engagement, training, and command-control-communications were also evaluated. During the live fire phase, 71 rounds were fired against single and multiple moving target arrays in a tactical scenario. Firings were conducted at various ranges under day and night conditions, and several missions were conducted in conjunction with smoke and dust normally present on the battlefield. Of the 71 rounds fired, 29 hit the target. The results of both DT and OT II generated the requirement for improved reliability discussed heretofore. Of particular concern was degraded performance on a smoke- or dust-obscured battlefield. In response to this concern, signficant changes in seeker circuitry were developed and tested by the prime contractor in August 1980 in an exercise called Smoke Week III. The test results demonstrated major improvements in COPPERHEAD performance and utility on the obscured battlefield.

b. (U) The test unit for OT II was a self-propelled 155mm cannon artillery battalion with an additional towed howitzer section attached from the XVIII Airborne Corps. COPPERHEAD projectiles were drawn from an ammunition supply point, transported to the firing unit in tactical vehicles, and subjected to the normal ammunition handling procedures used by combat soldiers. The fire control procedures and communications procedures used in the test are those currently employed by field artillery units.

Program Element: #6.46.21.A
DOD Mission Area: #212 - Fire Support

Title: COPPERHEAD (Cannon-Launched Guided Projectile)
Budget Activity: #4 - Tactical Programs

3. System Characteristics:

Operational/Technical Characteristics	Objectives	Demonstrated Performance
Weight (pounds)	150	138
Length (inches)	54	54.2
Accuracy (CEP-ft)		
Range (km)		
Maximum	16-24	16
Minimum	1.5-3.0	3.0
Single-Shot Kill Probability		

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.24.A
Title: High Mobility Multipurpose Wheeled Vehicles (HMMWV)
DOD Mission Area: #211 - Direct Fire Combat
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4670	3013	2743	0	0	16626
	QUANTITIES						33
DH17	High Mobility Multipurpose Wheeled Vehicles	4670	3013	2743	0	0	16626

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The High Mobility Multipurpose Wheeled Vehicle (HMMWV) Program is a Tri-Service Program, under Army lead, to develop a family of vehicles to meet critical Army, Air Force, and Marine Corps combat, combat support, and combat service support mission requirements and selectively replace vehicles in the 1/4-ton to 5/4-ton weight class presently in the tactical wheeled vehicle fleets of the three services. The 5/4-ton vehicles of the HMMWV family will utilize a common chassis, minimizing logistic support requirements, in three body configurations specifically tailored for mission requirements by the application of kits. Typical mission requirements include TOW missile carrier, forward air control, rear area and base security, personnel and cargo transport, and command and control. Obsolescent and overage vehicles to be replaced by the HMMWV include the MULE (M274) and the GAMA GOAT (M561 utility and M792 ambulance); the HMMWV will also selectively replace M151 1/4-ton utility vehicles. To the maximum extent possible, existing commercial and military components will be used in the HMMWV. A Joint Mission Element Need Statement (JMENS) has been approved.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Funds requested provide for an assessment of the results of Development and Operational Testing and the conduct of an In-Process Review to determine the acceptable contractor candidate vehicles to compete for production quantities. Additional evaluations on the ambulance version, communication kits, and other weapon systems will be conducted as well as the finalization of the Integrated Logistics Support package.

Program Element: #6.46.24.A
DOD Mission Area: #211 - Direct Fire Combat

Title: High Mobility Multipurpose Wheeled Vehicles (HMMWV)
Budget Activity: #4 - Tactical Programs

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Special IPR (Specifications)	December 1979	December 1979
Special IPR (Specifications)	September 1980	September 1980
Release RFP for prototype test vehicles	February 1981	M Month 1/
Award competitive contracts for prototype test vehicles	July 1981	M+5 Months 1/
Initiate Development Test II/ Operational Test II	April 1982	M+15 Months 1/
Development Acceptance IPR (type classification)	November 1982	M+21 Months 1/
Award Production Contract	December 1983	M+21 Months 1/
Initial Operational Capability	November 1984	M+49 Months 1/

1/Milestone dates were inexact due to pending Congressional action on Army's FY 1980 reprograming request.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	4670	3013	2743	0	16626
Funds (as shown in FY 1982 submission)	2770	3021	2810	0	9981

Program Element: #6.46.24.A
DOD Mission Area: #211 - Direct Fire Combat

Title: High Mobility Multipurpose Wheeled Vehicles (HMMWV)
Budget Activity: #4 - Tactical Programs

(U) Increase of $1900 thousand in the FY 1981 funding level is a result of reprograming to provide for increased cost to permit a fully competitive, three-contractor program. The funding decrease of $8 thousand in FY 1982 is a result of the amended budget request and the application of revised inflation indices. The decrease of $67 thousand in FY 1983 is attributable to application of revised inflation indices to previous estimate. The increase of $6645 thousand in total estimated cost for the program is a result of the changes discussed above for FY 1981 through 1983 and congressionally approved increase of $4900 thousand in FY 1980 to fully fund the competitive program. The total estimated cost does not include an additional $1,528 thousand provided by the Marine Corps in FY 1979 and FY 1980 to support the research effort (see paragraphs F and H).

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement, Army:						
Funds (current requirements)	0	0	38600	173700	982500	1194800
Funds (as shown in FY 1982 submission)	0	3600	0	0	933900	937500
Quantities (current requirements)	0	0	1180	6193	33395	40768
Quantities (as shown in FY 1982 submission)	0	0	0	0	38129	38129

(U) Funds identified in the FY 1982 submission were predicated on Congressional approval of the Army's FY 1980 reprograming request for $4900 thousand.

(U) The total cost and quantities are based on estimates of Army Initial Issue Quantities. Initial Issue Quantity and the Authorized Acquisition Objective are currently being finalized. The estimates do not include the requirements of the Air Force and Marine Corps.

Program Element: #6.46.24.A
DOD Mission Area: #211 - Direct Fire Combat

Title: High Mobility Multipurpose Wheeled Vehicles (HMMWV)
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION : The High Mobility Multipurpose Wheeled Vehicle (HMMWV) provides a 5/4-ton family of wheeled vehicles which uses a common baseline chassis with variations in body design to accommodate specific roles and missions. The common chassis concept greatly advances the tactical vehicle management process for the Services by emphasizing logistics commonality and standardization. The existing fleet of 1/4-ton through 5/4-ton wheeled vehicles is overage, obsolescent, and has demonstrated operational deficiencies sufficient to warrant immediate upgrading. Vehicles in the current fleet include: the M151 5/4-ton JEEP and M274 1/2-ton MULE (as weapons carriers), the M561 1/4-ton GAMA GOAT, and the M792 5/4-ton Ambulance. Each is limited in off-road mobility, payload capacity, or survivability when assigned to various combat, combat support, and combat service support roles critical to the success of today's Army. For most of these vehicles, obsolescence and the absence of a warm production base have seriously degraded supportability and maintainability. In the weapons carrier role, both the M151 1/4-ton and the M274 1/2-ton MULE are severly overloaded, unprotected, and slow. Vehicles from the HMMWV family are required to selectively replace vehicles in the current fleet. Additionally, the Marine Corps expects to completely modernize its 1/4-ton through 5/4-ton tactical wheeled vehicle fleet with common chassis derivatives of the HMMWV. The program is designed to capitalize to the maximum extent possible on existing commercially available vehicle technology. The development effort is minimal and is considered to be a low technical risk. The program depends on industry for the design and fabrication of prototype test vehicles. The HMMWV development and procurement program will provide vehicles capable of performing in demanding tactical environments. It is a complementary program to the Commercial Utility and Cargo Vehicle (CUCV), a nondevelopment program. These two vehicles (HMMWV and CUCV) will fulfill the 5/4-ton fleet requirement.

G. (U) RELATED ACTIVITIES: This program is supported by other Army ground mobility research and development programs, to include: Program Element #6.11.02.A, Project AF22, Research in Vehicle Mobility; PE #6.26.01.A, Tank-Automotive Technology; and PE #6.36.21.A, Vehicle Engine Development. This program also is supported by US Marine Corps research and development PE #6.47.29.M, Project 075J, High Mobility Tactical Truck-Light. Duplication of effort is precluded by Joint Services' participation in the planning and conduct of this program, review and coordination of the program at all Service management levels, and by participation in the development of the Performance Specification and In-Process Reviews.

H. (U) WORK PERFORMED BY: US Army Tank-Automotive Command, Warren, MI, has the responsibility for implementation of this program. Contractors for the development program are Teledyne Continental Motors, AM General Corporation, and Chrysler Defense Incorporated.

Program Element: #6.46.24.A
DOD Mission Area: #211 - Direct Fire Combat

Title: High Mobility Multipurpose Wheeled Vehicles (HMMWV)
Budget Activity: #4 - Tactical Programs

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Marine Corps research and development funds in FY 1979 in the amount of $253 thousand and in FY 1980 in the amount of $1,275 thousand were provided to the Tank-Automotive Command. Marine Corps plus Army funds were used to provide engineering support in program planning, development of the performance specification, preparation of the Joint Mission Element Need Statement, mobility studies, release to industry of a Letter of Intent with the performance specification and a request for industry comments on the program plan and performance specification, and the conduct of an In-Process Review to incorporate industry comments to improve the program plan and performance specification. The congressionaly approved reprograming of $4900 thousand allowed the Army to release the Request for Proposals for the design and fabrication of prototype vehicles. Responses were evaluated and three development contracts awarded. Development of kits and preparation of the Integrated Logistic Support (ILS) Package were initiated.

2. (U) FY 1982 Program: Design and fabrication of 11 prototype vehicles from each of three contractors will be completed. Physical teardown analysis and maintenance evaluation will be performed on prototypes from each contractor. Development Test II/Operational Test II (DT/OT II) on the other prototype vehicles will be conducted. Kit and ILS planning will continue.

3. (U) FY 1983 Planned Program: A Development Acceptance In-Process Review (DEVA IPR) will be conducted, and the High Mobility Multipurpose Wheeled Vehicle (HMMWV) Family will be type classified. A contract for the initial production of vehicles will be awarded. Development of kits will continue, and preparation of the Integrated Logistic Support (ILS) Package will be completed.

4. (U) FY 1984 Planned Program: The HMMWV Research and Development (R&D) Program will transition to procurement in FY 1983; there is no further R&D planned.

5. (U) Program to Completion: Conditional Initial Operational Capability (IOC) will be achieved by First Quarter FY 1985. Full-support IOC will be achieved by Third Quarter FY 1985.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.26.A Title: Fire Support Team Vehicle (FISTV)
DOD Mission Area: #212 - Indirect Fire Support Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	8432	9600	6926	None	None	33674
DF23	FISTV	8432	9600	6926	None	None	33674

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Supports development of a Fire Support Team Vehicle, which will provide significantly increased capability to the Fire Support Team Headquarters in support of fast-moving armor, mechanized infantry and cavalry units. Currently, the Fire Support Team Headquarters must rely on a standard M113 Armored Personnel Carrier with limited communications ability, limited target location capability, and no armor protection for its laser designator/rangefinder or its operator when in use. The Fire Support Team Team Vehicle provides a mobile, survivable platform with enhanced communications capability, significantly increased target location capability, and an armored environment for laser designation of enemy point targets for destruction by precision-guided munitions such as Copperhead and Hellfire. This program integrates the Ground Laser Locator Designator into an armored targeting station similar to the weapons station of the Improved TOW Vehicle. A North Seeking Gyro compass has been developed and integrated into the targeting station to provide accurate target heading and target elevation information. This information, when combined with target range data from the Ground Laser Locator Designator, provides highly accurate target information for conventional or precision-guided fire missions. The program also adds remote capability to the Ground Laser Locator Designator to permit operation from within the vehicle and supports the development of a new intercom which allows transmission or reception of radio traffic on any one of four radios from any one of four crew stations. (The Fire Support Team Vehicle will have the necessary radios to allow voice and digital interface with the platoon forward observers and TACFIRE.) Although the Fire Support Team Vehicle uses the M113A2, assets will be converted to the appropriate configuration at depot, and new Armored Personnel Carrier procurement will not be required.

Program Element: #6.46.26.A Title: Fire Support Team Vehicle (FISTV)
DOD Mission Area: #212 - Indirect Fire Support Budget Activity: #4 - Tactical Programs

C. (U) BASIS FOR FY83 RDTE REQUEST:

1. (U) This will be the final year of development for the Fire Support Team Vehicle. Development and operational testing will be completed, and the test data will be analyzed to determine operational suitability prior to a production decision in March 1983. Necessary corrections and fixes will be incorporated into the final design. Producibility, engineering, and planning will continue. The technical data package will be completed, and the technical manuals will be revised to incorporate results of testing and redesign. Software and hardware interfaces will be developed to facilitate diagnosing and repair of printed circuit boards using automatic test equipment. Prototype hardware and Government-Furnished Equipment (GFE) will be refurbished or restored as necessary.

2. (U) The total estimated development costs are $33.7 million. This estimate has been reviewed in detail by the Army and is considered adequate to complete this research project.

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Start Engineering Development Testing II	Started As Scheduled	4Q FY1981
Start System Operational Testing II	1Q FY1983	1Q FY1983
Complete All Testing	2Q FY1983	2Q FY1983
Production In-process Review (IPR)	2Q FY1983	2Q FY1983

Program Element: #6.46.26.A Title: Fire Support Team Vehicle (FISTV)
DOD Mission Area: #212 - Indirect Fire Support Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	8432	9600	6926	None	33674
Funds (as shown in FY 1982 submission, FISTV only)	8132	9628	7070	None	33812

Funding requirements shown in the FY82 submission are basically unchanged in FY83. The slight reduction in total program funds are a result of the application of revised inflation and civilian pay pricing indices.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Weapons and tracked Combat Vehicle Procurement, Army:						
Funds (current requirement)	0	0	71900	208200	151500	431600
Funds (as shown in FY 1982 submission)	0	0	87600	221900	79700	389200
Quantities (current requirement)	0	0	130	495	342	967
Quantities (as shown in FY 1982 submission)	0	0	225	595	160	980

Program Element: #6.46.26.A
Title: Fire Support Team Vehicle (FISTV)
DOD Mission Area: #212 - Indirect Fire Support
Budget Activity: #4 - Tactical Programs

The FY82 submission estimate for both quantities and dollars was based on preliminary estimates of this FY79 new start development. Quantities and dollar estimates have been refined based on FY81 development efforts. The small change in the total buy is based on unit deployment changes. The cost estimate for the procurement of 967 vehicles has been further refined to show current estimated costs. The delayed procurement changes for the Fire Support Team Vehicle align procurement of the FISTV with the procurement rates of the Ground Locator Laser Designation (GLLD).

Program Element: #6.46.26.A Title: Fire Support Team Vehicle (FISTV)
DOD Mission Area: #212 - Indirect Fire Support Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Artillery Forward Observer Teams, now called Fire Support Teams equipped with the Ground Locator Laser Designator, have opened a new dimension in artillery warfare--precision fire capability to kill moving enemy targets and more accurate and effective fires to support fast-moving mechanized warfare. Because of this increased effectiveness, it can be anticipated that enemy forces will take extra measures to neutralize or destroy the US Fire Support Teams by all means available. It is the vulnerability of the Fire Support Teams and their equipment to enemy fires which required that the Army undertake a development program to protect the Fire Support Teams and equipment to insure their combat survivability and effectiveness. The Fire Support Teams, when supporting highly maneuverable cavalry, mechanized, and armor units, are particularly vulnerable. Cavalry, mechanized, and armor units rely on their mobility and armor protection for their survivability, and their operations are characteristically fast-moving. Therefore, there is little or no opportunity for the Fire Support Teams supporting these forces to "dig in" for protection of their personnel and equipment. Recognizing the critical need for Fire Support Team mobility and protection, the Army has provided the Fire Support Team a Personnel Carrier when supporting these units. While the M113 Armored Personnel Carrier provides mobility to the Fire Support Team, it does not provide the needed protection to the Fire Support Team directing the fires of the supporting artillery when operating in the battle area. That shortcoming is the genesis for this program request; that is, to protect the Fire Support Teams and their equipment, especially the Ground Laser Locator Designator, while conducting lasing operations and directing fires. The easiest and most cost-effective way to accomplish this task was to develop a remote control capability in the Ground Laser Locator Designator and integrate it into the armored elevated hammerhead developed for the Improved TOW Vehicle program. Since a handheld magnetic compass normally used by Fire Support Teams to obtain direction is not accurate when used on or near an armored carrier, an additional effort required the integration of a North-Seeking Gyro compass, also located in the hammerhead to complement the Ground Laser Locator Designator. The combination of the Ground Laser Locator Designator, providing distance to target and lasing capability, and the North-Seeking Gyro compass, providing direction and vertical angle, give the Fire Support Team highly accurate, timely data. This new timeliness and accuracy goes far beyond any observer capability in the past which will result in a major increase in firepower effectiveness.

G. (U) RELATED ACTIVITIES: None.

H. (U) WORK PERFORMED BY: The overall in-house program responsibility lies with the Project Manager, Improved TOW Vehicle (ITV)/Fire Support Team, and the US Army Tank-Automotive Command (TACOM), Warren, MI, with assistance from three other agencies: The US Army Communications Command (CECOM), Ft Monmouth, NJ; the US Army Engineering Topographic Laboratories (ETL), Ft Belvoir, VA; and the US Army Missile Research and Development Command (MICOM), Huntsville, AL. The prime contractor for development is Emerson Electric, current producer of the Improved TOW Vehicle, located in St Louis, MO.

Program Element: #6.46.26.A
DOD Mission Area: #212 - Indirect Fire Support

Title: Fire Support Team Vehicle (FISTV)
Budget Activity: #4 - Tactical Programs

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The Project Office was established at the Tank-Automotive Command with the Project Manager, Improved TOW Vehicle, as the responsible officer for this program. A contract for design and integration of the vehicle was awarded to Emerson Electric. A contract to design and modify engineering development Ground Laser Locator Designator with a remote operating capability was awarded to Hughes Aircraft Co. Bendix was selected as the subcontractor for development of the North-Seeking Gyro. The design effort has been completed, and contractor testing of brassboard subsystems has been accomplished. A system model was fabricated, and extensive testing was conducted by the contractor to evaluate and confirm design of the more complex subsystems and their interface in the vehicle environment in preparation for formal government system tests. Planning and support, to include spares and draft technical manuals, were completed to support Government Engineering Design Test. A contract to remote six production GLLD's was awarded. The first three prototype vehicles were delivered to Yuma Proving Ground for Engineering Design Test-Government.

2. (U) FY 1982 Program: Engineering Design Testing will be completed. Correction of deficiencies and shortcomings discovered during this testing will be incorporated into the first three prototype vehicles. These vehicles will be refurbished and upgraded for training and user operational testing. Three additional prototype vehicles will be fabricated for Government prototype qualification testing. All six prototype vehicles will be equipped with the remoted production Ground Laser Locator Designators. All planning and test support for operational and development testing will take place, and development testing will be initiated.

3. (U) FY 1983 Planned Program: Development and Operational Testing will be completed. Reduction and analysis of test data, correction and redesign, and producibility and engineering planning will continue, culminating in a production decision in March 1983. The first production contract will be awarded. Technical publications and the Technical Data Package will be upgraded. Software and hardware interfaces will be developed to facilitate diagnosing and repairs of printed circuit boards using automatic test equipment. Equipment used for testing will be refurbished to a "like new" condition.

4. (U) FY 1984 Planned Program: Continue production and fielding.

5. (U) Program to Completion: Complete production and fielding.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.28.A
Title: Indirect Fire Training Munitions
DOD Mission Area: #212 - Indirect Fire Support
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	1337	0	1445	Continuing	Not Applicable
D250	Indirect Fire Training Munition	0	1337	0	1445	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program supports the engineering development of a new family of artillery and mortar training projectiles to meet the Army need of significantly reducing the cost of training ammunition while continuing to provide realistic training. The training rounds being developed in this program are full caliber projectiles that use pyrotechnic fuze spotting charges to provide training realism. The cost avoidance associated with substituting this new family of training ammunition for the standard high-explosive ammunition now being used is expected to exceed 25%. The Army will begin to realize this cost avoidance beginning in FY82 with the IOC of the 155mm M804 which began production at Scranton Army Ammunition Plant in FY 1981.

C. (U) EXPLANATION OF DEFERRAL: This project has been deferred in FY83 due to reprograming of available funds to higher priority Army requirements. The impact of this deferral is to delay Engineering Development of the XM844 8-inch low-cost inert training round by one year and to delay initiation of engineering development of the XM879 81mm full-range training projectile by one year. These developments will resume in FY84.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.30.A
DOD Mission Area: #211 - Direct Fire Combat

Title: M1E1 Development Program
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	61473	82724	54342	61252	35134	381883
	QUANTITIES:						
D060	120mm Gun Development	2986	2922	1360	985	0	24353
D064	120mm Tank Gun Ammo	26711	19153	21429	6994	14416	122865
D287	System Integration	31776	60649	31553	53273	20718	234665

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 1980's and beyond, to maintain interoperability with NATO tank fleets equipped with the Leopard 2 tank, and enhance survivability of US crewmen. The name change of this Program Element reflects Army decisions in March and 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 to be designated the M1E1.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Complete DT II of the XM827 kinetic energy (KE) round and XM831 chemical energy (CE) training round with type classification scheduled in June 1983. Procure hardware for modern technology (Mod Tech) KE round (XM829), CE round (XM830), and the KE training round (XM865). Integrating block 1 improvements into 5 prototype M1E1's. Conduct contractor testing of M1E1. Emphasize M1E1 engineering, production and logistical support planning, and M1E1 DT/OT II preparation.

Program Element: #6.46.30.A
DOD Mission Area: #211 - Direct Fire Combat

Title: M1E1 Development Program
Budget Activity: #4 - Tactical Programs

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Tank Main Armament Decision	2QFY78	2QFY78
Start US Development/ Integration of 120mm Gun System	2QFY79	2QFY79
Complete M1E1 Tank System Development and Operational Testing (DT/OT II)	4QFY84	2QFY83
Convene Army Systems Acquisition Review Council (ASARC III)	4QFY84	3QFY83
First Production Delivery of M1E1 Tank	4QFY85	4QFY84

Milestone changes result from September 1981 decision to delay initial M1E1 production to insure availability of 120mm ammunition to support fielding and to allow simultaneous introduction of Block 1 improvements and 120mm tank gun into production.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	61473	82724	54342	96386	381883
Funds (as shown in FY 1982 submission)	61404	82978	54219	287	285014

Program Element: #6.46.30.A
DOD Mission Area: #211 - Direct Fire Combat

Title: M1E1 Development Program
Budget Activity: #4 - Tactical Programs

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
Quantities (current Requirements)	12 prototype M1E1 tanks				
Quantities (as shown in FY 1982 submission)	Not applicable as shown in FY 1982				

Variances in FY81 and FY82 result from pricing and inflation index adjustments. Increase in FY83 and completion reflects increased effort required for integration and testing of Block 1 improvements as part of M1E1 DT/OT II and an increase in 120mm ammunition development effort.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Weapons and Tracked Combat Vehicles, Army						
Funds (current requirements)	0	12400	6100	0	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	0	12100	6100	0	0	18200

The FY82 increase is due to cost increase of facilitization hardware.

Ammunition Procurement, Army						
Funds (current requirements)	3485	15000	135744	307180	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	3988	15000	189406	Not Shown	1032300	Continuing

Program Element: #6.46.30.A
DOD Mission Area: #211 - Direct Fire Combat

Title: M1E1 Development Program
Budget Activity: #4 - Tactical Programs

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Quantities (current requirements)	0	0	4800	94000	Continuing	Not Applicable
Quantities (as shown in FY 1982 submission)	0	0	6200	Not Shown	79600	Continuing

FY83 funds are for initial facilitization of production facilities ($123.4m) and procurement of service and training rounds in low-rate production. The reduction results from delaying procurement of service and training ammunition.

Program Element: #6.46.30.A Title: M1E1 Development Program
DOD Mission Area: #211 - Direct Fire Combat Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: This program is an outgrowth of the 1975 Tripartite (United States, United Kingdom, and Federal Republic of Germany - US, UK, FRG) Tank Main Armament Evaluation, a continuing analysis of future armor threats, and NATO harmonization/standardization efforts. This Program Element originally consisted of three projects, 120mm Tank Gun Development (D060), 120mm Tank Gun Ammunition Development (D064), and Tank Gun Integration (D287). Evaluation of alternative tank main armament systems was completed in December 1977, and on 31 January 1978, the Army formally announced the selection of the FRG 120mm smoothbore gun system for adaptation to US manufacturing and incorporation into the M1 tank. Program objectives include translation and adaptation of FRG technology to US manufacturing methods, verification and certifcation of US-produced hardware, development of a new Mod Tech Armor-Piercing, Fin-Stabilized Discarding-Sabot Tracer (APFSDS-T) KE round, development of a range-limited KE training round, and simultaneous 120mm tank gun and Block 1 Improvement integration into Abrams tank production. The M1E1 will provide increased lethality against projected threat tanks and increased survivability for US crewmen. Simultaneous introduction of 120mm gun and Block 1 Improvement into production will minimize production modification costs and simplify configuration management and integrated logistic support. Integration of Block 1 Improvements will be facilitated by the 120mm-gunned-tank production slip to 4QFY85 which resulted from the September decision. Project D287, as renamed "Tank Systems Integration," accurately reflects scope of work expansion resulting from simultaneous 120mm gun and block improvement integration into M1E1 design.

G. (U) RELATED ACTIVITIES: This program is related to Program Element (PE) 6.46.20.A, Tank M1, Project D330, PE 2.37.35, M1E1 Block Improvements, and is dependent upon technology developed under PE 6.26.18.A, Ballistic Technology, and PE 6.26.03.A, 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.

H. (U) WORK PERFORMED BY: Chrysler Defense Incorporated, 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.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: An April 1978 Army Systems Acquisition Review Council (ASARC)-approved a 120mm gun program with first production delivery of a 120mm gun tank in August 1984. Program initiation was delayed until March 1979 following the February 1979 signing of the license agreement with the German developer, Rheinemetall, for US production delivery. A special ASARC in March 1979 approved a revised program with an August 1985 first production delivery.

Program Element: #6.46.30.A
DOD Mission Area: #211 - Direct Fire Combat

Title: M1E1 Development Program
Budget Activity: #4 - Tactical Programs

The Office of the Secretary of Defense (OSD) directed that the Army continue planning for the original August 1984 delivery. Contracts were awarded in June 1979 to Chrysler Corporation for the validation phase of the systems integration effort and in August 1979 to Honeywell Inc. for Technology Transfer, Fabrication and Test (TTF&T) of the FRG family of ammunition. A US/FRG joint feasibility demonstration program for a Mod Tech KE round was completed in July 1979. In October 1979, the FRG 120mm breech design was selected for adaptation to US production and integration. The first US-produced gun (tube and breech) was delivered from Watervliet Arsenal on schedule. Gun and ammunition were fabricated and tested to assure conformance with FRG technical data packages and performance requirements determined to obtain a safety release of hardware required for M1E1 tank system tests. System integration activities continued to integrate the larger gun system into the M1 tank and assure fightability and survivability comparable to that of the baseline 105mm system. Dynamic testing of US-fabricated tubes and breeches, and verification firing tests were conducted. Validation testing of US-fabricated ammunition was conducted concurrent with testing of German-produced ammunition to assure interoperability. The Mod Tech KE round (XM829) continued in engineering with various designs fabricated and tested to optimize penetration and accuracy performance. The US KE training round (XM832) proved unsuccessful during testing due to poor range limiting capability. Two M1 tanks were converted to the 120mm gun configuration and contractor testing and PT/ME were conducted. Fabrication of hardware and assembly of four additional M1E1's was initiated. In September 1981, the Army slipped first production delivery to 4QFY85 based upon problems encountered during translation of German ammunition design, and high risk of 120mm ammunition availability. The one-year delay supports the introduction of block 1 improvements and the 120mm gun into production simultaneously.

2. (U) FY 1982 Program: 120mm gun testing will be completed. With the exception of the Mod Tech KE round and KE training round, Honeywell Inc. will complete final design testing of the ammunition family, fabricate hardware for ammunition development testing (DT) and initiate DT II. Development and testing of the Mod Tech KE round and KE training round (XM865-German LKL) will continue. Fabrication of six M1E1 tanks will be initiated and necessary supporting hardware for DT/OT will be completed. Contractor activity, including system engineering, system logistics work, producibility, engineering and planning (PEP) for all US-produced hardware, will continue. The M1E1 coordinated test plan will be revised to integrate Block Improvement testing into DT/OT II.

3. (U) FY 1983 Planned Program: The 120mm gun, ammunition, and tank system contractor testing will be completed. M1E1 tank system DT/OT II testing will be initiated. Development of Producibility, Engineering, and Planning (PEP) and technical data packages will continue. The Mod Tech KE round will begin developmental testing. Initiate design and integration engineering effort for Block 2 improvements.

Program Element: #6.46.30.A
Title: M1E1 Development Program
DOD Mission Area: #211 - Direct Fire Combat
Budget Activity: #4 - Tactical Programs

4. (U) FY 1984 Planned Program: DT II of the XM829 Mod Tech KE round will be completed and type classified in FY 1984. Complete DT/OT II of M1E1 in 4QFY84. Compile data for Army Systems Acquisition Review Council production decision in June 1984. Plan for initial production delivery of M1E1 tanks in FY 1985.

5. (U) Program to Completion: Introduction of M1E1 into production, 4QFY85, will terminate this program.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D064 Title: 120mm Tank Gun Ammo Development
Program Element: #6.46.30.A Title: M1E1 Development Program
DOD Mission Area: #211 - Direct Fire Combat Budget Activity: #4 - Tactical Programs

A. (U) DETAILED BACKGROUND AND DESCRIPTION: This program implements the Army decision of January 1978 to select the German 120mm smoothbore gun system for future incorporation on the M1 Abrams Tank to meet the armor threat of the mid-1980's and beyond. This project concentrates on translating, developing, testing, and qualifying a five-round family of 120mm ammunition consisting of: a German Armor-Piercing, Fin-Stabilized, Discarding Sabot, Tracer round (APFSDS-T) (XM827) modified with a US-designed staballoy penetrator; a modern technology APFSDS-T round (mod Tech APFSDS-T) (XM829); a High-Explosive Antitank Multipurpose Tracer round (HEAT-MP-T)(XM830); and two Training rounds. The training rounds are: an Armor-Piercing Cone-Stabilized Discarding Sabot, Target Practice round (APCSDS-TP)(XM865); and a High-Explosive Antitank Target Practice round (HEAT-TP)(XM831) for use with the 120mm-equipped M1E1 Tank. These training rounds are necessary to meet range safety limitations and to reduce training costs. The XM827, XM830, and XM831 cartridges will be translated from the German designs. The XM829 will be a new development of US design. German development of their LKL kinetic energy target practice round has been monitored, and it will be translated to provide a kinetic energy training cartridge; if it does not meet all US requirements, an improved design based upon 105mm XM797 technology may be pursued.

B. (U) RELATED ACTIVITIES: This project is related to Program Element (PE) 6.46.20.A, Tank XM1; PE 6.46.30.A, Tank Gun Cooperative Development, Projects D060 - 120mm Tank Gun Development and D287 - Tank Gun Integration, and is dependent upon technology developed under PE 6.26.18.A, Ballistics Technology, and 6.26.03.A, Large Caliber and Nuclear Technology. Duplication of effort is avoided through centralized management by Project Manager, Tank Main Armament Systems.

C. (U) WORK PERFORMED BY: US Army Armament Research and Development Command, Dover, NJ; the US Army Test and Evaluation Command, Aberdeen, MD; Rhinemetall Corporation, Dusseldorf, GE, and Honeywell, Inc., Hopkins, MN.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The program was initiated in February 19,79 when a license agreement was signed with the German developer, Rheinmetall. Subsequently, deliveries of technical data were received from Germany, and a system contract for technology transfer, fabrication, and test (TTF&T) of the German ammunition family was awarded to Honeywell, Inc. A Joint US/German Feasibility Demonstration of the Modern Technology APFSDS-T (XM829) round was conducted. Initiation of a codevelopment program for this cartridge was not approved by the German government, and US development of

Project: #D064 Title: 120mm Tank Gun Ammo Development
Program Element: #6.46.30.A Title: M1E1 Development Program
DOD Mission Area: #211 - Direct Fire Combat Budget Activity: #4 - Tactical Programs

the modern technology APFSDS-T XM829 Cartridge was initiated. A one-piece staballoy penetrator for the XM827 cartridge was designed, and tests of the US-produced projectiles were initiated. The fuze improvement program for the XM830 HEAT-MP round was begun, and an improved fuze design was chosen. US manufacture of propellant was demonstrated in 1980. US manufacture of combustible cases was much more difficult than anticipated but was accomplished in early 1981. The Modern Technology APFSDS- T XM829 cartridge completed the validation design phase with hardware being fabricated using tungsten and staballoy penetrators. Over 600 rounds of various designs were subjected to a series of structural security, armor penetration, and accuracy tests. Development of the TPFSDS-TP XM832 round was initiated; however, it was suspended in FY81 pending resolution of difficulties with the 105mm XM797 baseline technology. To support M1E1 system tests, US manufacture of XM827 with steel cores (XM866) was initiated. Monitoring of the German LKL candidate (XM865) continued. Producibility Engineering and Planning (PEP) effort was in progress. Manufacture of hardware for safety release and PQT-G tests of XM827 APFSDS-T and XM831 HEAT-TP is in progress. US manufacture of German DM-28 (XM866) kinetic energy training cartridges will continue as an interim measure to support M1E1 System Tests. FY81 funding increase was necessary due to a cost growth attributed to technical problems associated with technology transfer, increase in scope due to unforseen changes in program requirements, and delays and additional work associated with lack of sufficient technical and manufacturing data.

2. (U) FY 1982 Program: PQT-G tests of the APFSDS-T XM827 and HEAT-TP XM831 will be carried on with type classification on schedule for 3QFY83. The system contractor (Honeywell) will initiate the delivery of TPCSDS-T XM865 rounds for PQT-G tests. Full-Scale Engineering Development will be initiated in the XM829; on the XM830 the assembly procedures of the fuze elements and press load warhead will be finalized as well as dynamic penetration test conduction.

3. (U) FY 1983 Planned Program: DT II of the XM827 and XM831 will be completed with type classification in June 1983. Procurement of DT II hardware for the XM829, XM830, and XM865 will be completed. DT II of the XM829, XM830, and XM865 will be initiated. FY83 funding increase is required to develop manufacturing methods and other engineering effort required to adapt the German-designed XM865 KE training round. This round was not a part of the original technical data package. Additional funding was also required to accelerate final design and testing of the XM829 improved capability kinetic energy round for fielding with the M1E1 tank.

4. (U) FY 1984 Planned Program: DT II of the Mod Tech APFSDS-T XM829, the XM865, the XM830 will be completed and the round type classified in the 1QFY84.

Project: #D064 Title: 120mm Tank Gun Ammo Development
Program Element: #6.46.30.A Title: M1E1 Development Program
DOD Mission Area: #211 - Direct Fire Combat Budget Activity: #4 - Tactical Programs

5. (U) Program to Completion: FSED on the cartridge, HEAT-MP-T, XM859 will commence in FY86. While milestones have not been definitized, type classification, with appropriate funding, would be in FY87 and IOC 18 months later.

6. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
APFSDS-T XM827 Type Classification	3Q83	3Q83
Mod Tech APFSDS-T XM829 Type Classification	1Q84	1Q84
HEAT-MP-T XM830 Type Classification	1Q84	3Q83
HEAT-TP XM831 Type Classification	3Q83	3Q83

The XM830 TC date revision was due to problems associated with the fuze element not meeting performance and safety requirements. Also, problems were encountered in the press process used for loading the charge instead of the cast and machined charge of the basic German design.

Project: #D064 — Title: 120mm Tank Gun Ammo Development
Program Element: #6.46.30.A — Title: M1E1 Development Program
DOD Mission Area: #211 - Direct Fire Combat — Budget Activity: #4 - Tactical Programs

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	26711	19153	21429	6994	14416	122865
Funds (as shown in FY 1982 submission)	19023	19212	10450	Not Shown	287	82183

The increase in FY81 funds is a result of restructuring within the program element. The decrease in FY82 is a result of the application of revised inflation and civilian pay pricing indices. The increase in FY83 is also a result of internal element restructuring.

Quantities (current requirements)	
APFSDS-T (Rounds)	1290
Mod Tech APFSDS-T (Rounds)	1580
HEAT-MP-T (Rounds)	1279
HEAT-TP (Rounds)	996
APFSDS-TP (Rounds)	981
Quantities (as shown in FY 1982 submission)	
APFSDS-T (Rounds)	1570

Project: #D064 — Title: 120mm Tank Gun Ammo Development
Program Element: #6.46.30.A — Title: M1E1 Development Program
DOD Mission Area: #211 - Direct Fire Combat — Budget Activity: #4 - Tactical Programs

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Estimated Cost
Mod Tech APFSDS-T (Rounds)						2850
HEAT-MP-T (Rounds)						3925
HEAT-TP (Rounds)						766
APFSDS-TP (Rounds)						1446

These quantities are for ammunition requirements for testing during Research and Development. Quantity differences reflect modification to test programs.

Other Appropriation Funds ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
Procurement Ammunition, Army Funds (current requirements)	3485[1]/	15000[2]/	135744[3]/	307180[4]/	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	3988	15000	189400	Not Shown	Continuing	Not Applicable
Quantities (current requirements)			4800	94000	Continuing	Not Applicable
Quantities (as shown in FY 1982 submission)			62000	Not Shown	Continuing	Not Applicable

1/ 1981 funds are for Manufacturing Methods and Technology (MM&T).

2/ FY 1982 estimate is for final payment of licencing fees.

Project: #D064 Title: 120mm Tank Gun Ammo Development
Program Element: #6.46.30.A Title: M1E1 Development Program
DOD Mission Area: #211 - Direct Fire Combat Budget Activity: #4 - Tactical Programs

3/ The FY 1983 funds are for initial facilitization of ammunition production facilities ($123.4M) and procurement of service ($5.8M) and training ($6.5M) in Low-Rate Initial Production.

4/ FY 1984 funding for completion includes $164.4M to complete ammunition production facilities capable of producing both 105mm and 120mm tank ammunition. Also included are $82.2M for service ammunition and $60.6M for training ammunition procurement.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D287 Title: System Integration
Program Element: #6.46.30.A Title: M1E1 Development Program
DOD Mission Area: # 211 - Direct Fire Combat Budget Activity: #4 - Tactical Programs

A. (U) DETAILED BACKGROUND AND DESCRIPTION: This project, previously named Tank Gun Integration, 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 gun and Block 1 improvements into the M1E1 tank. The addition of the Block improvement integration effort results from the Army decision that Block 1 improvements would be introduced into M1E1 production concurrently with the 120mm gun system.

B. (U) RELATED ACTIVITIES: This project is related to Program Element (PE) 6.46.20.A, Tank M1; PE 6.46.30.A, M1E1 Development, Project D060 - 120mm Tank Gun Development, D064 - 120mm Tank Gun Ammunition, D330, PE 2.37.35.A, M1E1 Block Improvements, and is dependent upon technology developed under PE 6.26.18.A, Ballistics Technology, and PE 6.26.03.A, Large Caliber and Nuclear Technology. All program activities are fully coordinated to assure no unnecessary duplication of effort, either within the Army or other Department of Defense agencies.

C. (U) WORK PERFORMED BY: Chrysler Defense Incorporated, Warren, MI; the US Army Armament Research and Development Command, Dover, NJ; US Army Test and Evaluation Command, Aberdeen, MD; and the US Army Operational Test and Evaluation Agency, Falls Church, VA.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Following the 22 February 1979 signing of a 120mm gun system licensing agreement with the GE 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 has been 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 has begun. Fabrication of two M1E1 tanks for contractor testing and Physical Teardown/Maintenance Evaluation (PT/ME) has been initiated. Formal test planning

Project: #D287 Title: System Integration
Program Element: #6.46.30.A Title: M1E1 Development Program
DOD Mission Area: # 211 - Direct Fire Combat Budget Activity: #4 - Tactical Program

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 has been completed. Contractor tests and PT/ME have been 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, has been 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, PEP, value engineering, costing, and scheduling will continue as will planning and preparation for conduct of DT/OT II.

2. (U) FY 1982 Program: Procurement and fabrication of the necessary hardware will be completed to convert six M1 tanks to M1E1 configuration. The major emphasis of FY82 will be the initiation and conduct of engineering testing with Block 1 improvement hardware integrated, and completion of POT-C on 120mm-configured tanks. Contractor activities including system engineering, configuration management, integrated logistics support, PEP, and safety will continue. Weight reduction engineering and procurement of sample armor plate will be completed. One ballistic hull and turret will be built using plate selected under weight reduction criteria.

3. (U) FY 1983 Planned Program: DT/OT II will continue during the year. 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.

4. (U) FY 1984 Planned Program: Complete DT/OT II of M1E1. An Army Systems Acquisition Review Council (ASARC) III production decision is envisioned in June 1984 with first production delivery of an M1E1 tank planned for 4QFY85.

5. (U) Program to Completion: Introduction of the M1E1 into production, 4QFY85, will result in completion of this project.

Project: #D287 — Title: System Integration
Program Element: #6.46.30.A — Title: M1E1 Development Program
DOD Mission Area: # 211 - Direct Fire Combat — Budget Activity: #4 - Tactical Program

6. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Initiate integration of 120mm gun into M1 tank	2QFY79	2QFY79
Equip two M1 tanks to 120mm configuration for Contractor testing and physical teardown/ maintenance evaluation	FY81	FY81
Equip four M1 production tanks with 120mm system for DT/OT II	FY82	FY82
Complete 120mm gun M1 tank system DT/OT II	4QFY84	2QFY83
First Production Delivery of M1E1 Tank	4QFY85	4QFY84

The DT/OT II completion date has been slipped to 4QFY84 to insure 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.

Project: #D287 Title: System Integration
Program Element: #6.46.30.A Title: M1E1 Development Program
DOD Mission Area: # 211 - Direct Fire Combat Budget Activity: #4 - Tactical Program

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	31776	60649	31553	53273	20718	234665
Funds (as shown in FY 1982 submission)	39395	60836	42381	Not Shown	0	181608
Quantities (current requirements) prototype M1E1 Tanks		12				
Quantities (as shown in FY 1982 submission) Prototype M1E1 Tanks		Not Shown				

FY81 decrease reflects reprograming to 120mm ammunition development project. FY82 decrease due to pricing and inflation index adjustments. FY83 decrease reflects reprograming of funds to ammunition development.

Other Appropriations:

Weapons and Tracked Combat Vehicles, Army						
Funds (current requirements)	0	4700	6100	0	0	10800
Funds (as shown in FY 1982 submission)	0	4700	6100	Not Shown	0	10800

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.31.A
DOD Mission Area: #212 - Indirect Fire Support

Title: Field Artillery Ammunition, 155mm
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	2243	1460	2573	15824	Continuing	Not Applicable
	QUANTITIES	(Not feasible to list due to number of diverse items)					
D175	Field Artillery Fuzes	0	0	2573	3066	Continuing	Not Applicable
D286	Field Artillery Ammo (NATO)	235	514	0	1644	Continuing	Not Applicable
D373	Ammo Cannon, 155mm	2008	946	0	0	Continuing	Not Applicable
D369	SADARM	0	0	0	11114	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 FY84.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Funds requested provide for: Continued evaluation and testing of the trilateral (United Kingdom, Germany, Italy) nations' newly developed 155mm projectiles and propelling charges with US 155mm howitzers and for initiation of engineering development of the XM762 hand-set, autoset electronic time fuze. Advanced development of this fuze was conducted in PE#6.36.28.

Program Element: # #6.46.31.A
DOD Mission Area: #212 - Indirect Fire Support

Title: Field Artillery Ammunition, 155mm
Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	2243	1460	2573	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	1678	1461	7101	Continuing	Not Applicable

FY 1981 increase is due to increased funding requirements to support expanded testing of the XM825 smoke projectile leading to acceleration of development and reduction of overall development cost. FY 1982 decrease is attributable to the application of lower fuel, inflation, and civilian pay pricing indices than were applied the previous year. FY 1983 decrease is due to a general restructuring of the program element based upon a delay in transitioning SADARM into engineering development and by a delay in availability of NATO trilateral ammunition for testing and reprograming to higher priority Army requirements in Project D286.

Program Element: # #6.46.31.A
DOD Mission Area: #212 - Indirect Fire Support

Title: Field Artillery Ammunition, 155mm
Budget Activity: #4 - Tactical Programs

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Ammunition Procurement, Army:						
Funds (current requirements)	0	0	161000	21200	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	0	0	0	Not Shown	Continuing	Not Applicable
Quantities (current requirements)	0	0	31000	41000	Continuing	Not Applicable
XM825 Projectile 155mm Smoke Screening	0	0	31000	41000	Continuing	Not Applicable
Quantities (as shown in FY 1982 submission) (in thousands)						
XM825 Projectile 155mm Smoke Screening	0	0	0	Not Shown	Continuing	Not Applicable

Procurement funding shown in the FY82 CDS for M203 charge is no longer reflected here since the item has transitioned to production. Procurement funding for XM825 Smoke Screening Projectile was not reflected last year.

Program Element: # #6.46.31.A
DOD Mission Area: #212 - Indirect Fire Support

Title: Field Artillery Ammunition, 155mm
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: A requirement exists to increase the indirect fire capability of field artillery cannon units by providing improved ammunition. The XM795 projectile is ballistically similar to the cargo optimized family of projectiles (M483A1, ICM; M692/M718 mines) and uses high-fragmenting steel to provide significantly increased lethality and, when fired with the M203 propelling charge, has a 23% range increase over the standard high-explosive projectile. The projectiles are in agreement with ballistic parameters contained in a Memorandum of Understanding (MOU) signed in 1978 between the United States and three European nations, Germany, Italy, and the United Kingdom. Project D286 provides for compatibility testing of newly devleoped NATO weapons and munitions with US howitzers and ammunition. The trilateral nations (United Kingdom, Germany, Italy) have developed the FH70, towed 155mm Howitzer, a new family of propelling charges, and a new high-explosive projectile, the L25. All of these items are in agreement with the ballistic parameters in the MOU mentioned above. Testing to demonstrate compatibility/interchangeability began in FY 1979 consistent with availability of test items. Projects D175 and D369 provide for the Engineering Development of follow-on indirect fire munitions fuzes and the Sense and Destroy Armor Munition (SADARM) respectively.

G. (U) RELATED ACTIVITIES: This program which was previously accomplished under Program #6.46.14.A, 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 6.36.28.A, Field Artillery Ammunition, and is dependent upon technology developed under Program Element 6.26.03.A, 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.

H. (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.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Engineering development was initiated for a new family of 155mm propelling charges (XM211 low zones, XM201 intermediate zones, M203 maximum zones) for the M198 and M109A1 Howitzers. The M203 charge was type classified in FY 1977 with the M198 Howitzer and was tested for compatibility with the M109A1 and found to be incompatible. In FY78 the XM201 charge development program was suspended as a result of the charge's inability to meet cannon tube wear constraints. In the interim, the XM211 charge was modified to provide intermediate zone capability. In FY80

Program Element: # #6.46.31.A
DOD Mission Area: #212 - Indirect Fire Support

Title: Field Artillery Ammunition, 155mm
Budget Activity: #4 - Tactical Programs

the XM211 charge development was terminated as a result of the design being incompatible with automatic loading hardware and a reorientation of priorities. Advanced development of the XM795 HE cargo optimized projectile was initiated in FY76. A validation in-process review (VAL-IPR) was conducted in FY 1978 and the XM795 entered engineering development. Initial development and operational tests (DT/OT I) were conducted in FY 1978 on two competitive smoke projectile designs, and the XM825 was selected for continued development. Engineering Development on the XM795 HE projectile continued. The Advanced Development program on the XM825 WP Smoke Projectile was completed, and a Validation IPR held in December 1978 approved entry into Engineering Development. In FY79 static tests on the XM825 were conducted at the Chemical Systems Laboratory, Edgewood Arsenal, MD, and ballistic testing with the XM203 propelling charge was accomplished at Dugway Proving Ground, UT. In Project D286 in FY79, UK charges were not received until October 1979. Scheduled testing was initiated in December 1979 at Yuma Proving Ground. DT/OT II tests on the XM795 High Explosive (HE) projectile were delayed as a result of minor technical problems. DT/OT II testing for the XM825 WP Smoke projectile was delayed as a result of technical problems which have subsequently been resolved. In FY 1981 DT/OT II testing for the XM795 was conducted, and a technical data package (TDP) suitable for production was completed, and the round was type classified. At present there is no planned procurement for the XM795 since the Army's 155mm High Explosive projectile requirements are met with current assets. DT/OT II testing was initiated for the XM825 WP Smoke Projectile. NATO interoperability testing continued.

2. (U) FY 1982 Program: Rationalization, Standardization, and Interoperability (RSI) testing will be performed using trilateral nations' propelling charges and US smoke projectiles in M198 and M109A1 Howitzers to confirm interoperability. DT/OT II testing for the XM825 smoke round will be completed, and a DEVA-IPR for type classification will be conducted.

3. (U) FY 1983 Planned Program: Engineering Development of the XM762 Electronic Time Fuze will be initiated in project D175.

4. (U) FY 1984 Planned Program: Engineering development of the Sense and Destroy Armor (SADARM) projectile will be initiated in project D369. Engineering Development of the XM762 Electronic Time Fuze will continue in project D175. Interoperability testing of Trilateral Ammunition will continue toward completion in project D286.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.46.32.A
Title: 105mm Tank Ammunition
DOD Mission Area: #211 - Direct Fire Combat
Budget Activity: #4 - Tactical Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5005	5195	1059	7938	Continuing	Not applicable
	QUANTITIES						
D173	Tank Target Practice	927	0	1059	0	Continuing	Not applicable
DG21	Service Ammunition	4078	5195	0	7938	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 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 XM815 is an improved HEAT-MP round and will serve as the companion to the APFSDS-T cartridge and will provide improved capabilities in the areas of hit probability, shape charge performance against modern armors and fuzing. It will replace the M456 series HEAT ammunition.

Program Element: #6.46.32.A Title: 105mm Tank Ammunition
DOD Mission Area: #211 - Direct Fire Combat Budget Activity: #4 - Tactical Support

C. (U) BASIS FOR FY 1983 RDTE REQUEST: FY 1983 program effort will be directed to engineering development (ED) of the TPFSDS-T XM797.

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Cartridge, 105mm, XM815		
Validation In-Process Review	4QFY83	4QFY81
Type Classification	4QFY85	4QFY84

Delay due to late initiation of advanced development.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	5005	5195	1059	Continuing	Not applicalbe
Funds (as shown in FY 1982 submission)	3686	5210	4576	Continuing	Not applicable

The increase in FY 1981 was to provide for Engineering Development of the XM833 APFSDS-T cartridge. The small decrease in FY82 is a result of the application of revised inflation and pay pricing indices. The decrease in FY83 is a result of the XM815 returning to advanced development for resolution of problems dealing with armor penetration and fin design.

Program Element: #6.46.32.A
DOD Mission Area: #211 - Direct Fire Combat

Title: 105mm Tank Ammunition
Budget Activity: #4 - Tactical Support

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Procurement of Ammunition, Army						
XM833 Cartridge						
Funds (current requirements)	0	0	69300	77400	Not Applicable	Continuing
Funds (as shown in FY 1982 submission)			Not Shown			
Quantities (current requirements)	0	0	96000	121000	Not Applicable	Continuing
Quantities (as shown in FY 1982 submission)			Not Shown			

Program Element: #6.46.32.A Title: 105mm Tank Ammunition
DOD Mission Area: #211 - Direct Fire Combat Budget Activity: #4 - Tactical Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Project DG21, Tank Service Ammunition, supports development of the modern-technology high-explosive antitank cartridge XM815, which will provide increased armor penetration and multipurpose capabilities through the use of advanced shaped charge liners and the latest fuzing techniques as well as development of the cartridge XM797, TPFSDS-T, which will provide the field with a low-cost, range-limited training round with precision and ballistic similitude to 3000 meters.

G. (U) RELATED ACTIVITIES: The activities of this Program Element are a continuation of Advanced Development conducted in PE 6.36.33.A, Tank Ammunition Development.

H. (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, Flinchbauch Products, Inc., Red Lion, PA; Nuclear Metals, Inc., Concord, MA; Dayron Corp., Orlando, FL; Bulova Systems and Instr. Div, 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.

I. (U) PROGRAM ACCOMPLISMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Development was completed for cartridge 105mm, Armor-Piercing, Fin-Stabilized Discarding Sabot-Tracer, M735. This development was completed and the round type classified Standard in FY 1977. It is now in production. Full-scale Engineering Development of the more advanced XM774 kinetic energy cartridge was completed, and the round type classified in October 1980. This item is now in production. Development was continued on the Target Practice Fin-Stabilized, Discarding Sabot-Tracer XM797 cartridge. Technical problems surfaced in achieving reliable break-up of the nose cap assembly at all required temperatures.

2. (U) FY 1982 Program: Continuation of nose cap redesign, prototype testing and In-Process Review for the XM797 round.

3. (U) FY 1983 Planned Program: Continue Engineering Development of the XM797. Effort will be directed toward the continued testing of projectiles to see if the improved gas nose cap design complies with the required range performance.

4. (U) FY 1984 Planned Program: Full-Scale Engineering Development will commence on cartridge 105mm XM815 HEAT-MP-T.

Program Element: #6.46.32.A
DOD Mission Area: #211 - Direct Fire Combat

Title: 105mm Tank Ammunition
Budget Activity: #4 - Tactical Support

5. (U) Program to Completion: The Rocket-Assisted Kinetic Energy projectile will begin Engineering Development during this period.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.01.A
DOD Mission Area: #345 - Tactical Communications

Title: Communications Engineering Development
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5909	8865	11705	14004	Continuing	Not Applicable
	QUANTITIES						*
D487	Tactical Multichannel Communications	3258	6321	7930	9456	Continuing	Not Applicable
D488	Tactical Net Radio Communications	2651	2544	3775	4548	Continuing	Not Applicable

*Quantity of Diversified Items.

B. 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. 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.

Program Element: #6.47.01.A Title: Communications Engineering Development
DOD Mission Area: #345 - Tactical Communications Budget Activity: #4 - Tactical Programs

C. BASIS FOR FY 1983 RDTE REQUEST: Full-scale engineering development of a Fiber Optics Transmission System (Long Haul) to replace the current metallic CX-11230 system will continue. A prototype hardware contract will have been awarded in FY82. Full-scle engineering development of a Multichannel Command Post Radio (Millimeter Wave) will be initiated to provide increased command post mobility, remoting capability, and cable replacement up to 8 km line of sight. Other advantages include increased bandwidth, reduced frequency congestion, reduced visual/RF signatures, and reduced vulnerability to Electric Countermeasures (ECM) and jamming. Development of an AUTOVON interface and tandem capability for the Automatic Switchboard SB-3614 will be initiated as a product improvement program. Provide engineering support for the survivable low-profile and directional antenna programs.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	5909	8865	11705	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	4677	8891	13918	Continuing	Not Applicable

FY83 funding level changes are a result of transfer of funds to a higher priority program. FY82 reduction due to civilian pay and inflation adjustments. FY81 funding increase supported engineering development for millimeter wave command post radio efforts.

E. (U) OTHER APPROPRIATION FUNDS: Not applicable.

Program Element: #6.47.01.A
DOD Mission Area: #345 - Tactical Communications

Title: Communications Engineering Development
Budget Activity: #4 - Tactical Programs

F. DETAILED BACKGROUND AND DESCRIPTION: 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. Current efforts include the completion of the following assemblages: Communication Technical Control Center Upgrade AN/TSQ-84A, Time Division Digital (Teletypewriter) multiplexing facilities, multichannel radio terminal and pulsator sets, tracked signal command post assemblages, application of fiber optics technology for both long-haul and intershelter cabling applications. The fiber optics program represents significant potential savings in weight and volume required by existent technology and provides for better ECM protection. Programs under this project also include development 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.

G. (U) RELATED ACTIVITIES: Program Element 6.27.01.A., Communications - Electronics, and Program Element 6.37.07.A, Communications Development, provide Exploratory and Advanced Developments that are continued into Engineering Development by this program. This program supports Program Element 6.37.46.A, 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.

H. (U) WORK PERFORMED BY: During FY 1981, MITRE Corporation, Bedford, MA, was contracted for a $546,000 level of effort to provide system engineering support for the long-haul fiber optics transmission system. This effort will continue into FY82 for an additional $570,000. In FY 1980, MITEL Corp, Canada, was awarded a contract for $40,000 to provide a prototype SB-3614 Switchboard NATO Interface Unit (NIU). In FY 1981 an additional $20,000 was awarded for a remote programmer for the NIU. During FY 1980, a contract for $208,000 with Systems Development Corporation, Eatontown, NJ, was awarded as part of a CENCOMS (Center for Communications Systems) program to design, specify, and implement an operational Communications Systems Design Center necessary to integrate existing processor-based communications equipment into the Center's configuration for both short- and long-range field support as well as providing for testing existing and prototype models of Army Communications Equipment either idenpendently or in devices. The output of this contract was plans, specifications,

Program Element: #6.47.01.A
DOD Mission Area: #345 - Tactical Communications

Title: Communications Engineering Development
Budget Activity: #4 - Tactical Programs

procedures, recommendations, and reports. This effort continued into FY81 for an additional $43,000. Five contracts for a total of $534,000 were awarded in FY81 for engineering support efforts in support of Project Manager Operations; i.e., transition plans, baseline cost estimates, life cycle data requirements, and configuration management support. These efforts will continue into FY82 for an additional $526,000.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Continued system definition phase of Fiber Optics Long-Haul Cable System preparing specifications and Technical Data Package for prototype contract. Continued MITRE Corporation contractual support effort for Fiber Optics Program. Executed contract for prototype of SB-3614 NATO Interface Unit (NIU) and programmer. Provided funds for the development contract on the Product Improvement Program for AN/TTC-38 (DC-DC converters). Provided funding for in-house development to correct compatibility problem of AN/GRC-143 radio with GRC-50 radios. Prepared system definition for engineering development of Millimeter Wave Multichannel Command Post Radio. Completed in-house development effort for Interim Message Facility for AN/TSC-58. Continued contractual engineering support efforts in support of Project Manager Operations. Finalized plans for Communications Support Design Center and initiated construction.

2. (U) FY 1982 Program: Continue in-house support of Long-Haul Fiber Optics Transmission System and execute prototype hardware contract. Continue MITRE contractual support efforts for fiber optics. Initiate system definition for Millimeter Wave Multichannel Command Post Radio. Initiate planning for Product Improvement of SB-3614 Switchboard to provide an AUTOVON interface and tandem capability. Continue contractual engineering support efforts in support of Project Manager Operations. Initiate system definition of Area Distribution Fiber Optics Transmission System. Provide engineering support for survivable low-profile and directional antenna.

3. (U) FY 1983 Planned Program: Continue in-house support of Long-Haul Fiber Optics Transmission System. Execute second increment of Long-Haul Fiber Optics prototype contract. Continue contractual support efforts for fiber optics by MITRE Corporation. Continue work in the definition phase of Area Distribution Fiber Optics Transmission System. Execute development contract for Product Improvement of SB-3614 Switchboard to provide AUTOVON interface and tandem capability. Execute prototype hardware contract for Millimeter Wave Multichannel Command Post Radio. Continue contractual engineering support efforts in support of Project Manager Operations. For all FY84 new starts, all necessary experimental work will be performed, and the proposed system will be ready for full-scale development. Award engineering development (ED) contract for broadband whip antenna. Complete ED of Steerable Null Antenna. Award ED contract for half-rhomic and log periodic antennas.

Program Element: #6.47.01.A
DOD Mission Area: #345 - Tactical Communications

Title: Communications Engineering Development
Budget Activity: #4 - Tactical Programs

4. (U) FY 1984 Planned Program: Continue in-house support of Long-Haul Fiber Optics Transmission System, Local Distribution Transmission System and Millimeter Wave Multichannel Command Post (CP) Radio. Execute third increment and intitiate DT/OT II of Long-Haul Fiber Optics Transmission System prototype. Execute prototype hardware contract for Area Distribution Fiber Optics Transmission System. Continue contractual support efforts on fiber optics program by MITRE Corporation. Execute second increment for Millimeter Wave Multichannel Command Post Radio prototype. Continue development effort for Product Improvement of SB-3614 Switchboard. Continue contractual engineer support efforts in support of Project Manager Operations. Continue engineering support of burst communications and survivable antenna.

5. (U) Program to Completion: This is a continuing program for Project D-487. In the FY85-88 period, primary emphasis will be on the following: Continue development of Area Distribution Fiber Optics System and Millimeter Wave Multichannel Command Post Radio. Continue MITRE support for Area Distribution Fiber Optics program. Complete DT/OT II Testing of Area Distribution Fiber Optics Program. Initiate Tracked CP Assemblage Program, New Shelterized Assemblages Program, Mobile Intercept Resistant Radio Program (MISR), Objective High Frequency Radio (OHFR) Development Program, Secure Fiber Optics Cable System Program and Tactical Antenna Systems development effort.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: D487 — Title: Tactical Multichannel Communications
Program Element: #6.47.01.A — Title: Communications Engineering Development
DOD Mission Area: # 345 - Tactical Communications — Budget Activity: #4 - Tactical Programs

A. (U) DETAILED BACKGROUND AND DESCRIPTION: The Army needs upgraded tactical communications equipment which will interface with new systems being introduced in the near future. The objective of this project is to develop tactical communications equipment and systems that will be employed by the Army from the forward edge of the battle area through Echelons Above Corps (EAC). This project neither includes nor duplicates those systems/equipment developed under the Joint Tactical Communications (TRI-TAC) Program, the Tactical Satellite Communications Ground Environment (TACSAT-COM), or the Single-Channel Ground and Airborne Radio Subsystem (SINCGARS-V) programs. This project provides product improvement and enhancement of the tactical multichannel switched system assemblages and equipment. These improvements provide for increased capability, enhanced electronic countermeasures resistance, improved operational mobility, increased reliability, extended life, reduced maintenance requirements, improved interface/interoperability with other systems, and facilitates the smooth transition to the future TRI-TAC, TACSATCOM, and SINCGARS systems. This project develops tactical communications equipment and ancillary items for unique Army purposes and those that are not part of one of the three major systems indicated above but will be used in conjunction with these developments (i.e., Fiber Optic Cable Systems). This project also provides support for the Communications System Design Facility which can be used to: (1) implement and test evolutionary system design improvements, (2) provide a facility for new equipment and subsystem integration, (3) serve as a communications software support and development center, and (4) serve as a representative communications operational system analysis center.

B. (U) RELATED ACTIVITIES: Program Element 6.27.01.A., Communications - Technology, and Program Element 6.37.07.A, Tactical Communications, provide Exploratory and Advanced Developments that are continued into Engineering Development by this program. This program does not duplicate other DOD efforts. Close liaison is maintained with other program managers to ensure duplication does not occur.

C. (U) WORK PERFORMED BY: MITRE Corporation, Bedford, MA, provides system engineering support for the long-haul fiber optics transmission system. MITEL Corp., Canada, was awarded a contract to provide a prototype SB-3614 Switchboard Nato Interface Unit (NIU). Systems Development Corporation, Eatontown, NJ, was contracted as part of a CENCOMS (Center for Communications Systems) program to design and specify an operational Communications Systems Design Center. In-house work is performed by Project Manager, Army Tactical Communications Systems (ATACS), Fort Monmouth, NJ, and Center for Communications Systems (CENCOMS), Fort Monmouth, NJ.

Project: D487 Title: Tactical Multichannel Communications
Program Element: #6.47.01.A Title: Communications Engineering Development
DOD Mission Area: #345 - Tactical Communications Budget Activity: #4 - Tactical Programs

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Continued work in the definition phase of Fiber Optics Long-Haul Cable System which included contractual Support effort by MITRE Corporation that will lead to system definition and design criteria. Executed contract for prototype of SB-3614 NATO Interface Unit (NIU) and programmer. Provided funds for the development contract on the Product Improvement Program for AN/TTC-38 (CD-CD converters). Provided funding for in-house development to correct compatibility problem of AN/GRC-103 radio with GRC-50 radios. Prepared system definition for engineering development of Millimeter Wave Multichannel Command Post Radio. Completed in-house development effort for Interim Message Facility for AN/TSC-58. Continued contractual engineering support efforts in support of Project Manager Operations. Finalize plans for communications support design center and initiate construction.

2. (U) FY 1982 Program: Continue in-house support of Long Haul Fiber Optics Transmission System and execute prototype hardware contract. Continue MITRE contractual support effort for fiber optics. Initiate system definition for Millimeter Wave Multichannel Command Post Radio. Initiate planning for Product Improvement of SB-3614 Switchboard to provide an AUTOVON interface and tandem capability. Continue contractual engineering support efforts in support of Project Manager Operations. Initiate system definition of Area Distribution Fiber Optics Transmission System.

3. (U) FY 1983 Planned Program: Continue in-house support of Long Haul Fiber Optics Transmisssion System. Execute second increment of Long Haul Fiber Optics prototype contract. Continue contractual support efforts for fiber optics by MITRE Corporation. Continue work in the definition phase of Area Distribution Fiber Optics Transmission System. Execute development contract for Product Improvement of SF-3614 Switchboard to provide AUTOVON interface and tandem capability. Execute prototype hardware contract for Milimeter Wave Multichannel Command Post Radio. Continue contractual engineering support efforts to support of Project Manager Operations. For all FY84 new starts, all necessary experimental work will be performed and the proposed system will be ready for full-scale development.

4. (U) FY 1984 Planned Program: Continue in-house support of Long Haul Fiber Optics Transmission System, Local Distribution Transmission System and Millimeter Wave Multichannel Command Post (CP) Radio. Execute third increment and initiate Operational Test (OT) II of Long Haul Fiber Optics Transmission System prototype. Execute prototype hardware contract for Area Distribution Fiber Optics Transmission System. Continue contractual support efforts on fiber optics program by MITRE corporation. Execute second increment for Millimeter Wave Multichannel Command Post Radio prototype. Continue

Project: D487 Title: Tactical Multichannel Communications
Program Element: #6.47.01.A Title: Communications Engineering Development
DOD Mission Area: #345 - Tactical Communications Budget Activity: #4 - Tactical Programs

development effort for Product Improvement of SB-3614 Switchboard. Continue contractual engineer support efforts in support of Project Manager Operations.

5. (U) Program to Completion: This is a continuing program. In the FY85-88 period, primary emphasis will be on the following: Continued development of Area Distribution Fiber Optics System and Millimeter Wave Multichannel Command Post radios; continued MITRE support for Area Distribution Fiber Optics program; complete Testing of Area Distribution Fiber Optics Program; initiate Tracked Command Post (CP) Assemblage Program, New Shelterized Assemblages Program, Mobile Intercept Resistant Radio Program (MISR), Objective High Frequency Radio (OHFR) Development Program, Secure Optics Cable System Program and Tactical Antenna Systems development effort.

6. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimate Cost
RDTE						
Funds (current requirements)	3258	6321	7930	9456	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	2520	6340	10053	Not Shown	Not Applicable	Not Applicable

Funding changes from the FY 1982 submission for FY 1981 are a result of additional efforts in the fiber optics long haul cable and the millimeter wave radio for tactical command posts. In FY 1982, the change is a result of application of revised civilian pay and inflation pricing indices. FY 1983 reduction due to transfer of funds to higher priority programs.

Other Appropriations: Not Applicable.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.02.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	0	15854	14556	12472	Continuing	Not Applicable
D451	Army Support of JTIDS	0	15854	14556	12472	Continuing	Not Applicable

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 joint 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 enchances 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 #6.37.13A, Project D370.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: The Army JTIDS program will be in Full-Scale Development (FSD) in FY 1983 as part of a joint Air Force/Army development of JTIDS Class 2 terminals for tactical applications. Five Engineering Development Model (EDM) Class 2 terminals will be delivered to the PJH program testbed. Contract award will be made for development of Test Program Sets (TPSs). The Net Management Model will be utilized to continue development and evaluation of net management techniques. Identification of antenna technology will be completed. An Over-the-Air Rekeying (OTAR) study for the

Program Element: #6.47.02.A
DOD Mission Area: #343 - Theater Communications

Title: Joint Tactical Information Distribution System (JTIDS)
Budget Activity: #4 - Tactical Programs

Class 2 terminal will continue. Development of integrated logistics support packages and of Skill Performance Aids (SPAs) will proceed. Efforts will continue as appropriate on configuration of an Army version of the USAF Adaptable Surface Interface Terminal (ASIT).

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
DSARC III	2d Qtr FY 1986	3d Qtr FY 1986

Forecast for the Class 2 terminal DSARC III has been moved up one quarter.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	0	15854	14556	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	Not shown	15902	14892	32371	63165

Program transitioned from PE 6.37.07.A to PE 6.47.02.A, Project D451 in FY82. Differences between the FY83 and FY82 Congressional Descriptive Summaries are the result of minor reprograming to higher priority programs. Change to a continuing program reflects anticipated funding requirements beyond POM years, FY83-87.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands) Not Applicable.

Program Element: #6.47.02.A
DOD Mission Area: #343 - Theater Communications

Title: Joint Tactical Information Distribution System (JTIDS)
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND 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. In 1977 the Joint Program Office (JPO) acquired the first JTIDS Time Division Multiple Access (TDMA) EDM terminals. These large terminals, designated Class 1 (AN/URQ-31), were for use in command and control (C2) platforms. Testing was successfully completed and a production contract awarded in July 1980. The need for a JTIDS capability in mobile ground and tactical air platforms next resulted in the development of a smaller Advanced Development Model (ADM) Class 2 TDMA terminal, designated the AN/URQ-28. An airborne configuration of the AN/URQ-26 is currently in test. The primary Army development objective is to obtain sufficient Class 2 JTIDS terminals to support development, testing, and deployment of the 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 control systems, fielded in the 1980's and beyond, to operate at full potential.

G. (U) RELATED ACTIVITIES: The Army JTIDS effort is directly associated with the PJH system being developed under Program Element #6.37.13A, Project D370. JTIDS overall is a joint Air Force-Army-Navy development with the Air Force acting as lead service under Program Element 6.47.54.F.

H. (U) WORK PERFORMED BY: In-house: The US Army Communications-Electronics Command (USACECOM), Ft Monmouth, NJ, and the Electromagnetic Compatibility Analysis Center (ECAC), Annapolis, MD. Contractual efforts: MITRE Corporation, Bedford, MA; Singer Co., Kearfott Division, Little Falls, NJ; Rockwell-International Corp., Grand Rapids, IA; Hughes Aircraft Company (Ground Systems Group), Fullerton, CA; Network Analysis Corporation, Great Neck, NY; IBM Federal Systems Division, Oswego, NY. Management by PM PLRS/JTIDS (USACECOM), Ft Monmouth, NJ.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The JTIDS Class 2 terminal entered FSD with award of a firm-fixed-price contract to the team of Singer-Kearfott/Rockwell International in January 1981. An initial study has also been conducted by IBM to determine an optimum operational, functional, and physical ASIT configuration suitable for Army use. (Army requirements for a version of the USAF-developed ASIT are presently in the definition phase. The ASIT has been proposed, however, as a means of interfacing JTIDS transmissions from the E-3A Air Warning and Control System (AWACS) with the AN/TSQ-73 Missile Minder) system at Air Defense battalion and group operations centers. The benefits of a direct AWACS interface

Program Element: #6.47.02.A
DOD Mission Area: #343 - Theater Communications

Title: Joint Tactical Information Distribution System (JTIDS)
Budget Activity: #4 - Tactical Programs

with the Army Air Defense community, which the ASIT could provide, has been clearly demonstrated, most recently during exercise BOLD EAGLE 82 in October 1981.) Additional studies for Army use of JTIDS have included Electromagnetic Compatibility Analyses and network management efforts which will continue throughout development. Current Army involvement in the Navy JTIDS program is limited to a Design Analysis and Commonality (DAC) study to keep abreast of the Navy design approach for Distributed TDMA.

2. (U) FY 1982 Program: Continue participation in JTIDS Class 2 terminal FSD leading to establishment of final design parameters. Start development of integrated logistics support packages and SPAs. Exercise contract option/add-on for additional Class 2 EDM terminals for the PJH program as funded by PE 6.37.13A. A study to determine static/dynamic net management concepts and an assessment of antenna technology appropriate for JTIDS will be initiated. Initiate OTAR study. (Definition of an Army ASIT requirement is expected by second quarter FY82.)

3. (U) FY 1983 Planned Program: Continue FSD of the JTIDS Class 2 terminal. Deliver five EDMs to the PJH Phase 3 testbed. Continue development of integrated logistics support packages and SPAs. Initiate development of TPSs. Utilize the Net Management Model to continue development and evaluation of net management techniques. Continue OTAR study for the Class 2 terminal. Complete electromagnetic compatibility evaluations. (Continue efforts as required to configure the ASIT to a Class 2 Army version.)

4. (U) FY 1984 Planned Program: Continue FSD of the Class 2 terminal to include initial test and evaluation. Participate in a joint effort with the USAF to transition the JTIDS message standard from the Interim JTIDS Message Specification (IJMS) to the Tactical Data Information Link-Joint (TADIL-J). Continue development of TPSs, SPAs, integrated logistic support packages, the OTAR study and net management techniques. Support the PJH testbed.

5. (U) Program to Completion: Complete basic FSD of the TDMA Class 2 terminal. Initially field as part of the PJH testbed system with an initial divisional capability being obtained in late FY86. 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 and operational testing (DT/OT) and exercises/demonstrations within and outside of CONUS. This is a continuing program.

Program Element: #6.47.02.A Title: Joint Tactical Information Distribution System (JTIDS)
DOD Mission Area: #343 - Theater Communications Budget Activity: #4 - Tactical Programs

J. (U) TEST AND EVALUATION DATA: The Army's principal interest in the JTIDS program to date is the full-scale development and test of the Class 2 JTIDS terminal since this small terminal will be used with the Position Location Reporting System (PLRS) to form the PLRS-JTIDS Hybrid (PJH) or Army Data Distribution System (ADDS). A JTIDS Joint Test Force (JTF) has been established at Eglin Air Force Base, FL, to manage joint service DT&E/IOT&E testing. The JTF consists of personnel who represent the interests of the development and test communities in each DOD component. They are supported as appropriate by representatives of Service using, supporting, training, and testing commands. Other interested agencies (e.g., the Federal Aviation Administration (FAA), the National Security Agency (NSA), and the Joint Interoperability and Tactical Command and Control Systems (JINTACCS) Program Office) are being requested to provide representatives and support as needed.

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 T&E have been performed. The first JTIDS T&E period was a basic concept demonstration and validation of the large Class 1 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.

Program Element: #6.47.02.A Title: Joint Tactical Information Distribution System (JTIDS)
DOD Mission Area: #343 - Theater Communications Budget Activity: #4 - Tactical Programs

(5) (U) E-3A (AWACS) and AN/ARC-181 physical and electrical interface.

(6) (U) Logistic supportability and reliability, availability, and maintainability (RAM).

c. (U) The following tests were conducted to support Army requirements:

(1) (U) Foliage Propagation Test. The Army completed tests of 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 indicate that dense forest paths have the expected effect on useable path length and validate prior analytical data. (Similar test environments will be encountered again during a special USMC OT II test of PLRS in amphibious operations during January 1982.) 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 pass air surveillance radar data to Short-Range Air Defense (SHORAD) elements. Testing was conducted at Eglin Air Force Base, FL. Track data were passed 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 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 ITD.

(3) (U) Bold Eagle 81. In October 1981, the JTIDS capability to operate in links from the E-3A to AN/TSQ-73 Group and Battalion Operation Centers, through an AN/TCS-107 (ASIT) interface, was demonstrated during Exercise Bold Eagle-81 at Eglin Air Force Base, FL. Testing showed that E-3A radar data can be successfully passed directly to Army Air Defense units via JTIDS data links, and was passed 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 Position Location Reporting System (PLRS)/JTIDS Hybrid (PJH) testbed using advanced development models until engineering development models are available in 1983.

e. (U) Future JTIDS testing will comprise tests to expand the TDMA data base and support the following milestones:

(1) (U) A Class 2 TDMA DSARC III in 1986. (DT&E for the Class 2 EDM terminals, under USAF lead, will be accomplished during 1984.)

(2) (U) PJH development completion in 1986. (PJH system DT&E is currently scheduled from FY84 through FY86 and will be managed by USATECOM.)

2. (U) Operational Test and Evaluation: OT&E of JTIDS will be conducted periodically during the 1982-1986 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 C^2 system, TACFIRE, and others. 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 II terminal production programs.) The PJH system will be deployed to Fort Hood, TX, in FY86 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 CNI requirements.

3. (U) System Characteristics:

Operational/Technical Characteristics	Objectives	Demonstrated Performance
Operational		
(1) Jam Resistance		To be determined in FSD testing
(2) Time of Arrival Ranging Accuracy (@150 NMI)		
(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 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.04.A
Title: Unattended Ground Sensors (UGS)
DOD Mission Area: #217 - Land Warfare, Tactical Surveillance, and Reconnaissance
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimate Cost
	TOTAL FOR PROGRAM ELEMENT	3955	6927	4135	0	TBD	TBD
DL73	Remotely Monitored Battlefield Sensor System (REMBASS)	3955	6927	4135	0	TBD	TBD

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Soviet force superiority in manpower and hardware make early detection of those forces under all weather, terrain, and electronic countermeasures conditions mandatory if the Army is to be successful on future battlefields. The REMBASS program meets this challenge with a hand-emplaced passive all-weather Unattended Ground Sensor (UGS) system capable of 24-hour operation anywhere in the world by FY 1984. REMBASS equipment will improve the Army's capability for early warning alert, ground surveillance, and target development in an active countermeasures environment and during all conditions of weather, terrain, and visibility. This system consists of readout and relay devices, power sources, and unattended ground sensors, including seismic acoustic classifying, magnetic, and infrared sensors.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: This year Engineering Development (ED) involves completion of design development and testing of the training simulator, complete required refurbishment based on lessons learned in Development Tests II/Operational Tests II, complete the design and testing of the automatic disconnect for the Lithium Battery.

Program Element: #6.47.04.A
DOD Mission Area: #217 - Land Warfare, Tactical Surveillance, and Reconnaissance

Title: Unattended Ground Sensors (UGS)
Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds	3955	6927	4135	TBD	TBD
Funds (as shown in FY 1982 submission)	3595	6948	0	11105	44558

The increase in FY81 is attributable to Army reprograming from other programs. The FY82 request reflects amount programed resulting from President Reagan's FY82 amendment after Army had zeroed REMBASS in FY82 and outyears due to severe budget constraints. The dollars added in the FY83 budget represents the additional funds identified by the Army that are required to complete the development of the hand-emplaced system.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands) None.

Program Element: #6.47.04.A
DOD Mission Area: #217 - Land Warfare, Tactical Surveillance, and Reconnaissance

Title: Unattended Ground Sensors (UGS)
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The objective of this project is to develop the techniques of target detection, identification, and classification using passive remote sensors and to produce Engineering Development (ED) system models suitable for extensive user tests. Feasibility of the remote sensor concept was proven in Vietnam between 1968 and 1973. Selected Advanced Development (AD) models were tested and transitioned into engineering development (ED) as REMBASS. A hand-emplaced sensor system, REMBASS employs a variety of sensor types including magnetic, seismic acoustic classifier, and infrared. The REMBASS program made a major breakthrough in discriminating between personnel and wheeled and tracked vehicle targets. Data from field tests at Ft Huachuca in January 1980 demonstrated that the probability of the REMBASS classifying sensor correctly identifying personnel is 100%, wheeled vehicles is 61%, and tracked vehicles is 91%.

G. (U) RELATED ACTIVITIES: Coordination between the services has been formalized with a Joint Service Memorandum of Agreement for Tactical Remote and Physical Security Sensor Systems Research, Development, Test, and Evaluation. The Department of Defense Physical Security Equipment Action Group (PSEAG) reviews all planned and ongoing Research, Development, Test, and Evaluation (RDTE) in the Tactical Remote and Physical Security Sensor area to insure appropriate interoperability between service systems and cooperative and coordinated RDTE efforts. There is extensive international interest in the REMBASS program. Inquiries have been received from Australia, Canada, Egypt, France, Germany, Israel, Korea, Norway, Saudi Arabia, Sweden, and the United Kingdom. Information has been provided to NATO panels and other international forums. In addition to US Army, Marine Corps, and NATO users, potential domestic users include the Federal Bureau of Investigation, State Department (Sinai Field Mission), Immigration and Naturalization Service, Drug Enforcement Agency, state law enforcement agencies, and hazard waste strike forces. Domestic inquiries have been received concerning REMBASS-type hardware for protection of PERSHING missile battalions, MX missile, ground-launch cruise missile, and tactical aircraft (i.e., B-52). This program element is the Engineering Development (ED) effort corresponding to work previously reported under 6.37.19.A, Surveillance, Target Acquisition, and Night Observation (STANO) Systems, and program element 6.47.23.A, STANO Systems, through FY 1975. The Advanced Development (AD) work reported under program element 6.37.04.A, REMBASS, has been discontinued.

H. (U) WORK PERFORMED BY: Responsibility for management of the REMBASS project is assigned to Project Manager (PM), FIREFINDER/REMBASS, US Army Electronics Research and Development Command (ERADCOM), Fort Monmouth, NJ. In-house work is performed by the US Army Electronics Research and Development Command (ERADCOM), Fort Monmouth, NJ, and Adelphi, MD; US Army Mobility Equipment Research and Development Command (MERADCOM), Fort Belvoir, VA; Human Engineering Laboratory (HEL), Aberdeen Proving Ground, MD; and US Army Armament Research and Development Command (ARRADCOM), Dover, NJ. Contractors

Program Element: #6.47.04.A
DOD Mission Area: #217 - Land Warfare, Tactical Surveillance, and Reconnaissance

Title: Unattended Ground Sensors (UGS)
Budget Activity: #4 - Tactical Programs

include: Chamberlain Manufacturing Corporation, Waterloo, IA; RCA Corporation, Camden, NJ, and Burlington, MA; Analytics Incorporated, Philadelphia, PA; and Value Service Engineering, West Long Branch, NJ.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: A Validation In-Process Review (IPR) for basic components of the REMBASS to enter Engineering Development (ED) was approved by the Department of the Army on 17 May 1976. Three design plan contracts were awarded: one each to GTE Sylvania, RCA Corporation, and American Electronics Laboratory. A Special IPR was conducted on 10 May 1977 to finalize the coordinated developer/user configuration for basic REMBASS. Based on evaluation of the resulting design plans, an engineering development contract was awarded in June 1977 to RCA Corporation. Commander, European Command, initiated a combined (Germany, United Kingdom, and United States) study program, AVID GUARDIAN, which on its completion in July 1977 proved conclusively that unattended ground sensors perform reliably and effectively under European conditions of heavy military traffic, high speeds, and severe weather. Army Remote Sensors (REMS) were used to provide security of the Olympic Village complex at the Lake Placid Winter Olympics against unauthorized intrusion.

2. (U) FY 1982 Program: Complete hand-emplaced hardware fabrication, conduct Development Tests II/Operational Tests II, and conduct Development In-Process Review (IPR).

3. (U) FY 1983 Planned Program: Complete necessary refurbishment based on Development Tests II/Operational Tests II, initiate design and fabrication of training simulator, and complete design and fabrication of the Lithium Battery.

4. (U) FY 1984 Planned Program: Complete approved Engineering Change Proposals (ECP) developed from DT/OT II and finalize documentation and reports for a production data package.

5. (U) Program to Completion: Continue completion of Engineering Change Proposals and finalization of documentation reports as required.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.05.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	0	17589	14754	7637	4902	86107
D207	Modular Integrated Communications and Navigation System (MICNS)	0	17589	14754	7637	4902	86107

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: US forces face highly mobile and heavily mechanized forces which 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 Standoff Target Acquisition System (SOTAS), the Army's Remotely Piloted Vehicle System (RPV), the Air Force's Precision Location and Strike System (PLSS), and the GBU-15 Guided Weapon System. The MICNS will improve US force's capability for early warning alert, target acquisition, and target strike in the face of intensive opposing force's electronic countermeasures at an affordable cost by eliminating duplicative development and sharing common logistics. The MICNS uses an architecture that can be enhanced in responce to an escalated threat in the 1990's.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: To provide FY83 incremental funding of the MICNS engineering development contract awarded in FY79; to fund contracts for analytical and program documentation support; and to provide government in-house support of the MICNS program. Emphasis will be placed on cost reduction initiatives and evaluation of new applications. This was a new program element in FY82. Prior to FY82, the MICNS engineering development program was funded from PE 6.47.48.8, SOTAS; PE 6.47.30.A, RPV; and PE 6.47.F, PLSS.

Program Element: #6.47.05.A
Title: Modular Integrated Communication and Navigation System (MICNS)
DOD Mission Area: #344 - Tactical Command and Control
Budget Activity: #4 - Tactical Programs

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
OT Testing - RPV	To be determined	4Q FY83 (As shown on RPV CDS)
Production Award - RPV	To be determined	1Q FY84 (As shown on RPV CDS)

Army budget cuts in September 1981 slowed RPV research and development and delayed production start. Subsequently Congress restored RPV funds. New RPV milestones are being developed. The MICNS program will support the new RPV milestones. SOTAS milestones were removed due to program termination. Other requirements are in the early stages of analysis and include Corps Support Weapon, Pave Mover, and Antiballistic Missile System.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	0	17589	14754	12539	86107
Funds (as shown in FY 1982 submission)	0	17643	6400	TBD	TBD

FY82 reduction is due to general budget reductions and reprograming of funds to higher priority Army requirements. Increase for FY83 and Additional to Completion is due to contractor and government underestimation of technical complexity and costs, initiation of the development of test program sets for automated test equipment, and spares for development and operational tests. Negotiations are in progress to restructure the MICNS contract to a fixed price effort. Milestones have been established to accomplish this goal by April 1982.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands) None.

Program Element: #6.47.05.A
DOD Mission Area: #344 - Tactical Command and Control

Title: Modular Integrated Communication and Navigation System (MICNS)
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: 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 6.47.48.A and RPV Program Element 6.47.30.A and the Air Force PLSS Program Element 6.47.42.F. A separate MICNS program element commencing in FY 1982 represents a 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 cycles.

G. (U) RELATED ACTIVITIES: Prior to April 1975, initial exploratory development efforts of MICNS were jointly funded by the Army under Program Element 6.27.03A, Task DH93, and Defense Research Projects Agency, Program Element 6.27.02.E. 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 6.37.25.A, Remotely Piloted Vehicles, Task DK-61, which demonstrated the feasibility of building an Integrated Communications and Navigation System (ICNS) which 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 6.37.36A, 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 during early calendar year 1978 successfully demonstrated the system concept. The testing was conducted under Program Element 6.37.25.A, RPV. Advanced development was completed in FY 1978, and the program transitioned 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 FY82, the MICNS ED program was funded from PE 6.47.48.A, SOTAS; PE 6.47.30.A, RPV; and PE 6.47.42.F, PLSS.

H. (U) WORK PERFORMED BY: Responsibility for management of the MICNS project is assigned to the Product Manager, MICNS, US Army Electronic Research and Development Command (ERADCOM), Fort Monmouth, NJ. In-house work is performed by ERADCOM, Ft. Monmouth, NJ, and Aldelphi, MD; US Army Communication Research and Development Command (CORADCOM), Fort Monmouth, NJ,

Program Element: #6.47.05.A
DOD Mission Area: #344 - Tactical Command and Control

Title: Modular Integrated Communication and Navigation System (MICNS)
Budget Activity: #4 - Tactical Programs

and US Army Communication and Electronic Command (CECOM), Fort Monmouth, NJ. Contractors include Harris Corporation, Melbourne, FL, and Systems Planning Corporation, Rosslyn, VA.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: 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 1979. RPV participation in the MICNS development was approved by DA at the RPV validation In-Process Review held in September 1978. The 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 complete SOTAS engineering prototype was demonstrated and tested in July 1980. The RPV engineering prototype has been completed, tested, and refurbished for delivery 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. System design was completed.

2. (U) FY 1982 Program: Continue MICNS engineering development effort to complete the design of RPV airborne and ground data terminals. Qualification testing of the terminals will be initiated on equipment to be completed in April 1982. Design of RPV special test equipment will be started. DT/OT support packages will be started.

3. (U) FY 1983 Planned Program: RPV data link hardware qualification will be completed. Delivery of qualified RPV terminals to the RPV contractor is planned for 1QFY83. Data link integration and integration testing with the RPV system will be completed. Development of the support package for RPV DT/OT will continue. RPV Special Test Equipment (STE) design completed. Fabrication and testing of first STE models will be completed.

4. (U) FY 1984 Planned Program: Ninety percent of the RPV hardware will be delivered. Development of MICNS field support package will be initiated for RPV.

5. (U) Program to Completion: RPV DT/OT support package will be completed. DT/OT testing of RPV data terminals completed. All hardware deliveries completed. Field support package development for RPV will be completed. Award production contract for RPV. Start work on other Army, Navy, and Air Force applications of the MICNS antijam data link components.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.06.A
Title: Radiological Defense Equipment
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	318	308	838	968	Continuing	Not Applicable
	QUANTITIES						
D517	Radiac Equipment						
	Engineering Development	318	308	838	968	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: #6.47.06.A
Title: Radiological Defense Equipment
DOD Mission Area: #276 - Defensive Chemical and Biological Systems
Budget Activity: #4 - Tactical Programs

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Engineering Development will be continued (second year) on the digital radiac. This radiac, which is suitable for both tactical and health physics survey, can be used either as a handheld instrument or as part of a tank-automotive system. It is the top-priority radiac required by the European theater. Engineering Development of radiac equipment is a continuing program.

Major Milestones		Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Radiacmeter			
Vehicular	IOC*	FY 1983	FY 1982
Aerial	IOC	FY 1982	FY 1982
Individual	IOC	FY 1985	FY 1983
Tactical	IOC	FY 1983	FY 1983
Installation Monitor	IOC	FY 1984	FY 1983
X-Ray Probe	TC**	FY 1982	FY 1981

*IOC - Initial Operational Capability
**TC - Type Classification

IOC of the vehicular radiac slipped 1 quarter pushing it into the next fiscal year, because of late receipt of the Independent Evaluation report from the user and some delays in First Article Testing. IOC of the individual dosimeter system will be delayed until FY 1985 pending completion of the evaluation of the German system in competition with the US-UK design. The installation monitor IOC has been delayed one year because of delays in award of the contract. IOC of the X-ray probe was delayed because test data validity was questioned by the user and is being reassessed.

Program Element: #6.47.06.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Radiological Defense Equipment
Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	318	308	838	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	268	308	847	Continuing	Not Applicable

The increase of $50 thousand in FY 1981 is a result of reprograming to support full execution of program objectives. The decrease of $9 thousand in FY 1983 funding requirements reflects revised inflation adjustments.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement Army						
Funds (current requirements)	3700	3800	2400	26200	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	3700	3800	2000	-	Continuing	Not Applicable
Quantities (Numerous procurements of a variety of instruments)						

The FY 1983 fund estimates have been increased by $400 thousand because a new contract was written making FY 1983 the first year of a multiyear contract for the tactical dosimeter system rather than the second year of a previously written contract. Costs associated with the first year of a multiyear contract had to be absorbed in FY 1983.

Program Element: #6.47.06.A
Title: Radiological Defense Equipment
DOD Mission Area: #276 - Defensive Chemical and Biological Systems
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: 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, dismounted, and fixed installation 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 issue. 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 and aerial radiacs provide for an extremely fast survey capability that does not exist today. 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. The aerial radiac will be mounted in Army aircraft or in remotely piloted vehicles. It will automatically correct for altitude, and then compute and record the ground dose rate. Computer data links will enable near-realtime fallout plotting. The fixed installation fallout monitor will provide a capability to remotely monitor radiation in as many as 10 separate locations at fixed or semifixed installations such as depots or command posts. An X-ray probe for alpha radiation detection is being developed that will enable a one-meter standoff detection of plutonium. This capability is required in the event of an accident involving plutonium scatter. Current procedures require a "hands and knees" survey with the alpha detector held within a few centimeters of the ground. Fewer items of new equipment will be required as rate metering and dosimetric capabilities are combined in multipurpose devices. Aural and visual alarms are included to warn the soldier of the presence of a threatening radiological environment. User error is virtually eliminated with the inclusion of autoranging and digital readout.

G. (U) RELATED ACTIVITIES: This effort is related to Exploratory Development conducted in Program Element (PE) 3.27.03.A, Combat Surveillance/Target Acquisition and Identification, and to Advanced Development conducted in PE 6.36.04.A, 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, is being developed jointly with the Canadian Department of Defense Production, and the DT-236 individual dosimeter is being developed jointly with the United Kingdom Ministry of Defense. The vehicular radiac system was developed to be compatible with all armored fighting vehicles. Liaison with other Services is maintained through the Tri-Services Radiac Working Group to preclude duplication.

Program Element: #6.47.06.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Radiological Defense Equipment
Budget Activity: #4 - Tactical Programs

H. (U) WORK PERFORMED BY: In-house Army efforts are performed by the US Army Electronics Research and Development Command (ERADCOM), Fort Monmouth, NJ. The top five contractors are: Rockwell International Corporation, Los Angeles, CA; Radio Corporation of America, Philadelphia, PA; Nuclear Corporation of America, Denville, NJ; Canadian Admiral Corporation, Toronto, Canada; and Xetex Inc, Redwood City, CA.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Continued action competing the German-developed individual dosimeter system with the jointly developed United States (US)-United Kingdom (UK) individual dosimeter system. Continued low-rate initial production for the aerial radiac and full production of the tactical dosimeter. Type classified the installation monitor system, and initiated procurement.

2. (U) FY 1982 Program: Perform minimum engineering development required to support type classification of digital radiac direct from advanced development. Select either the US-UK or the German individual dosimeter system for Army use. Type classify the X-ray probe for the alpha survey meter and initiate production.

3. (U) FY 1983 Planned Program: Continue production of the tactical dosimeter and X-ray probe. Continue engineering development of the digital radiac, if type classification direct from advanced development is unsuccessful.

4. (U) FY 1984 Planned Program: Initiate production and procurement of the digital radiac and the individual dosimeter system. Continue procurement of tactical dosimeter; complete procurement of the X-ray probe for alpha survey meter. Initiate development of a radiation analyzer to detect plutonium in a standoff mode. This instrument would be used in an accident/plutonium scatter environment.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.09.A
Title: Identification Friend or Foe (IFF) 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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	1410	2418	2660	4793	Continuing	Not Applicable
	QUANTITIES						
D530	IFF Equipment	1410	2418	2660	4793	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Objective is to provide engineering development models of equipment to meet Army IFF requirements for air defense and battlefield applications. Programs include: (1) new applications of and improvements to the existing Mark XII air defense IFF system; (2) development of signal processing techniques and equipment for the noncooperative identification of aircraft by selected weapon platforms, to enable positive identification of foes and friends with malfunctioning transponders, and (3) a multifunction radar transponder beacon for use by Special Forces in covert operations.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: The Antijam (A-J) improvement program for Mark XII interrogators will be continued and expanded to include the AN/TPX-46(V)1 through (V)6 and the AN/TPX-50. The fabrication of Engineering Development (ED) models of the noncooperative aircraft identification processor for HAWK will be initiated. Testing of the transponder beacon for the Special Forces will be completed and test results analyzed.

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Award Contract, Multifunction Beacon	FY81	FY81
Award Contract, AN/PPX -3 Improvements	FY82	-
Award Contract, AN/TPX-46 and AN/TPX-50		

Program Element: #6.47.09.A
DOD Mission Area: #344 - Tactical Command and Control

Title: Identification Friend or Foe (IFF) Developments
Budget Activity: #4 - Tactical Programs

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Interrogator Improvements	FY82	-
Award Contract, AN/APX -100 Modification	FY82	-
Award Contract, Noncooperative IFF for IHAWK	FY83	FY83

Program Element: #6.47.09.A Title: Identification Friend or Foe (IFF) Developments
DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 198^ RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Estimated Cost
RDTE					
Funds (current requirements)	1410	2418	2660	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	2976	2424	5242	Continuing	Not Applicable

Decreases from FY81 and FY83 were due to reprograming to higher priority projects.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.47.09.A
DOD Mission Area: #344 - Tactical Command and Control

Title: Identification Friend or Foe (IFF) Developments
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The existing air defense IFF system, the Mark XII system, is in use by all three Services. All military aircraft are capable of responding to Mark XII cryptographic interrogations. New weapon systems can take advantage of this system by incorporating an IFF interrogator. Versions of Mark XII interrogators are, therefore, planned for the Defense Acquisition Radar (DAR), the Scout helicopter self-protection missile system, and the SHORAD Command and Control (C^2) system. Because the MK 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 maximum ranges. The most advanced techniques are in the area of aircraft identification using radar signature analysis, and systems for HAWK and PATRIOT are likely to be the first to reach engineering development. Finally, a multifunction radar transponder beacon is being sought by Special Forces units, to facilitate their location and identification by AF and Navy support aircraft. It is anticipated that, for this application, an existing commercial beacon can be modified to perform satisfactorily.

G. (U) RELATED ACTIVITIES: Advanced Development efforts on NATO Identification System (NIS) Mark XII Improvements and Noncooperative Identification are accomplished under Program Element 6.37.06.A, 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.

H. (U) WORK PERFORMED BY: Army IFF activities are managed by the Combat Surveillance and Target Acquisition Laboratories in Fort Monmouth, NJ. Application of Mark XII to the new air defense acquisition radar would be accomplished by Hazeltine Corporation of Greenlawn, NY. Application to the Scout hicopter would be based on the Stinger interrogator (AN/PPX-3) built by Teledyne Electronics of Newbury Park, CA. The Bendix Corporation of Towson, MD, is a participant in the Mark XII improvement program. Noncooperative IFF for HAWK would be constructed by SCOPE, Inc., of Reston, VA. The multifunction radar transponder beacon would be accomplished by Motorola in Phoenix, AZ.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The vulnerability of air defense interrogators was assessed. A contractual effort was initiated in FY 1981 to develop 10 transponder beacons for the Special Forces to provide terminal guidance to supporting aircraft. In past years this program element has funded engineering development of the Mark XII system for air defense weapons and aircraft transponders.

Program Element: #6.47.09.A Title: Identification Friend or Foe (IFF) Developments
DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

2. (U) FY 1982 Program: The transponder beacon will be completed and testing initiated. New contracts will be awarded to improve the AN/PPX-3, AN/TPX-46 to provide increased jam resistance and to modify certain AN/APX-100 transponders.

3. (U) FY 1983 Planned Program: Continue funding the contracts initiated in FY 1982, complete testing of the transponder beacon, and award a contract for engineering development models of a noncooperative aircraft processor for HAWK.

4. (U) FY 1984 Planned Program: Complete fabrication and laboratory testing of Mark XII circuit improvements and initiate Development Testing/Operational Testing (DT/OT) II. Continue ED contract for HAWK noncooperative aircraft processors for HAWK.

5. (U) Program to Completion: This is a continuing program. Future efforts will include engineering development models of the NATO Identification System Mark XV and BIFF.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.10.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4359	5326	4931	5777	Continuing	Not Applicable
	QUANTITIES						Not Applicable
DL70	Night Vision Devices	4359	5326	4931	5777	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 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 are needed in order to 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 devices to meet this critical need. The program is directed so that life cycle costs are minimized by making maximum use of common sensors in the night sights of as many weapon systems as possible, and by making technology changes compatible with existing sights.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: The AN/PVS-7, third-generation night vision goggle (low-cost night vision aid), will continue in Engineering Development. 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. Additionally, the Advanced Driver's Viewer program will enter Engineering Development. This common device will allow high-performance driving for all closed-hatched combat vehicle operations, and will be integrated with the vehicles themselves.

Program Element: #6.47.10.A
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance

Title: Night Vision Devices
Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	4359	5326	4931	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	5720	5340	5493	Continuing	Not Applicable

The decrease in FY 1981 ($1361) was due to program realignment and reprograming to higher priority projects. Decrease in FY 1982 ($14) was due to inflation index change. Decrease in FY 1983 ($562) reflects the reallocation of funds to higher Army priorities.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands) Not Applicable

Program Element: #6.47.10.A
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance

Title: Night Vision Devices
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The Night Vision Goggle, AN/PVS-7, is a lightweight, head-mounted, passive image intensifier night vision system used for driving vehicles, patrolling, short-range surveillance, weapon firing, medical aid, and other manual tasks in a forward battle area. The AN/PVS-7 provides two-eyed viewing through a single intensifier tube to reduce procurement and life cycle cost as well as weight. Its third-generation image intensifier tube provides better performance at starlight than the current AN/PVS-5, which it will supplement and replace. The AN/PVS-7 will operate with throwaway batteries or vehicle power. A test set will be developed to improve the field maintenance capability. Additionally, present and future combat night vision capabilities need to be upgraded to operate effivetively under extreme low-light level and dirty battlefield conditions (smoke, fog, dust, etc). Therefore, an advanced common interchangeable device for the driver, called the Advanced Driver's Viewer, will be developed as well as a family of advanced manportable equipments.

G. (U) RELATED ACTIVITIES: The United States Navy, Marines, 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 6.37.10A, Night Vision Advanced Development, are utilized.

H. (U) WORK PERFORMED BY: In-house work is performed by the United States Army Night Vision and Electro-Optics Laboratory, Fort Belvoir, VA. Current major contractors are Bell and Howell Corporation, Chicago, IL; Varian Associates, Palo Alto, CA; and ITT, Roanoke, VA. Contractors for the Engineering Design effort for the Advanced Driver's Viewer will be selected in FY 1983 and in FY 1984 for the Thermal Weapon Sight development.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: This program has produced a variety of night vision equipment, both manportable items used by the individual soldier, and combat vehicle-mounted devices. Recent accomplishments include type classification of the Individual Weapon Sight (AN/PVS-4), Crew Served Weapon Sight (AN/TVS-5), Driver's Viewer (AN/VVS-2), Handheld Thermal Viewer (AN/PAS-7), Night Observation Device, Long-Range (NODLR) (AN/TAS-6), and Infrared (IR) Aiming Light (AN/PAQ-4). Hardware development of Aviator's Night Vision Imaging System (ANVIS) has been completed, and Development Test II and Operational Test II were initiated.

Program Element: #6.47.10.A
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance

Title: Night Vision Devices
Budget Activity: #4 - Tactical Programs

2. (U) FY 1982 Program: Complete Engineering Development of Aviator's Night Vision Imaging System (ANVIS). Development and Operational Tests will be completed, maintenance and support concepts will be finalized, and engineering changes made. Conduct Development Acceptance In-Process Review and initiate production. Initiate Engineering Development program for AN/PVS-7 Night Vision Goggle program described in para F above.

3. (U) FY 1983 Planned Program: Continue Engineering Development of AN/PVS-7. Hardware development will be completed, and DT/OT will be initiated. Initiate engineering development of Advanced Driver's Viewer for incorporation into combat vehicles. Initiate a logistics support package for support of the Development Test/Operational Test II of the Driver's Viewer.

4. (U) FY 1984 Planned Program: Complete Engineering Development of AN/PVS-7 night vision goggle. Continue Engineering Development of Advanced Driver's Viewer. Initiate Engineering Development of Thermal Weapon Sight, which will fulfill multiple applications such as rifle sights, crew-served weapon sights, and future manportable missile sights.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.11.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	12942	14406	20335	17019	Continuing	Not Applicable
	QUANTITIES						Not Applicable
D665	Aircraft Survivability Equipment	12942	14406	20335	17019		

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the development, test, and type classification for production and fielding of Aircraft Survivability Equipment (ASE) systems required for the survival and increased combat effectiveness needs of tactical and special electronic mission aircraft (SEMA). This program addresses infrared, radar, laser, optical/electro-optical directed air defense threats and potential enemy airborne interceptors. The program is time-phased to be a logical follow-on to advanced development from PE 6.37.11.A, Aircraft Survivability Equipment (ASE). Resultant production programs provide 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. The program is adjusted continually to meet the changing nature of technology and 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) BASIS FOR FY 1983 RDTE REQUEST: This program provides for the continued development and improvement of advanced infrared (IR), radar, optical, laser and vulnerability reduction systems and subsystems to counter the current and maturing threats to the Army aircraft. These threats involve primarily antiair systems but also include main tank guns, antitank guided missiles, and the HIND helicopter. Laser designators and rangefinders associated with these systems make them an ever-increasing threat to the survival and combat effectiveness of Army tactical aircraft. The engineering development and testing for the AVR-2 laser warning receiver will be completed and production will begin in FY83. Since the deployment of

Program Element: #6.47.11.A
DOD Mission Area: #371 - Self-Protection
Title: Aircraft Survivability Equipment (ASE)
Budget Activity: #4 - Tactical Programs

the basic SA-7 and SA-9, major improvements to these infrared (IR) missile systems have been made. Upgrading and supplementing deployed IR countermeasure systems will continue in FY83. The special electronic mission aircraft (SEMA) version of the ALQ-156 missile detector, the UH/EH-60 Blackhawk helicopter IR suppressor, and the continuation of the joint Army/Navy AAR-46 passive missile detector are included in this program to keep pace with the threat. US Army special electronic mission aircraft (SEMA) are seriously threatened by surface-to-air continuous wave (CW) homing missiles. The continuation of the Army's portion of the joint development program with the Navy of the ALQ-162 CW radar jammer is included in the program to address this threat and its projected growth. Millimeter chaff and monopulse expendables as well as the Army's portion of the Tri-Service Airborne Self-Protection Jammer (ASPJ) program are included in FY83 program.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	12942	14406	20335	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	11458	16148	21103	Continuing	Not Applicable

FY82, and FY83 decrease reflect an internal Army reprograming action for higher priority projects. FY81 increase reflects an additional amount of funds in support of the Blackhawk (AH-60) Hover Suppressor program.

Program Element: #6.47.11.A
DOD Mission Area: #371 - Self-Protection

Title: Aircraft Survivability Equipment (ASE)
Budget Activity: #4 - Tactical Programs

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Aircraft Procurement, Army						
Funds (current requirements)	18924	111879	36017	72973	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	25677	47304	41606	-	Continuing	Not Applicable
Quantities (current requirements)*	-	-	-	-	Continuing	Not Applicable
Quantities (as shown in FY 1982* submission)	-	-	-	-	Continuing	Not Applicable

Funding revisions reflect changes within aircraft modification program to meet current aviation requirements within TOA constraints. Large increase in FY 1982 supports the procurement of Aircraft Survivability Equipment for the Rapid Deployment Force.

*The Aircraft Survivability Equipment (ASE) program provides a wide range of ASE to 11 separate aircraft modification lines and 2 aircraft production programs. It is therefore impossible to provide meaningful quantitative data in the limited format shown above.

Program Element: #6.47.11.A
DOD Mission Area: #371 - Self-Protection

Title: Aircraft Survivability Equipment (ASE)
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Starting in FY83, the two engineering development (ED) projects currently managed by the Army Project Manager for Aircraft Survivability Equipment (PM-ASE), DC 52 (Scout/Attack Helicopter Survivability Systems) and D665 (Special Electronic Mission Aircraft Survivability Systems) are combined. This was done because of the close similarity between the technical aspects of these two projects. Therefore, only one project, D665 (retitled Aircraft Survivability Equipment), will be identified in PE 6.47.11.A. In 1972, the SA-7 was used against Army helicopters in Vietnam. The aircraft were quickly equipped with the infrared (IR) suppressors and low-reflectance paint developed under this program and the advanced development program, PE 6.37.11.A, AEWSP Equipment. Flare dispensers were also adapted and successfully employed for larger helicopters. An IR jammer for use on fixed-wing aircraft demonstrated the required capabilities to defeat the SA-7 missile. Radar warning receivers (APR-25/26) were used to detect enemy radar-directed weapons. Together, these efforts demonstrated the need for and the credibility of aircraft survivability equipment (ASE) and countermeasures across the electromagnetic spectrum. Accordingly, requirements were established for present fleet and developmental aircraft to enable them to complete combat and combat support missions in the presence of the full range of modern sophisticated radar, IR, laser, optical, and electro-optical directed threat weapons on the mid-intensity battlefield. Since its initiation, the program has successfully developed countermeasures which have been subsequently produced and deployed to maintain the combat effectiveness of Army aircraft in the presence of an increasing threat.

G. (U) RELATED ACTIVITIES: This program is conducted in conjunction with PE 6.37.11.A, Aircraft Electronic Warfare/Self-Protection (AEWSP) Equipment, also managed by the Army Project Manager for Aircraft Survivability Equipment (PM-ASE) and PE 6.32.15.A, Joint Survivability Investigations, for which the PM-ASE is the Senior Army Representative. In 1977, the Joint Logistics Commanders signed a Memorandum of Agreement 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 for most helicopters and selected fixed-wing aircraft; radar jammers, for attack and other selected helicopters/fixed-wing aircraft; and 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. At the request of the German and United Kingdom representatives, discussions on the joint use of US Army ASE were conducted in 1978/1979/1980 and are planned for 1981.

Program Element: #6.47.11.A
DOD Mission Area: #371 - Self-Protection
Title: Aircraft Survivability Equipment (ASE)
Budget Activity: #4 - Tactical Programs

H. (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; TRACOR, Inc., Austin, TX; Calspan Corp., Buffalo, NY; Emerson Electronic, St Louis, MO; Grumman Aircraft Company, Bethpage, NY; Loral, Inc., Yonkers, NY; Garret AiResearch, Torrance, CA; Honeywell Inc., Lexington, MN; Perkin Elmer, Norwalk, CT; Sikorsky Aircraft Company, Stratford, CT; Bell TEXTRON, Hurst, TX; Science Applications Inc., Huntsville, AL; American Electronics Laboratory, Landsdale, PA.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: In response to the SA-7 missile, infrared (IR) suppressors and low-reflectance IR paint were produced from development models and applied to attack, observation, and utility helicopters. This IR signature reduction equipment was successful in reducing the effectiveness of the SA-7 and convincingly proved that Army Aircraft could survive against sophisticated air defense threats. In 1976, interim IR suppressors and low reflectance paint were fielded to frontline US tactical aircraft in Germany, Korea, and the United States or the OH-58A, AH-1G/Q, UH-1H and RU-21H aircraft. The ALQ-147 IR Jammer was fielded in 1977 for OV-1D and RV-1D aircraft in Germany and Korea. The APR-39(V)1 Radar Warning Receiver for Tactical Aircraft was commercially developed and entered production in 1975 followed by fielding in 1978. The ALQ-144 IR jammer, applicable to current attack, utility, and scout helicopters as well as the AH-64, and UH-60 BLACKHAWK, completed Development Test (DT)/Operational Test (OT) in 1977, entered production in 1976 and was fielded in 1981. The dual-purpose M-130 chaff/flare dispenser, capable against both the ground based and airborne defense threats entered production in 1977 and was fielded in 1978. The ALQ-156 missile detector system entered engineering development (ED) in 1976 followed by production in FY 1981 for application to CH-47 C/D aircraft. The ALQ-136(V)1 radar jammer and the APR-39(V)2 radar warning receiver entered production in FY 1979/FY 1981, respectively. Vulnerability reduction efforts to harden the tailboom of the Cobra were completed and incorporated during production/conversion of the modernized AH-1S. The OH-58 vulnerability reduction programs for flight controls and run dry transmission were initiated in FY 1976 and incorporated during the OH-58C conversion program. The flat plate canopies to reduce glint for the OH-58 and AH-1 helicopters satisfactorily completed development and were incorporated during the production/conversion programs for these aircraft. Following successful completion of engineering development, production was initiated for the OH-58 IR suppressor (FY 1977), OV-1D/RV-1D IR suppressor (FY 1979), AH-1S IR suppressor (FY 1979), and RU-21 IR suppressor (FY 1978); and all have been fielded. The AVR-2 laser warning receiver entered engineering development in FY 1979. The design and development required to adapt the AH-1S IR suppressor to the UH/EH-1H aircraft was initiated in FY 1979 and completed in FY 1981.

Program Element: #6.47.11.A Title: Aircraft Survivability Equipment (ASE)
DOD Mission Area: #371 - Self-Protection Budget Activity: #4 - Tactical Programs

Development and production validation testing was performed on the ground radar emitter training for aviators (GRETA) followed by fielding in FY 1981. The SEMA version of the ALQ-156 missile detector and the improved low speed/hover IR suppressor for the UH-EH-60 BLACKHAWK helicopter entered engineering development in FY 1978 and continued in FY 1981. The Army joined the Navy for codevelopment of the ALQ-162 CW (continuous wave) radar jammer in 1980 with production scheduled for 1983. The above equipment is being adapted as appropriate by other services in accordance with Triservice Memorandum of Agreement. Production programs are planned and programed by the Navy for Marine use of the APR-39(V)1 and (V)2 radar warning receiver, ALQ-144 IR jammer, the ALQ-136(V)1 radar jammer, and the AVR-2 laser warning receiver.

2. (U) FY 1982 Program: The FY 1982 program continues the engineering development for the AVR-2 laser warning receiver, the ALQ-156 missile detector for Special Electronic Mission Aircraft (SEMA) applications, the improved low speed/hover IR suppressor for the UH/EH-60 BLACKHAWK helicopter, and the joint development with the Navy of the ALQ-162 CW radar jammer. Engineering development will be initiated for the advanced threat radar warning receiver (AT APR-39) update for adding millimeter wave warning for tactical aircraft production validation testing will be conducted for the ALQ-136(V)1 radar jammer. Engineering development will be initiated for an airborne intercept SEMA configuration of the ALQ-136 radar jammer (ALQ-136).

3. (U) FY 1983 Planned Program: Program plan completes development of the AVR-2 laser warning receiver, the ALQ-162 CW radar jammer, and the low airspeed improvement to the ALQ-147A infrared jammer; continues engineering development for the millimeter wave frequency extension to the AT APR-39 for tactical aircraft; continues development of the ALQ-156 missile detector, the AT ALQ-136 radar jammer for Special Electronic Mission Aircraft and the hover IR suppressor subystem for UH/EH-60 series aircraft; initiates the engineering phase of the fire retardant (SAVIM) application to the AH-1S aircraft; initiates engineering development of the DRFM (digital memory) monopulse and millimeter frequency extension submodules for the AT ALQ-136 radar jammer for both SEMA and tactical aircraft application.

4. (U) FY 1984 Planned Program: This program completes the development of the BLACKHAWK hover IR suppressor subsystem; continues the ALQ-156 missile detector and AT ALQ-136 radar jammer airborne intercept submodule for SEMA aircraft; continues the AT ALQ-136 radar jammer and AT APR-39 radar warning receiver for tactical and SEMA aircraft applications; production validation testing will be conducted for the ALQ-156 (V)1 missile detector and the APR-39(V)2 radar warning receiver; continues the AH-1S SAVIM program; continues the development for the millimeter wave extension for the AT APR-39 radar warning receiver for tactical aircraft.

Program Element: #6.47.11.A
DOD Mission Area: #371 - Self-Protection

Title: Aircraft Survivability Equipment (ASE)
Budget Activity: #4 - Tactical Programs

5. (U) Program to Completion: Because of the changing threat to aircraft, this is a continuing program. Upon successful completion of those ASE equipments previously initiated, production followed by fielding will be initiated and completed.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.12.A Title: USA Tactical Command, Control, and Communications 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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
10120	TOTAL FOR PROGRAM ELEMENT	9578	8110	14900	23021	Continuing	Not Applicable
D323	System Engineering for Tactical C^3 Systems	8846	5961	12605	18080	Continuing	Not Applicable
D324	USA/NATO Tactical C^3 Systems Interoperability	732	2149	2295	4941	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 C^3 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 (C^3) 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 C^3 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.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Project D323 efforts will include: Completion of Baseline and Objective portions Top-Level C^3 Specifications, Fire Support and Maneuver Control Functional Segment Specifications, and a number of

Program Element: #6.47.12.A Title: USA Tactical Command, Control, and Communications Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

Operational-Level Specifications. Completed Phase I and began Phase II transition plans for Top-Level C^3 and Functional Segment Specifications. Begin remaining Operational-Level Specifications. Together, these specifications will technically define the given phases of deployment of the Army's Command, Control, and Communications (C^3) Systems. They will provide basis for interface retrofits to existing systems, and guide future systems to obviate the need for such retrofits. Also in FY83 will be the completion of additional interface specifications, development of interface hardware and software, and testing/verification of interfaces. Project D324 efforts include the continuation of development of the NATO Rationalization, Standardization, and Interoperability Plan for the US Army Tactical Command, Control, and Communications System Acquisition, and the completion of the technical interface design plans and associated interface specifications for US Army Tactical Computer System/Tactical Computer Terminal (TCS/TCT) interoperability with the German and British equivalent systems (Heros and Wavell). Efforts will also be pursued to establish a test program for demonstrating USA Tactical Fire Direction System (TACFIRE) compatibility and interoperability with the German and British equivalent systems (ADLER and BATES). Work will also be devoted to the development, coordination, presentation, and defense of US Army technical positions concerning proposed interoperability standards for NATO national tactical data systems, combat net radio systems, and tactical switched systems.

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
a. (U) Publish First Edition of Army Command and Control System (ACCS) Materiel Development/ Materiel Development Plan	FY 82	See Note
b. (U) Establish ACCS Configuration Control Board	FY 82	FY 81
c. (U) Complete Baseline and Objective Portions of Army Command and Control Systems Specifications, all levels	FY 83	FY 82

Program Element: #6.47.12.A Title: USA Tactical Command, Control, and Communications Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
d. (U) Complete Positioning, Locating, Reporting System/Joint Tactical Information Distributing System (PLRS)/(JTIDS) Hybrid Jamming Vulnerability and Spoofing Vulnerability Assessment	FY 83	FY 81/FY 82
e. (U) Complete Transition Phase I Portions of ACCS Functional Segment Specifications and Top-Level C^3 Specifications	FY 83	FY 83
f. (U) Complete PLRS/JTIDS Hybrid System Feasibility Analysis	FY 84	FY 84
g. (U) Develop TACFIRE Battalion level software tape for joint US/German requirements. Hold US/GE functional fire support demonstration.	FY 82	Not Shown

Note: Milestone a: shown last year as Materiel Development Plan, due FY81. Materiel Development Plan is now to be combined with Combined Arms Combat Development Agency's (CACDA) Combat Development Plan. Milestone b: Not needed yet. Milestone c: Insufficient personnel forced slip. Milestone d: Jamming vulnerability assessment done for individual equipment, but system assessments could not begin pending system definition.

Program Element: #6.47.12.A Title: USA Tactical Command, Control, and Communications Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE 6.47.12.A					
Funds (current requirements)	9578	8110	14900	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	10400	8128	19978	Continuing	Not Applicable

The decreases in funding level for FY81 and FY83 are due to overall reprograming to higher Army priorities.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands): Not Applicable.

Program Element: #6.47.12.A Title: USA Tactical Command, Control, and Communications Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The design and development of the Army command, control, 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 C^3 system. These requirements have been documented in the Army Command and Control Master Plan (AC2MP) and other sources. Project D323 is the principal vehicle for carrying out Army Command and Control System (ACCS) systems engineering responsibilities assigned by the AC2MP to DARCOM (and largely, in turn, to CENSEI). Project effort to accomplish this includes: (1) develop a family of tactical C^3 Systems Specifications consisting of a Top-Level C^3 System Specificatic Functional Segment and Operational-Level Systems Specifications, and Interface Specification/Development/Testing; (2) perform Systems Engineering Support for PLRS/JTIDS Hybrid System to ensure that it adequately satisfies Army operational requirements and is properly integrated in Army C^3 system; (3) provide engineering analyses for frequency allocations of Army Communications-Electronics; (4) provide systems engineering for CECOM programs. The objective of Project D324 is to define levels of NATO National Tactical Data Systems interoperability in order to insure that the NATO combat forces can operate effectively as part of a multinational force. The Culver-Nunn Amendment of 1975 emphasized the intent of Congress that equipment for US Forces in NATO should be standardized or at least made interoperable with that of other NATO nations to the maximum extent possible. In order to realize these objectives, it is essential that system engineering design controls be applied to ongoing and planned US Army tactical data system projects concurrently with the development of system engineering interoperability plans. This approach will serve to guide all current/future US Army tactical data equipment/system design activity in satisfaction of Congressional mandate, so as to maximize the operational effectiveness of combined NATO National tactical forces deployment. Both the system engineering plan and the interoperability plan will be integrated as much as possible with counterpart plans at the Joint and Intra-Army levels.

G. (U) RELATED ACTIVITIES: This program is related to interoperability of Tactical Command and Control Systems (JINTACCS) program (6.47.79.A). JINTACCS efforts drive towards joint interoperability (interoperability across Service lines), while this program moves towards Army interoperability (within the Army), thus complementing JINTACCS by building on their standards to cover Army-unique requirements.

H. (U) WORK PERFORMED BY: Contractors: BDM Corp., McLean, VA, and Norfolk, VA; MITRE Corp., McLean, VA; and Calculon, Arlington, VA. In-house organization: US Army Communications-Electronics Command (CECOM) Elements, Ft Monmouth, NJ, et al.

Program Element: #6.47.12.A Title: USA Tactical Command, Control, and Communications Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments:

a. (U) Project D323 was first funded in FY80 and the following were among accomplishments: Completed Interface Development Management Plan; completed draft Interface Specifications for selected fire control, air defense, and information systems. Drafted portions of Top-Level C^3 Specification, Maneuver Control and Fire Support Functional Segment Specification, and selected Operational-Level Specifications. Performed functional analyses to support Functional Segment Specifications.

b. (U) Project D324 was first funded in FY81 and the following was accomplished: Participated in bilateral efforts to insure interoperability between: US TACFIRE and UK BATES/West German ADLER artillery fire support systems, US SIGMA and West German HEROS operations tactical data systems. Initiated development of US SIGMA interface with UK WAVELL (operating tactical data systems). Supported preparation of Interface Management Plan and Memorandum of Understanding. Supported completion of SIGMA-HEROS Technical Interface Design Plan and Configuration Management Plan and initiation of hardware and software development to implement same.

2. (U) FY 1982 Program:

a. (U) For Project D323: Finalize Interface Specifications listed above, and prepare selected others. Test TACFIRE/MLRS interface. Substantially complete drafts of Baseline and Objective portions of Top-Level C^3 Specification, Fire Support and Maneuver Control Functional Segment Specification, and selected other specification portions. Continue FLRS/JTIDS Hybrid assessments, frequency engineering, and CECOM systems engineering activities.

b. (U) For Project D324: NATO conferences/meetings will be attended to include the Allied Tactical Data Systems Interoperability Agency Military Command, Control and Information Systems Working Group and STANAG Subgroups to discuss and plan for interoperability of various systems (specifically TACFIRE and British and German equivalent systems). For those Army systems identified, technical Interface Design Plan (TIDP) development and Compatibility and Interoperability (C&I) test planning are being initiated. Planning will also begin for Configuration Management of Army systems which will be effected by NATO interoperability requirements.

Program Element: #6.47.12.A Title: USA Tactical Command, Control, and Communications Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

3. (U) FY 1983 Planned Program:

a. (U) For Project D323: Completion of Baseline and Objective portions Top-Level C^3 Specification, Fire Support and Maneuver Control Functional Segment Specifications, and a number of Operational-Level Specifications. Complete Phase I and begin Phase II transition plans for Top-Level C^3 and Functional Segment Specifications. Begin remaining Operational-Level Specifications. Together, these specifications will technically define the given phases of deployment of the Army's Command, Control, and Communications (C^3) Systems. They will provide basis for interface retrofits to existing systems, and guide future systems to obviate the need for such retrofits. Also in FY83, will be the completion of additional interface specifications, development of interface hardware and software, and testing/verifications of interfaces. PLRS/JTIDS Hybrid System Engineering will continue order to insure objective assessment and system consistency for this data-handling equipment in the C^3 system; FY83 products will include establishment of system feasibility and completion of PLRS/JTIDS Hybrid Integrated System Control Design Specification.

b. (U) For Project D324: Those Army systems which are planned to be interfaced with the various NATO C^3 tactical data systems include the following: US Army Tactical Fire Direction System (TACFIRE) with its British and German equivalents, Missile Minder (AN/TSQ-73) with its German equivalent, and the tactical operational center automated system for Corps and the supporting elements with its British and German equivalents. Technical Interface Design Plan development will commence, and compatibility and interoperability (C&I) test planning for these system interfaces will continue throughout FY83. Configuration Management planning will continue, a preparation will begin for modifications to the Army interoperability testbed. The NATO Rationalization, Standardization, Interoperability Plan for US Army Tactical Command, Control, and Communications System Acquisition will be completed and updated.

4. (U) FY 1984 Planned Program:

a. (U) For Project D323: Complete/maintain specifications. Continue interface development/verification, frequency engineering, PLRS/JTIDS engineering, and systems engineering activities. Complete automation of Army frequency allocation analysis.

b. (U) For Project D324: Those Army systems which are planned to be interfaced with the various NATO C^3 tactical data systems include the following: US Army Tactical Fire Direction System (TACFIRE) with its British and German

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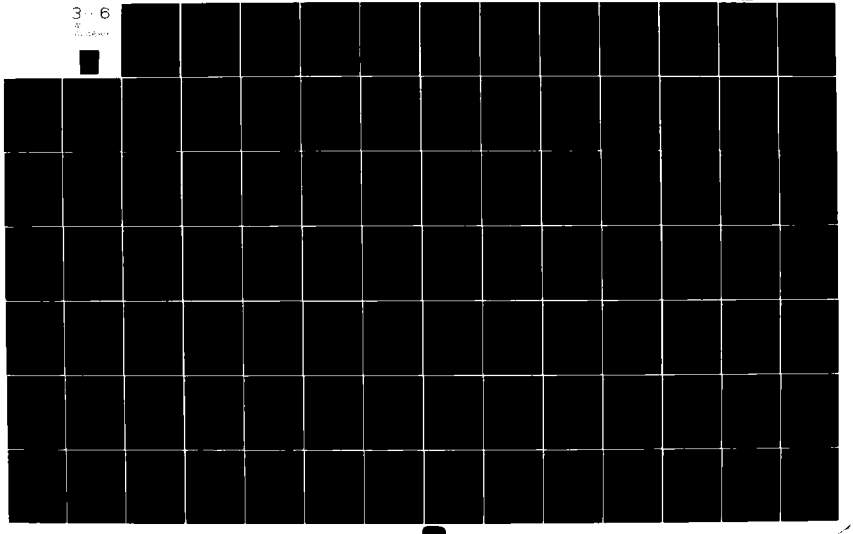

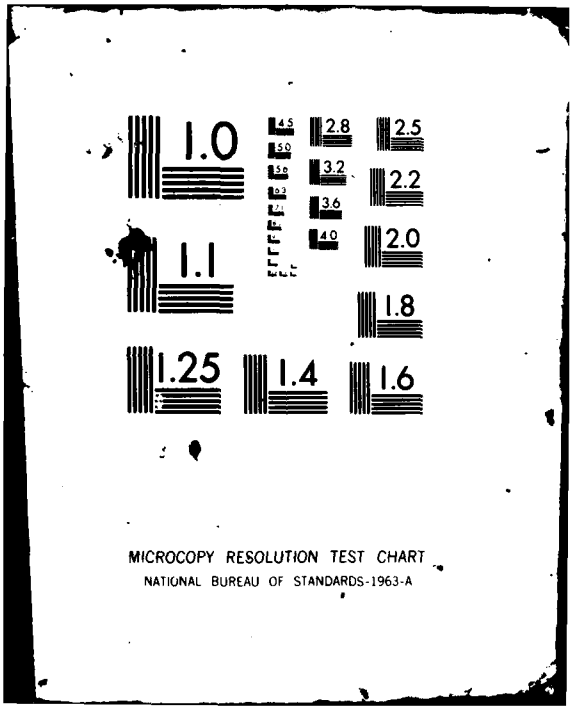
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Program Element: #6.47.12.A Title: USA Tactical Command, Control, and Communications Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

equivalents, Missile Minder (AN/TSQ-73) with its German equivalent, and the tactical operational automated system for Corps and the supporting elements with its British and German equivalents. Technical Interface Design Plan development will commence, and compatibility and interoperability (C&I) test planning for these system interfaces will continue throughout FY84. Configuration Management planning will begin for modifications to the Army interoperability testbed.

5. (U) Program to Completion: This is a continuing program. The resultant set of specifications will be updated as necessary, under a formal configuration control process, to reflect changes in user needs and doctrine. It is anticipated that new automated command, control and communication system elements will be introduced and those in the field will be changed/updated. Therefore there will be a continuing need for configuration management for developmental and operational systems.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D323 Title: Systems Engineering for Army Tactical Command, Control, and Communications (C^3) Systems

Program Element: #6.47.12.A Title: USA Tactical C^3 Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

A. (U) DETAILED BACKGROUND AND DESCRIPTION: 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. This involves supervision and management of considerable volumes of information. The combat developer makes a strong case for modern command, control, and communications (C^3) systems and facilities to respond to the ever-increasing capabilities of the enemy threat. These needs, when addressed in view of fiscal and engineering realities, result in a challenge to the materiel developer to provide the required materiel to the Army inventory without adversely affecting the near-term readiness of the tactical force. 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, 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 C^3 system. Project effort to accomplish this includes: (1) Developing a family of tactical C^3 Systems Specifications consisting of top-level C^3 System Specifications, Functional Segment and Operational Level Systems Specifications, and Interface Specification/Development/Testing; (2) providing engineering analyses for frequency allocations of Army Communications-Electronics; (3) providing systems engineering for Communications Electronic Command (CECOM) programs.

B. (U) RELATED ACTIVITIES: This program is related to the Joint Interoperability of Tactical Command and Control Systems (JINTACCS) program (6.47.79.A). 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 which 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.

C. (U) WORK PERFORMED BY: Contractors: BDM Corp, McLean, VA, and Norfolk, VA; MITRE Corp, McLean, VA; and Calculon, Arlington, VA. In-house organization: US Army Communications Electronics Command (CECOM) Elements, Ft Monmouth, NJ, et al.

Project: #D323 Title: Systems Engineering for Army Tactical Command, Control, and Communications (C^3) Systems

Program Element: #6.47.12.A Title: USA Tactical C^3 Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Work covered a variety of tasks, some of which were:

a. (U) Completed Interface Development Management Plan. Completed draft Interface Specifications for: Fire Control, Air Defense, and Information Systems.

b. (U) Drafted portions of Top-Level C^3 specification, Maneuver Control and Fire Support Functional Segment Specification, and selected Operational Level Specifications. Performed functional analyses to support Functional Segment Specifications.

c. (U) Completed initial system definition assessment, net management concept, and other tasks for Position, Locating, & Reporting System/Joint Tactical Information Distribution System (PLRS/JTIDS) Hybrid System Engineering Assessment.

d. (U) Provided engineering review for numerous Army combat and noncombat systems for purposes of frequency management.

2. (U) FY 1982 Program: Finalize Interface Specifications listed above, and prepare selected others. Test Tactical Fire Direction System (TACFIRE)/Multiple Launch Rocket System (MLRS) interface. Substantially complete drafts of Baseline and Objective portions of Top-Level C^3 Specification, Fire Support and Maneuver Control Funtional Segment Specifications. Begin additional operational level specifications. Continue PLRS/JTIDS Hybrid assessments, frequency PLRS/JTIDS Hybrid frequency engineering, and CECOM systems engineering activities.

3. (U) FY 1983 Planned Program: Completion of Baseline and Objective portions of Top-[illegible] Specification, Fire Support and Maneuver Control Functional Segment Specifications, and a number of Operational [illegible]fications. Complete Phase I and begin Phase II transition plans for Top-Level C^3 and Functional Segment Specifica[illegible]gin remaining Operational Level Specifications. Together, these specifications will technically define the giv[illegible]ases of deployment of the Army's Command, Control, and Communications (C^3) Systems. They will provide the basis for interface retrofits to

Project: #D323 Title: Systems Engineering for Army Tactical Command, Control, and Communications (C^3) Systems

Program Element: #6.47.12.A Title: USA Tactical C^3Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

existing systems, and guide future systems to obviate need for such retrofits. Also in FY83 will be the completion of additional interface specifications, development of interface hardware and software, and testing/verification of interfaces. PLRS/JTIDS Hybrid System Engineering will continue in order to insure objective assessment and system consistency for this data-handling equipment in the C^3 system; FY83 products will include establishment feasibility and completion of PLRS/JTIDS Hybrid integrated system control design specification. Engineering analysis will be done to obtain worldwide approval of frequency allocations for peacetime and wartime applications of Army communications-electronics equipment in development and procurement (ongoing); an automation of Army allocation analyses will be initiated. Systems engineering will assure satisfaction of TRADOC Technical Interface Requirements, agreed interface specifications, and other issues such as those resulting from integration of TRI-TAC equipment into tactical communications.

4. (U) FY 1984 Planned Program: Complete/maintain specifications; specifically, complete transition Phase II on Top-Level C^3 and other specifications. Continue interface development/verification, frequency engineering, PLRS/JTIDS engineering, and systems engineering activities. Complete automation of Army frequency allocation analysis.

5. (U) Program to Completion: This is a continuing program, with some subtasks concluding and others expanding. Completed specifications are configuration controlled, undergoing updates to reflect changes in doctrine and introduction of new generations of C^3 equipment.

Project: #D323 Title: Systems Engineering for Army Tactical Command, Control, and Communications (C^3) Systems

Program Element: #6.47.12.A Title: USA Tactical C^3Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

6. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
a. (U) Publish First Edition of Army Command and Control Systems (ACCS) Combat Development/Materiel Development Plan	FY82	See Note
b. (U) Establish ACCS Configuration Control Board	FY82	FY81
c. (U) Complete Baseline and Objective Portions of Army Command and Control Systems Specifications, all levels	FY83	FY82
d. (U) Complete PLRS/JTIDS Hybrid Jamming Vulnerability and Spoofing Vulnerability Assessment	FY83	FY81/FY82
e. (U) Complete Transition Phase I Portions of ACCS Functional Segment Specifications and Top-Level C^3 Specifications	FY83	FY83
f. (U) Complete PLRS/JTIDS Hybrid System Feasibility Analysis	FY84	FY84

Milestone a: shown last year as Materiel Development Plan, due FY81. Materiel Development Plan is now to be combined with Combined Arms Combat Development Agency (CACDA) Combat Development Plan. Milestone b: Not needed yet. Milestone c:

Project: #D323 Title: Systems Engineering for Army Tactical Command, Control, and Communications (C^3) Systems

Program Element: #6.47.12.A Title: USA Tactical C^3Systems Engineering

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

Insufficient personnel forced slip. Milestone d: Jamming vulverability assessment done for individual equipment, but system assessments could not begin pending system definition.

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	8846	5961	12605	18080	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	8589	5973	14789	-	Continuing	Not Applicable

Increase of $257K in FY81 funding level is a result of reprograming to provide additional support to PLRS/JTIDS and minimal support to involved project managers. FY83 funding reduced due to other higher priorities.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.13.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	1951	2531	2574	5276	Continuing	Not Applicable
D540	Clothing and Equipment	1215	1672	2367	4445	Continuing	Not Applicable
D548	Military Subsistence System	736	859	207	831	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 plans for the correction and improvement of that part of the combat support system which provides for the basic needs of the individual soldier: food, clothing, shelter, chemical, biological, ballistic, and camouflage protection. It includes the development and improvement of special items of individual clothing and equipment required for the mechanized and foot soldier on the integrated battlefield for operations in extremes of terrain and climate, and for protection of ground combat vehicle crewman against ballistic, chemical, acoustic, and flame hazards; the improvement of field food service equipment, fabric field shelters, field service equipment, and field printing equipment; and the evaluation of domestic and foreign food service equipment for effectiveness in meeting military food system requirements to avoid the expense of in-house research and development. This request provides for Navy, Air Force, and Marine Corps 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 for all the military services and the Defense Logistics Agency (DLA).

C. (U) BASIS FOR FY 1983 RDTE REQUEST: 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 (ED) on items transitioning from Advanced Development programs. The improvements planned under this program will incorporate the latest developments in material and equipment design and are expected to significantly increase individual combat efficiency under the diverse geographical and climatological battlefield conditions. Food service developments in this and related Program Elements (PE's) provide for more efficient and cost-effective provision of this

Program Element: #6.47.13.A
DOD Mission Area: #215 - Land Warfare Support

Title: Combat Feeding, Clothing, and Equipment
Budget Activity: #4 - Tactical Programs

vital element of life support systems for the Joint Services under conditions of peacetime training, emergency deployment, and combat. The work to be performed under this request allows for exploitation of methods, materials, and capabilities developed under related basic research programs and deemed suitable for Engineering Development prior to adoption as Standard.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1951	2531	2574	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	2349	3536	4207	Continuing	Not Applicable

(U) Reduction of $398 thousand in the FY 1981 funding level is a net result of an increase in Project DL40, Clothing and Equipment, to support a high-priority effort for cold weather protective clothing, and a decrease in Project D548, Military Subsistence System, due to reprograming to higher priority Army requirements.

(U) Funding decrease of $1005 thousand in FY 1982 is a result of the amended budget request, the application of revised inflation indices, and a Congressionally directed decrease.

(U) The reduction of $1633 thousand in the FY 1983 funding level is the result of reduction in program scope to fund higher priority Army requirements.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.47.13.A
DOD Mission Area: #215 - Land Warfare Support

Title: Combat Feeding, Clothing, and Equipment
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: This program provides for the development of individual combat protective clothing and equipment to increase the soldier's combat efficiency and survivability on the battlefield. It includes the Engineering Development (ED) of operational rations and food service equipment, and development of improved field shelters. The projects within this Program Element directly affect the soldier's safety, effectiveness, and survivability. This is the final stage of development for items transitioning from Advanced Development Program Elements comprising the Army clothing, individual equipment, and DOD food system development programs.

G. (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. The Army has overall responsibility, to include funding, for the Department of Defense (DOD) Food, Research, Development, Testing, and Engineering (RDT&Eng) Program, which includes specific efforts to respond to DOD and the Joint Services' requirements. Related work in clothing and equipment is conducted in PE 6.27.23.A, Clothing, Equipment, and Shelter Technology; PE 6.37.47.A, Soldier Support/Survivability, Project D669, Clothing and Equipment. Work in foods is conducted in PE 6.11.02.A, Support of Equipment for the Individual Soldier, Project AH52, Research in Support Equipment of Individual Soldier; in PE 6.27.24.A, Joint Services Food Systems Technology, Project AH99, Food Technology; and in PE 6.37.47.A, Soldier Support/Survivability, Project D610, Food Advanced Development.

H. (U) WORK PERFORMED BY: The US Army Natick Research and Development Laboratories, Natick, MA, performs the majority of in-house efforts. Other Government facilities involved are: US Army Human Engineering and Chemical Systems Laboratories, Aberdeen Proving Ground, MD; US Army Test and Evaluation Command, Aberdeen Proving Ground, MD; US Army Cold Regions Test Center, Fort Greely, AK; US Army Research Institute of Environmental Medicine, Natick, MA, and US Department of Agriculture, Stored Products laboratory, Savannah, GA. Current contractors include Arthur D. Little, Cambridge, MA; Brunswick Corp., Willard, OH; Bjorksten Labs, Madison, WI; Reynolds Metals, Richmond, VA; and Dake Division of JSJ Corp., Grand Haven, MI.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Continued development of: face mask for Combat Vehicle Crewman (CVC) clothing system; body armor and helmet for Explosive Ordnance Disposal (EOD) personnel; and combat boot for ground soldiers. Initiated production test of the Personnel Armor System for Ground Troops (PASGT) helmets and first production buy of the PASGT vest. Conducted tropic test of Battle Dress uniform to determine suitability in tropic environment. Awarded

Program Element: #6.47.13.A
DOD Mission Area: #215 - Land Warfare Support

Title: Combat Feeding, Clothing, and Equipment
Budget Activity: #4 - Tactical Programs

contracts for development of: Insulated canteen; fuel handler's gloves; and extreme cold weather flyer's gloves. Completed fabrication of prototype extendable, modular, personnel tents for development and operational tests. Completed development of United States Marine Corps field refrigeration equipment. Evaluated foreign and domestic food service equipment for potential use in the field, garrison, and hospital food service system applications.

2. (U) FY 1982 Program: Conduct operational and development testing of a new infantry combat boot with superior water-repellent and infrared properties. Initiate development of: gloves for use by aircrewmen in extreme cold weather; body armor for use by explosive ordnance disposal units; protective helmet for combat vehicle crewmen and artillerymen; aircrew torso body armor (.50 caliber armor) and helmet-compatible communicative/aural protection system. Complete testing of gloves to protect POL handlers in cold weather and type classify. Continue development of the insulated canteen to provide troops with water in a liquid state in extreme cold climates. Initiate and complete development and operational test of the extendable, modular personnel tent, and type classify. Initiate engineering development of special kits for use with the new extendable, modular personnel tent to provide new capabilities for medical needs and chemical agent protection. Initiate engineering development of a 12.7mm protective insert required for protection of aircrewmen. Evaluate foreign and commercial food service equipment for military services in garrison. Initiate engineering development for the Air Force field feeding system. Continue insect-resistance testing of protective packaging materials for incorporation in the procurement of the new Meal-Ready-to-Eat (MRE) individual combat ration.

3. (U) FY 1983 Planned Program: Complete development of new infantry combat boot and type classify. Complete engineering development of gloves for use by aircrewmen in extreme cold weather. Complete engineering development of the insulated canteen for use in extreme cold climates. Continue engineering development of: the helmet for use by combat vehicle crewmen and artillerymen; the transportable helicopter enclosure; special kits for use with the extendable modular personnel tent and the helmet-compatible communications/aural protection system. Initiate engineering development on: the microclimate cooling system for armor vehicle crewmen and the medium-weight printing plant for use in psychological warfare operations. Continue engineering development of the Air Force field feeding equipment. Continue evaluation of selected domestic and foreign food service equipment for potential use in garrison and/or field food service systems. Continue insect-resistance testing of MRE package. Initiate engineering development on the Army Combat Field Feeding System Equipment.

4. (U) FY 1984 Planned Program: Complete testing of body armor for aircrewmen and explosive ordnance disposal units and type classify. Continue testing the helmet for combat vehicle crewmen and artillerymen. Complete testing of the

Program Element: #6.47.13.A
DOD Mission Area: #215 - Land Warfare Support

Title: Combat Feeding, Clothing, and Equipment
Budget Activity: #4 - Tactical Programs

transportable helicopter enclosure, and type classify. Continue procurement of prototypes and testing of special kits for the extendable personnel tent. Develop and test prototypes of the microclimate cooling system for armor vehicle crewmen. Continue testing of the helmet-compatible communications/aural protection system and the medium-weight field printing plant. Initiate development of: the cold weather clothing system for aircrewmen to effect a 30% weight reduction; aircrew survival vest; special ladderweave clothing; nuclear, biological, and chemical agent-protective cover and safety helmet for ground troops. Complete testing of the 12.7mm protective insert. Initiate engineering development on ground-launched Cruise Missile food service system. Continue engineering development of the Air Force field feeding system and Army Combat Field Feeding System Equipment. Continue evaluation of domestic and foreign food service equipment for possible services' application.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.14.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3061	1533	1805	5962	Continuing	Not Applicable
	QUANTITIES						Not Applicable
D194	Engine-Driven Generators	0	0	0	0	Continuing	Not Applicable
D196	Silent Power Generating Sources	3061	1533	1805	5962	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 10 kW, have low power efficiency, 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) BASIS FOR FY 1983 RDTE REQUEST: Funding is required to continue the development of the 1.5 kilowatt (kW) methanol fuel cell member of a family of silent power generation equipment. Key milestones for the 1.5 kW fuel cell are:

Program Element: #6.47.14.A
DOD Mission Area: #215 - Land Warfare Support

Title: Tactical Electric Power Sources
Budget Activity: #4 - Tactical Programs

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Complete test model design/fabrication	1st Qtr FY 1982	4th Qtr FY 1981
Complete development and operational tests	3rd Qtr FY 1983	3rd Qtr FY 1983
Development acceptance in-process review	2nd Qtr FY 1984	2nd Qtr FY 1984

The one-quarter delay of the expected completion of the test model fabrication has been caused by minor technical difficulties and supplier delays in delivery.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST ($ in thousands):

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	3061	1533	1805	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	3292	2144	4636	Continuing	Not Applicable

D194-$452 thousand in FY 1981 funds was reprogramed to higher priority Army requirements. The decrease of $608 thousand in the FY 1982 funding level is the result of the amended FY82 budget request. A reduction of $375 thousand in FY 1983 funds is the result of a decrease in the scope of the planned effort to fund other higher priority Army requirements.

D196 - A $221 thousand increase in FY 1981 reflects higher actual project costs than previously estimated. The decrease of $3 thousand in FY 1982 is the result of the amended budget request and the application of revised inflation indices. A reduction of $2456 thousand in FY 1983 funds reflects deferral of the start of full-scale development of the 3kW methanol fuel cell due to delay in completing prerequisite Advanced Development.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands) Not Applicable.

Program Element: #6.47.14.A Title: Tactical Electric Power Sources
DOD Mission Area: #215 - Land Warfare Support Budget Activity: #4 - Tactical Programs

F. (J) DETAILED BACKGROUND AND DESCRIPTION: This program supports development of power generation and related equipment to satisfy the Army's requirements for efficient and reliable tactical mobile electric power. Items of power generation equipment developed under this program are considered as individual systems within the Army and have general-purpose application. The program provides the major development thrust toward achieving Department of Defense goals for maximum standardization of power generation equipment with attendant benefits of commonality of components, reduced logistics support requirements, and lower life cycle costs. The program encompasses the development, within the prescribed Department of Defense family of generators, of engine-driven generators (gasoline, diesel, gas turbine, and other advanced combustion engine sets), fuel cell units for silent power generation, and power conditioning devices. Objectives of the program are to develop generator sets which are lighter weight for increased mobility, lower in life cycle costs, more fuel efficient, quieter, longer in life, higher in reliability, and with lower thermal signatures.

G. (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 6.11.02.A, Project AH47, Electronic Devices Research, and Project AH51, Combat Support. Exploratory development is conducted in Program Element 6.27.33.A, Mobility Equipment Technology. Advanced development is conducted in Program Element 6.37.02.A, Electric Power Sources.

H. (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.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: A contract for the fabrication of the 1.5kW methanol fuel cell member of the Silent Lightweight Electric Energy Plant family was awarded. Phase I design and analysis and component development and testing have been completed. Phase II fabrication of contractor performance qualification hardware was initiated.

2. (U) FY 1982 Program: Full-scale development of the 1.5kW methanol fuel cell power plant will be continued, and contractor preliminary qualification testing of the Phase II prototypes will be accomplished. In addition, the Development Test (DT) II units will be fabricated and DT II initiated.

Program Element: #6.47.14.A Title: Tactical Electric Power Sources
DOD Mission Area: #215 - Land Warfare Support Budget Activity: #4 - Tactical Programs

3. (U) FY 1983 Planned Program: DT II of the 1.5kW methanol fuel cell will be completed. Operational Test (OT) II will then be accomplished and the documentation prepared for the Development Acceptance In-Process Review (DEVA IPR), the final decision point in the development process.

4. (U) FY 1984 Planned Program: The 3.0kW methanol fuel cell (MFC) will begin engineering development. The 1.5kW MFC will be reviewed for acceptance (type classification) as a Standard Army item.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.17.A 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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	8748	8001	5967	11600	Continuing	Not Applicable
DH01	Combat Engineer Equipment	69	1662	1042	3548	Continuing	Not Applicable
DL39	General Support Equipment	3103	2554	2521	1425	Continuing	Not Applicable
DL41	Fuels Handling Equipment Systems	0	0	0	3582	Continuing	Not Applicable
D429	Tactical Rigid-Wall Shelters	4682	2636	1115	1642	Continuing	Not Applicable
D832	Combat Medical Materiel	894	1149	1289	1403	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 capabilities to the current and future battlefield. The effectiveness and survivability of the combat forces in a hostile situation is highly dependent on the capabilities to supply vital cargo. Fuel, ammunition, food, and medical supplies must be delivered to field units quickly and in the required quantities. Hardened shelters are required to preserve communications, command, and control capabilities in either a nuclear or nonnuclear battlefield environment. 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 new family of multiuse standard tactical shelters, hardened against nuclear, ballistic, and chemical/biological threats is required to protect sophisticated electronic equipment and operating personnel. New and more efficient environmental control equipment (heating/air-conditioning) is required. New and improved field casualty treatment systems are vital to maintaining combat effectiveness.

Program Element: #6.47.17.A Title: General Combat Support
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Funding is required to conduct Engineering Development (ED) of an assault bridge for the light force; a family of high-capacity water purification units; rapidly emplaceable petroleum pipeline and hoseline systems; a standard family of tactical shelters and hardened shelters to house critical communications, medical and electronics systems; and various equipment for field medical support in a combat environment.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	8748	8001	5967	Continuing	*Not Applicable*
Funds (as shown in FY 1982 submission)	11259	12018	14531	Continuing	Not Applicable

The net decrease of $2511 thousand in FY 1981 funding results from the reprograming of funds to higher priority Army requirements. The decrease is the combined effect of decreases in funding required in projects DH01, D429 and DL41, partially offset by a funding increase in DL39 to accelerate the development of a tactical water purification system.

The decrease of $4017 thousand in FY 1982 is a result of the amended budget request and the application of revised inflation indices.

The net decrease of $8564 thousand in FY 1983 funding requirement results from a decrease in the scope of planned effort in Projects DH01 and D429. The significant reduction in DH01 funding reflects the deferral of the international (US-United Kingdom-German) engineering development of new heavy force tactical bridging resulting from a recent reassessment of tactical bridging needs by the three nations.

Program Element: #6.47.17.A Title: General Combat Support
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost	
Other Procurement, Army							
Water Purification Unit 3000 gal/hr							
Funds (current requirements)	0	0	0	0	0	(1)	
Funds (as shown in FY 1982 submission)	0	0	9500	0	87780	97280	
Quantities (current requirements)	0	0	0	0	0	(1)	
Quantities (as shown in FY 1982 submission)	0	0	75	0	693	768	
Multifuel Heater, 250,000 BTUH							
Funds (current requirements)	0	0	0	0	0	(2)	
Funds (as shown in FY 1982 submission)	0	0	3000	0	66028	69028	
Quantities (current requirements)	0	0	0	0	0	(2)	
Quantities (as shown in FY 1982 submission)	0	0	670	0	14747	15417	
Hi-Speed Mini-Sterilizer							
Funds (current requirements)	0	0	784	1083	2227	4094	(3)
Funds (as shown in FY 1982 submission)	0	0	2300	0	0	0	

Program Element: #6.47.17.A Title: General Combat Support
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost	
Quantities (current requirements)	0	0	150	200	392	742	(3)
Quantities (as shown in FY 1982 submission)	0	0	742	0	0	0	
High Capacity Radiograph System							
Funds (current requirements)	0	0	8709	13534	17317	39560	(3)
Funds (as shown in FY 1982 submission)	0	8300	2700	0	0	0	
Quantities (current requirements)	0	0	100	150	185	435	(3)
Quantities (as shown in FY 1982 submission)	0	150	50	0	0	0	
Low-Capacity Radiograph System							
Funds (current requirements)	0	0	2090	4331	7310	13731	(3)
Funds (as shown in FY 1982 submission)	0	0	10360	0	0	0	
Quantities (current requirements)	0	0	100	200	323	623	(3)
Quantities (as shown in FY 1982 submission)	0	0	864	0	0	0	

(1) (U) The 3000/2000 gph Reverse Osmosis Water Purification Unit (ROWPU) development program is being restructured to include concurrent development of a mid-size ROWPU. Revised costs and quantities have not been established.

(2) (U) Procurement of 250,000 BTUH Multifuel Heater has been deferred indefinitely due to technical problems during developmental testing.

(3) (U) Since the 1982 submission, total requirements have been determined and the planned procurement restructured to provide the most cost effective acquisition.

ram Element: #6.47.17.A Title: General Combat Support
D Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

(U) DETAILED BACKGROUND AND DESCRIPTION: This program supports the Engineering Development (ED) of various items of at support and combat service support equipment that meet the Army's critical needs in logistics supply, mobility, tersurveillance, survivability, and field medical care. Specific activities conducted under this program essential to : requirements to support land combat and contingency operations include: capabilities for rapid combat engineer con- ıction; resupply of increasingly greater amounts of containerized cargo; mobile water purification units; environmental trol for shelters and vehicles housing critical electronic equipment and personnel in all climates; resupply and distri- lon to field elements of bulk fuels, oils, and lubricants (POL); tactical shelters to meet Department of Defense stand- lzation goals and to afford required protection of sensitive communication/electronic and medical systems; and equipment meet requirements for field medical care.

(U) RELATED ACTIVITIES: Close coordination is maintained with other services to avoid duplication, and to provide pro- m guidance, through the Joint Committee on Tactical Shelters, the Defense Medical Materiel Board, the Joint Container ering Group, the DOD Executive Agent for Land Based Water Resources, and the Program Advisory Group for Bulk Petroleum ls Distribution. The projects of this Program Element contain items and systems that have progressed to Engineering elopment (ED) from related Advanced Development Program Elements 6.37.26.A, Combat Support Equipment, and 6.37.32.A, bat Medical Materiel. Related exploratory development Program Elements include 6.27.23.A, Clothing, Equipment, and lter Technology; 6.27.33.A, Mobility Equipment Technology; and 6.27.72.A, Combat Casualty Treatment Technology.

(U) WORK PERFORMED BY: In-house work is performed at the US Army Mobility Equipment Research and Development Command, t Belvoir, VA; US Army Natick Research and Development Command, Natick, MA; and the US Army Medical Bioengineering search and Development Laboratory, Fort Detrick, MD. Current contractors include Raytheon Corporation, Bedford, MA; dyear Aerospcae, Litchfield Park, AR; Gichner Mobile Systems, Old Forge, PA; Craig Systems, Lawrence, MA; Dynamic lences Industries, Fairfax, VA; Seagold Industries, New Brunswick, Canada; and Barnes Engineering Co/General X-Ray rporation, Stamford, CT.

(U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Fourteen Military Amphibious Reconnaissance Boats were procured and tested determine conformance with joint Army, Navy, and Marine Corps requirements. Design of the 3000/2000-gallon-per-hour verse Osmosis Water Purification Unit (ROWPU) was completed. Developmental testing of the 250,000 British Thermal Unit r Hour (BTUH) Multifuel heater was terminated due to unresolved technical difficulties. Worldwide testing of the one-side

Program Element: #6.47.17.A Title: General Combat Support
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

expandable shelter was completed. Prototypes of the 20-foot nonexpandable and two-side expandable shelters were fabricated for test. Nuclear hardening of the S-250 and S-280 shelters continued. The optometry set, aid bag, and spine board were type classified. The environmental protection container for temperature-sensitive medical supplies has been redesigned to eliminate deficiencies detected during testing.

2. (U) FY 1982 Program: The Military Amphibious Reconnaissance Boat will be reviewed for type classification. Engineering development is expected to begin on a new assault bridge for the light force. Engineering Development of the one-side expandable shelter will be completed, and the shelter will be reviewed for type classification. Developmental testing of the 20-foot nonexpandable and two-side expandable shelters will be conducted. Nuclear hardening of the S250 and S280 shelters will be continued. In the combat medical materiel area, follow-on developmental and operational tests of the High-Capacity X-ray System will be conducted. Engineering development of the Low-Capacity X-ray System will begin, and the environmental protection containers will be reviewed for type classification.

3. (U) FY 1983 Planned Program: Engineering development will continue on the assault bridge for the light force. Developmental tests will be initiated on the mid-size Reverse Osmosis Water Purification Unit. Developmental tests will be completed on the 3000/2000-gallon-per-hour Reverse Osmosis Water Purification Unit, and operational test will be initiated. Developmental testing of mobilizers (transporters/dollies) for the family of military standard shelters will be completed. Engineering Development of the 20-foot nonexpandable and the two-side expandable shelters will be completed, and the shelters reviewed for type classification. Developmental and operational testing of the hardened S250 and S280 shelters will be conducted. Tests will be completed on the electromagnetic interference protection kits for the nonexpandable shelters. Operational and developmental testing of the High-Capacity X-ray System will be completed. Engineering development will begin on the field clinical analysis system and the field dental utility unit.

4. (U) FY 1984 Planned Program: Engineering development of the assault bridge for the light force will continue with the fabrication of prototype units for testing. Operational tests on the 3000/2000-gallon-per-hour Reverse Osmosis Water Purification Unit will be completed, the technical data package will be validated for production, and the program will transition to procurement. Developmental tests will be completed on the mid-size Reverse Osmosis Water Purification Unit, and operational tests will be initiated. Development of mobilizers for the new family of military standard tactical shelters is expected to be completed. The nuclear-hardened S250 and S280 shelters will be reviewed for type classification. Development of the electromagnetic interference kits for nonexpandable shelters is expected to be completed. Fabrication of a hardened 20-foot nonexpandable shelter is scheduled to be initiated. The High-Capacity X-Ray System will be reviewed

Program Element: #6.47.17.A Title: General Combat Support
DOD Mission Area: #213 - Land Combat Engineer Support Budget Activity: #4 - Tactical Programs

for type classification. Engineering Development will continue on the field clinical analysis system and the field dental utility unit.

5. (U) Program to Completion: This is a continuing program. Engineering Development of various items will be conducted as they progress from associated Advanced Development programs.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.18.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	6147	5761	5099	6157	Continuing	Not Applicable (Not Feasible to List)
DL82	Physical Security	6147	5761	5099	6157	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The objective of this program element is to conduct engineering development of physical security equipment used to provide protection for critical areas, installations, 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) BASIS FOR FY 1983 RDTE REQUEST:

1. (U) Complete fabrication of Engineering Development (ED) Models of the Interim Facility Intrusion Detection System (FIDS) sensors, the sensor self-test subsystem, and audio surveillance device, and the control, communication, and display subsystem (CCDS), which was not completed in FY82 due to contract delays. Complete Army test and evaluation of the Interim FIDS. Individual components as well as an integrated system will be evaluated. Development Test II will be conducted at the Electronics Proving Ground, Fort Huachuca, AZ. Operational Test II will be conducted at the US Army Communication Electronics Board (USACEBD), Ft. Gordon, GA. These Interim FIDS components will be type classified in FY84. Continue Engineering Development of the Advanced FIDS components: Redundent Console, control unit with Redundent channels, multi-area control unit, Small Area Console, Remote Displays (Monitor and Map), Interior and Exterior Interfaces between the Air Force's BISS and the FIDS, Radio Frequency Motion Sensor, CCTV Assessment Subsystem, Tower Console, Convert Duress Sensor, and the Tagged Material Detecter.

Program Element: #6.47.18.A
DOD Mission Area: #215 - Land Warfare Support

Title: Physical Security
Budget Activity: #4 - Tactical Programs

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Type Classify Advanced Facility Intrusion Detection System, Covert Duress Sens and Tagged Materiel Detector	FY84	Not Shown

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	6147	5761	5099	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	5832	5777	6213	Continuing	Not Applicable

FY81 increase due to reprograming to fund cost growth on the interim FIDS contract. FY82 decrease due to inflation and civilian pay index adjustments. FY83 decrease due to reprograming to higher priority areas.

Program Element: #6.47.18.A
DOD Mission Area: #215 - Land Warfare Support

Title: Physical Security
Budget Activity: #4 - Tactical Programs

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement, Army:						
Funds (current requirements)	8200	6500	3800	2500	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	8900	5700	2900	-	Continuing	Not Applicable

Decrease in FY81 due to reprograming. Increase in FY82 and FY83 are due to increase requirement for add-on components and spares.

Program Element: #6.47.18.A
Title: Physical Security
DOD Mission Area: #215 - Land Warfare Support
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Objective is to conduct all design, development, test, and evaluation required to provide the technological base and establish the concept feasibility necessary to proceed into engineering development of complete, integrated physical security systems to protect materiel, bases, facilities, installations, and personnel against theft, sabotage, or espionage. Developments will be directed towards satisfying the Navy, Air Force, and Army Materiel Need for an interior security system (Facility Intrusion Detection System (FIDS)), and their requirement for a Physical Security Lighting and Barrier System. The approach to advanced development is to provide a DOD system overview via systems analysis. Development will include the following: (1) sensors, including penetration, motion, item removal, duress, and contraband; (2) electronic data links, data link security supervisory components, and centralized data processing components; (3) alarm display, monitoring, and readout components; (4) physiological and/or psychological deterrent devices; (5) devices to protect cargo in depots or in transit by truck or ship; (6) devices to provide physical security for the rear area of deployed forces; (7) standardized securing equipment and locking hardware; and (8) exterior lighting and barrier systems. Interfaces necessary to integrate exterior sensors developed by the Air Force and potential shipboard security equipment components adopted by the Navy will also be developed in consonance with the direction from the Under Secretary of Defense (Research and Engineering) (memorandum of 26 July 1979) for the Army to "develop the command, control, and display subsystem (CCDS) of the Department of Defense standardized physical security equipment system; ensure that the CCDS has the capacity and design to manage all segments of the entire military/commercial security equipment land based systems." In addition, there will be a continuing evaluation of commercial physical security equipment as well as those items that might be developed by other government agencies.

G. (U) RELATED ACTIVITIES: The Interim Facility Intrusion Detection System (FIDS) is being developed under PE 6.47.18A, as directed by the Under Secretary of Defense in his above-referenced memorandum of 26 July 1979, 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.

Program Element: #6.47.18.A
DOD Mission Area: #215 - Land Warfare Support

Title: Physical Security
Budget Activity: #4 - Tactical Programs

H. (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, Ft. Monmouth, NJ. Major contractors are GTE Sylvania, Mountainview, CA, MELPAR, Falls Church, VA, and Southwest Research, San Antonio, TX.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments:

a. (U) Joint-Service Interior Intrusion Detection System (JSIIDS): Development of the J-SIIDS was initiated in December 1971 under the auspices of the Defense Special Projects Group (DSPG). Production contracts for all components were awarded during FY73, and Initial Operational Capability was achieved during 1QFY75. Additional buys were made in FY76 and FY77. Additional J-SIIDS components, including a commercial alarm monitor interface, a special-application alarm monitoring system, an alarm line security attachment, and remote resynchronization kit were Type Classified and a production contract awarded for these components during FY77. J-SIIDS development terminated in FY79.

b. (U) Facility Intrusion Detection System (FIDS): In FY78 the first DT II/OT II models of the Command, Control Display Subsystem (CCDS) were received and in-house evaluation initiated. Also in FY78 contract packages were prepared for complete DT II/OT II models of interim FIDS systems, including CCDS, sensor, stimuli, etc. Anticipated award in 4Q78 was delayed due to a Small Business Administration action (SBA-8A). The contract was awarded in 1Q79. The contract was modified in FY79 to include a Coder Multiplexer Sensor to Central Master Control interface. During FY80 and FY81, design and development continued on interim components. The contract efforts on Advanced Group I components were discontinued due to the impact of the interim components contract delays.

2. (U) FY 1982 Program: Initial deliveries of the Interim FIDS Components contract will be completed, and work will continue on the remaining items. The delivered items will undergo Engineering Development Test (EDT); contract efforts for Advanced Group I components will be awarded. Contracts for the Engineering development of the covert duress sensor and tagged material detector will be awarded. Contract efforts will be required for completion of technical and logistical support data, software modification, installation of the FIDS at the test sites, and technical assistance in the integration of FIDS with other DOD Physical Security components. In-house efforts are required to ensure items comply with contract

Program Element: #6.47.18.A
DOD Mission Area: #215 - Land Warfare Support
Title: Physical Security
Budget Activity: #4 - Tactical Programs

requirements and to coordinate development activities. Development of the FIDS CCTV assessment Subsystem and RF Motion Sensor will be continued.

3. (U) FY 1983 Planned Program: The Interim Facility Intrusion Detection System (FIDS) components contract will be completed and those items will undergo DT II and OT II. Design of ADV GP I CCDS Components will be completed, and contracts for engineering development models will be awarded. DT II/OT II will be initiated on the Covert Duress Sensor and Tagged Material Detector. A VAL IPR will be held on the Radio Frequency Motion Sensor. Contract support for Software maintenance and for System Engineering efforts for DOD component integration with FIDS will continue. In-house effort is required to ensure that items comply with contract requirements, to coordinate development activities and to validate the use of modified J-SIIDS components for Electronics Alerting System (EAS) applications. An EAS SIPR will be held in FY83.

4. (U) FY 1984 Planned Program: DVA IPR's will be conducted for Interim FIDS and the Covert Duress Sensor and Tagged Material Detector. Engineering Development on the Advanced Group I CCDS components will continue. DT II will begin for the RF Motion sensor and some Advanced Group I CCDS items. Engineering Development will be initiated on selected advanced FIDS items which successfully complete Advanced Development.

5. (U) Program to Completion: This is a continuing program. In FY84 and the outyears, there will be a continuing effort to develop physical security hardware which is capable of countering the ever-increasing sophistication of the threat to military personnel and property. Coordinated efforts with the other Services will be directed towards integrating components/subsystems/systems developed under this Program Element into a completely integrated interior/exterior physical security system for the Department of Defense.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.22.A
DOD Mission Area: #215 - Land Warfare Support

Title: Education and Training Systems
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	N/A	N/A	995	4723	Continuing	Not Applicable TBD
D750	Education and Training System	N/A	N/A	995	4723	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This Joint-Service Engineering Development program is intended to provide prototype demonstrations of more cost-effective training and education developments. The services are facing an increasing training and education challenge. Among the reasons are: a decrease in quantity of available manpower, a decrease in the verbal and mathematical skills of entry-level manpower, an increase in the number and complexity of weapon systems, and the rapidly increasing cost of training. New instructional technologies are required to meet this challenge. The 1981 Defense Science Board Summer Study of the Technology Base concluded that microprocessor-based personal learning aids represent one of only 17 technologies that can make an order-of-magnitude difference in combat effectiveness. The technology is available: microprocessors, videodiscs, voice technology, interactive display technology, artificial intelligence, etc. The objective of this program element is to improve and demonstrate the effectiveness of advanced education and training technology ready for joint Army, Navy, and Air Force use. Available technology will be applied to training and education needs identified by the services. An effort will be made to identify technology-based instructional methods that can be used by more than one service.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Funds are requested for FY 1983 to initiate joint-service engineering development of low-cost, training-effective instructional systems/devices/methods employing recent major advances in information technology. Funds will be used to develop military prototype instructional hardware and software to meet present training deficiencies or projected future needs. Deficiencies/needs of each service will drive the application of technology. Each service will nominate candidate projects. Selection of projects for demonstration will be made under OUSDRE supervision.

Program Element: #6.47.22.A
DOD Mission Area: #215 - Land Warfare Support

Title: Education and Training Systems
Budget Activity: #4 - Tactical Programs

Among possible candidates for engineering development are: technology-based personal learning aids, low-cost job-site training systems, "suitcase trainers," electronic "war games" (with the appeal of arcade games), improved visual displays for simulators, improved weapon fire simulation techniques, computer-based job-site training management systems, and feedback systems for instructional quality control.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands): Not Applicable. New Start FY 1983.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.47.22.A
Title: Education and Training Systems
DOD Mission Area: #215 - Land Warfare Support
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The services each have a major training and education responsibility. They must turn raw recruits into well-trained men and women who can carry out mission-related jobs effectively. They must further train them to work together in a coordinated fashion as members of crews and teams, and as complete units. Most current training methods are personnel-intensive. The cost of training is escalating rapidly. The military services have made substantial investments in "traditional" instructional technology. Experience has shown that the expected return on investment has not been realized, indicating that these traditional approaches may have matured to a point of diminishing returns. Technology is available that has the potential to revolutionize military instruction over the next several years, if properly used. Among the relevant information technologies are: microprocessors, videodiscs, voice recognition/synthesis technology, electronic "war games" designed for specific military scenarios, interactive display technology, and artificial intelligence. This Joint-Service program element is intended to provide prototype demonstrations of advanced instructional systems/devices/methods meeting the needs of more than one service. Hardware capability often outstrips our ability to use it effectively. Therefore, a major emphasis of this program will be on instructional system simplicity to insure that only the capability needed is used. Among the desired design characteristics of the developments envisioned are the following: Systems should be inexpensive (relative to existing training systems), standardized, performance-oriented, relatively instructor-free, and interfaceable or networkable with similar systems. Possible engineering developments include the following: microprocessor-based, job-site training systems tailored to meet local needs; improved visual displays for simulation; "suitcase trainers"; improved weapon fire simulation techniques; computer-based job-site training management systems, and feedback systems for instructional quality control.

G. (U) RELATED ACTIVITIES: This is a joint-service program with the US Army Research Institute for the Behavioral and Social Sciences (ARI) as the lead laboratory. Other DOD R&D organizations involved are: the Naval Training Equipment Center (NTEC), the Naval Personnel Research and Development Center (NPRDC), the Air Force Human Resources Laboratory (AFHRL), the Army Project Manager for Training Devices (PM-TRADE), and the Army Human Engineering Laboratory (HEL). The service laboratories will submit candidate engineering developments for consideration. A steering committee chaired by a representative of OUSDRE and comprised of representatives from each service will select for funding those developments felt to have the greatest potential for direct and immediate application to the needs of more than one service.

H. (U) WORK PERFORMED BY: As this program element will not be initiated until FY 1983, there are no contractors. In-house developing organizations responsible for the execution of this program will be: (lead laboratory) the US Army Research Institute for the Behavioral and Social Sciences (ARI), the Naval Training Equipment Center (NTEC), the Naval Personnel Research and Development Center (NPRDC), the Air Force Human Resources Laboratory (AFHRL), the Army's Project Manager for Training Devices (PM-TRADE), and the Army Human Engineering Laboratory (HEL).

Program Element: #6.47.22.A
DOD Mission Area: #215 - Land Warfare Support

Title: Education and Training Systems
Budget Activity: #4 - Tactical Programs

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Not Applicable.

2. (U) FY 1982 Program: Not Applicable.

3. (U) FY 1983 Planned Program: This will be a new start in FY 1983. It is not possible to specify the particular developmental efforts to be funded at this time. Developments included will be determined by the steering committee described in paragraph G above. All necessary experimental work will be performed, and proposed system applications will be ready for full-scale development.

4. (U) FY 1984 Planned Program: As in FY 1983, the efforts to be funded for FY 1984 will be determined by the steering committee.

5. (U) Program to Completion: To be determined by the steering committee.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.24.A
Title: Biological Defense 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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2047	1034	391	0	Continuing	Not Applicable
	QUANTITIES						
	XM19 Alarm/XM2 Sampler						680
DF45	Biological Defense Materiel	2047	1034	391	0	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the Engineering Development (ED) of biological defense materiel and equipment to detect the presence of and to warn against a biological attack. Specifically, the ED program is in response to an approved Required Operational Capability for a first-generation biological agent detection and warning system for Army field use. The biological detection and warning system (BDWS) currently under development consists of the XM19 Biological Alarm and the XM2 Biological Sampler. The M42 Alarm, a fielded device, completes the system. The XM19 Alarm is a point sampling and analysis device which detects the presence of biological aerosols and provides an alarm. The collocated XM2 Sampler is also a point sampling device, which upon automatic activation by the XM19 or by the operator, collects a viable quantity of the suspected biological aerosol for subsequent analysis by designated medical laboratories. The M42 is an Alarm unit which gives visual and aural indications of contamination. The system will provide Corps, Division, and Brigade levels an array of BDWS for large-area rapid warning.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Engineering Development (ED) will be completed after the Development Acceptance In-Process Review (DEVA-IPR) and Type Classification (TC) in support of the initial production contract. All RDTE testing for environment extremes and Development Test IIA (initial production test) will be completed. The Materiel Fielding Plan (MFP) will be finalized and approved.

Program Element: #6.47.24.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Biological Defense Materiel
Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	2047	1034	391	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	2671	1036	0	Continuing	Not Applicable

The reduction of $624 thousand in the FY 1981 funding level is a result of reprograming to higher priority Army chemical warfare/chemical biological defense (CW/CBD) requirements. The decrease of $2 thousand in the FY 1982 funding level is a result of the amended budget request and application of revised inflation indices. The increase of $391 thousand is the result of close-out costs for completion of engineering development in support of the initial production contract.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
OPA Funds						
Funds (current requirements)	0	0	6200	0	58929	65229
Funds (as shown in FY 1982 submission)	0	0	2800	0	19300	22100
Quantities (current requirements)						
Biological Detection and Warning System, XM19/XM2	0	0	78	0	602	680

Program Element: #6.47.24.A
DOD Mission Area: #276 ~ Defensive Chemical and Biological Systems

Title: Biological Defense Materiel
Budget Activity: #4 - Tactical Programs

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Quantities (as shown in FY 1982 submission)	0	0	78	-	436	514

The increase of $3400 thousand in funding for FY 1983 is due to erroneously reported funding data in the last submit. The increase in total quantities is due to an adjustment to the Basis of Issue by the user community.

Program Element: #6.47.24.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Biological Defense Materiel
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The objective of this program is to develop and type classify a first-generation biological agent automatic point detection and warning system for Army field use. The scope of this project includes the development of the XM19 Alarm and the XM2 Sampler (components of the biological detection and warning system) for use as applicable to corps, division, and brigade organizations. The XM19 Alarm automatically detects biological agent aerosols by a chemiluminescent reaction. The XM2 Sampler collects samples of the aerosols for subsequent identification by designated medical laboratories.

G. (U) RELATED ACTIVITIES: Many items of equipment suitable for chemical defense are also suitable for biological defense (e.g., protective shelters). Such items are developed in PE 6.47.25.A, Chemical Defense Materiel, and not duplicated here. Duplication of effort is avoided through periodic meetings and reviews of the chemical-biological defense program by key personnel. The Army is responsible for its own chemical defense items and for those that meet joint requirements of the Army and other Services.

H. (U) WORK PERFORMED BY: In-house efforts are performed at the US Army Chemical Systems Laboratory, Edgewood, MD. Contractors: Bendix Corporation, Baltimore, MD; Stanford Research Institute, Menlo Park, CA; and Southern Research Institute, Birmingham, AL.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: During FY's 1979 and FY 1980, the following were accomplished relative to development of the biological detection and warning system (BDWS), XM19/XM2: (a) continued evaluation of the XM19 detector air handling system, alarm algorithm, and wash station; (b) several background tests were conducted to evaluate the performance of selected design changes to various air handling components of the biological detector, XM19; (c) narrowing the size range of particles accepted by the XM19 proved to reduce the false alarm rate of [illegible] prototypes; (d) studies were initiated to investigate approaches to providing the capability of determining "all clear" conditions after a biological attack; (e) completed fabrication of test prototypes; (f) initiated contractor and government testing; (g) overall planning and management of the test and evaluation activities were placed under a Configuration Control Board (CCB) Subcommittee for integration. In FY 1981, engineering development continued with completion of contractor and laboratory tests; completion of "all clear" capability study which the user rejected for the XM19 program; and initiation of Development Test II and Operational Test II (DT/OT II).

Program Element: #6.47.24.A Title: Biological Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Programs

2. (U) FY 1982 Program: All formal testing (DT/OT II) will be completed on the BDWS in FY 1982 due to funding reduction in FY 1981 and late delivery of test prototypes by the contractor. Development Acceptance In-Process Review (DEVA-IPR) and type classification (TC) will be completed.

3. (U) FY 1983 Planned Program: All environmental extreme testing evaluations will be completed. Technical data package conversion to government standard will be completed. First production contract will be prepared, staffed, negotiation initiated, and awarded. Engineering support will be provided to the contract.

4. (U) FY 1984 Planned Program: This project is not funded in FY 1984.

5. (U) Program to Completion: This is a continuing program which supports Engineering Development of biological detection and warning equipment to improve the defense of US forces against biological warfare attack.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.25.A
Title: Chemical Defense 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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	17423	37696	26017	45288	Continuing	Not Applicable
DF97	Chemical Decontamination Materiel	1127	1809	8237	5360	Continuing	Not Applicable
D017	CB Collective Protection	1000	8315	3807	5671	Continuing	Not Applicable
D019	Individual Chemical Protection	6549	4016	2467	2708	Continuing	Not Applicable
D020	Chemical Detection Warning and Sampling Devices	1210	12245	5269	17123	Continuing	Not Applicable
D023	Collective Protection Materiel for Armored Vehicles	7230	10480	5677	13455	Continuing	Not Applicable
D138	Training System for Chemical Defense	307	831	560	971	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The objective of this program is to conduct engineering development of rapid detection and warning systems, chemical decontamination systems, and protective materiel and equipment to alert US forces of the presence of a chemical warfare environment and to provide protection. Additionally, training systems are developed that will realistically simulate persistent and nonpersistent chemical agent attacks in a variety of combat scenarios. The new protective mask in development, with appropriate components, replaces the M17-series mask, the M24 aircrew mask, the M25A1 tanker mask, the M9A1 special-purpose mask, and the Navy Mark V mask. The new mask provides improved peripheral vision, flexible lens for optical coupling, ease of filter (canister) replacement, inturned periphery to improve fit, and improved respiratory protection with minimum burden to the wearer. The development of the new mask is in response to a Joint Service requirement. The requirement for improved chemical detection, warning, and identification materiel and equipment addresses the need to reduce the physiological and logistical burden on US forces while increasing their chances

Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Programs

of survival in a chemical warfare environment by provision of early and more sensitive warning devices. An improved decontamination system will provide US forces the capability to remove or reduce the hazards posed by chemical agents on the battlefield and thus enhance their operational capability. There also exists a need for collective protection for certain headquarters and communications functions and certain armored vehicles and their crews to accomplish their assigned missions in an active chemical environment and to relieve the stresses and restrictions inherent in wearing individual protective clothing and equipment. The above improvements are essential to maintain a totally integrated chemical defense posture.

C. (U) BASIS FOR FY 1983 REQUEST: Engineering development (ED) will be completed on the XM81 training simulator for the M8 series alarms. The new protective mask (XM30) will be type classified by the Army in FY 1982; ED will continue on the new protective mask (XM30) to bring the production models into full compliance with the Joint Operational Requirements (JOR). ED will also continue on the NBC Hybrid Collective Protection Equipment for combat vehicles (HCPE); Modular Collective Protection Equipment (MCPE) applications for vehicles, vans, and shelters; improved decontamination apparatus for tactical equipment; a Multipurpose Chemical Biological Decontaminant (MCBD); and training devices for simulation of chemical attack by artillery, warhead, and aircraft. MCPE applications total 59 with 14 active tasks during FY 1983. ED will be initiated on a Jet Exhaust Decontamination System (JEDS) and the Individual Decontamination Kit (IDK).

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	17423	37696	26017	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	17469	37807	43095	Continuing	Not Applicable

The reduction of $46 thousand in FY 1981 funding level is a result of reprograming to higher priority Army requirments. The funding decrease of $111 thousand in FY 1982 is a result of the amended budget request and the application of revised inflation indices. The reduction of $17,078 thousand in FY 1983 is a result of terminating the development task for a contamination monitor in favor of adopting the British Contamination Monitor (CAM) and maintaining the remote sensing chemical agent alarm, XM21, in advanced development.

Program Element: #6.47.25.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Chemical Defense Materiel
Budget Activity: #4 - Tactical Programs

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands). Not Applicable.

Program Element: #6.47.25.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Chemical Defense Materiel
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND DESCRIPTION: The objective of this program is to conduct engineering development (ED) on defensive materiel and equipment to protect individuals from chemical agents by providing: protection for the respiratory system and body surface; manual and automatic detection and warning devices that respond to toxic agents in all forms on surfaces; means to decontaminate skin, clothing, equipment, and terrain; and the development of collective protection materiel for shelters, vans, and armored vehicles and their crews. Development of the new mask is in response to a Joint Operational Requirement (JOR) for improved respiratory protection with emphasis on improved operational capabilities and reduced logistical burden, suitability for wear under a wide range of operational conditions and improved storage characteristics. Type classification of the new mask is scheduled for FY 1982 with waivers to specific optical clarity and coupling requirements of the JOR. ED will continue on the mask in FY 1983 to bring the production models in full compliance with the JOR. The Automatic Chemical Agent Detector and Alarm is also being developed under a JOR to provide a fully automatic detector for all known or suspected threat agents, low logistical burden, and be adaptable for mobile use and contamination monitoring. Development of new/improved decontamination materials and equipment is in response to requirements for rapid, low burden, and complete decontamination to reduce effects of NBC defensive posture. Detection, warning, and identification equipment development is geared to remote, all-agent, and sensitivity requirements necessary to provide early warning of NBC attack, thereby increasing soldier survival in an NBC warfare environment. Training equipment is being developed to simulate as accurately as possible all threat conditions so that reaction doctrine will enhance soldier survivability. All improvements are part of a broad program to correct deficiencies in US defensive posture which jeopardize the survivability of US forces in an active NBC environment.

G. (U) RELATED ACTIVITIES: PE 6.27.06.A, CB Defense and General Investigations, defense technology base addresses in-depth exploratory activities in the development of a broad spectrum of CB defensive equipment concepts. Related Advanced Development work is being performed under Program Element 6.37.21.A, Chemical Defense Materiel Concepts. The Automatic Chemical Agent Detector and Alarm (ACADA) is a Joint Service Operational Requirement (JSOR). The NBC Marking Set was type classified after a successful International Material Evaluation (IME) by Test and Evaluation Command (TECOM). This item is standard equipment for Federal Republic of Germany (FRG) forces. Another IME program has been recommended by Chemical Systems Laboratory (CSL) for adaption of the British Contamination Monitor (CAM) to meet the draft requirement of Training and Doctrine Command (TRADOC).

H. (U) WORK PERFORMED BY: In-house efforts are performed by US Army Chemical Systems Laboratory, Edgewood, MD. Prime Contractors are Sierra Engineering Company, Sierra Madre, CA; Bendix Corporation, Baltimore, MD; Mine Safety Appliance Co., Murrysville, PA; Honeywell, Inc., Orlando, FL; Donaldson Co., Minneapolis, MN; and Brunswick Corporation, Deland, FL.

Program Element: #6.47.25.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Chemical Defense Materiel
Budget Activity: #4 - Tactical Programs

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: During FY 1978, the new protective mask, XM29 began engineering development (ED). During FY79, (1) a Special In-Process Review (IPR) redirected the new mask program to the separate lens configuration XM30 mask; (2) the improved airburst simulator, Chemical Attack Warning and Transmission System (CAWTS, XM207), and Hybrid Collective Protection Equipment (HCPE) entered ED; and (3) Development and Operational Tests II were completed on the Liquid Agent Detector (LAD, XM9,) Paper. During FY 1980, the (1) M9 paper was acepted as an expendable items included in the Common Table of Allowances (CTA) and initial production begun; (2) ED was continued on the new protective mask (XM30), Modular Collective Protection Equipment (MCPE) for vehicles, vans, and shelters, training simulators for airburst persistent and nonpersistent agents, CAWTS (XM207), and HCPE; (3) ED was initiated on the M8 Chemical Alarm Simulator (XM81) and the Vehicle Mounted Decon Apparatus (VMDA, XM14). During FY 1981, ED was continued on the new protective mask (XM30), CAWTS (XM207), M8 Chemical Alarm Simulator (XM81), and MCPE applications for vehicles, vans, and shelters. ED was initiated on the M256 Detector Kit Simulator.

2. (U) FY 1982 Program: The XM30 configuration with waivers for specific user requirements will be adopted as the new protective mask by type classification, and first production procurement will be initiated. Engineering development (ED) will be continued until production models are brought into full compliance with the Joint Operational Requirement (JOR). ED will be completed on the Chemical Attack Warning and Warning and Transmission System (CAWTS); M2656 Detector Kit Simulator; and XM11 Airburst Simulator including: (1) Complete Development Test II and Operational Test II (DT/OT II), (2) conduct Development Acceptance In-Process Review (DEVA IPR) and type classify, and initiate first production procurement. ED will continue on (1) NBC collective protection for combat vehicles, (2) Modular Collective Protection Equipment (MCPE) applications for vehicles, vans, and shelters, (3) M8 Chemical Alarm Simulator (XM81) and Lightweight Decontamination System (SANATOR). The ED program for the XM14 truck-mounted decontamination apparatus will be redirected because of changes in user requirements. Nomenclature and new type designator will be sought for new design as XM14 design is terminated. ED will be initiated on the XM272 Water Testing Kit and Multipurpose Decontaminant (replace DS-2).

3. (U) FY 1983 Planned Program: ED will be completed on the M8 Chemical Alarm Simulator, XM81, including completion of DT/OT II and type classification, and first production procurement will be initiated. ED will continue on (1) Modular Collective Protection Equipment (MCPE) applications for vehicles, vans, and shelters; (2) Multipurpose Decontaminant; (3) Lightweight Decontaminant System (SANATOR-XM17); and (4) XM30 new protective mask. ED will be initiated on the Jet Exhaust Decontaminant System (JEDS-XM16), Individual Decontamination Kit (IDK), and preemplaced Ground Burst Simulator.

Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Programs

4. (U) FY 1984 Planned Program: ED will be completed on the Lightweight Decontamination System. ED will continue on the Jet Exhaust Decontaminant System (JEDS-XM16); Multipurpose Decontaminant; Individual Decontaminant Kit (IDK); XM272 Water Testing Kit; Combat Vehicle Alarm (CVA); MCPE for vehicles, vans, and shelters; Preemplaced Ground Burst Simulator and XM30 new protective mask. ED will be initiated on Combat Vehicle Alarm (CVA), Automatic Liquid Agent Detector, new training simulants and Interior Surface Decontamination System (ISDS-XMIS).

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #DF97 Title: Chemical Decontamination Materiel
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Programs

A. (U) DETAILED BACKGROUND AND DESCRIPTION: The Union of Soviet Socialist Republics (USSR) and Warsaw Pact (WP) nations have a recognized technological advantage over the United States (US) in decontamination capabilities which significantly enhances their ability to conduct sustained operations in a toxic environment. An accelerated decontamination program was initiated by the Army in May 1978. The objectives of the program are to achieve at least parity with the USSR/WP and provide a survival and sustained operational capability for US forces on a chemically contaminated battlefield. An Army Science Board Ad Hoc committee reviewed the Army's decontamination program from October 1978 to March 1979. The Committee's report reemphasized the urgency for the accelerated program and made recommendations for improvement. The purpose of this project is to conduct Engineering Development (ED) on new systems designed to quickly and effectively decontaminate personnel and equipment in the field. This is the only project in the Department of Defense for ED of decontamination materiel.

B. (U) RELATED ACTIVITIES: Engineering Development (ED) is conducted on decontamination/contamination-avoidance concepts completing Advanced Development under Program Element 6.37.21.A, Chemical Decontamination Materiel. In accordance with Department of Defense (DOD) Directive 5160.5, which designates the Army as Executive Agent for Chemical Warfare/Chemical-Biological Defense Research, Development, Test and Evaluation, work is planned and accomplished in response to requirements from all Services. Items or systems of Army and Joint service interest which complete exploratory development progress to Advanced Development under Program Element 6.37.21.A, Chemical Decontamination Materiel.

C. (U) WORK PERFORMED BY: Contractors: Brunswick Corporation, Marion, VA; in-house developing organization is the United States Army Chemical Systems Laboratory, Aberdeen Proving Ground, MD.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: ED on the XM14, Decontamination Apparatus, Power-Driven, Truck-Mounted, was initiated in FY 1980. The apparatus will be an improvement of the M12A1 Power-Driven Decontamination Apparatus (PDDA). Originally, Engineering Development was directed toward a decontamination apparatus mounted on a dedicated diesel-powered vehicle with power take-off. A Joint Working Group Meeting was held on 22 October 1981 which redirected the program and eliminated a dedicated vehicle. The XM14's developmental program will be revised and continued in FY 1982. The Lightweight Decontamination System began ED in FY 1981 with initiation of the International Materiel Evaluation (IME) of the Norwegian NBC Sanator. Effort will be continued through FY 1983.

Project: #DF97 Title: Chemical Decontamination Materiel
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Programs

2. (U) FY 1982 Program: Effort on the Vehicle-Mounted Decontamination Apparatus will be continued with fabrication of Development Test/Operational Test II hardware and the initiation of Developmental Test II (DTII). The IME will continue on the Norwegian NBC Sanator. Engineering development will be initiated on the multipurpose decontaminant which will ultimately replace the current DS2 decontaminant with increased effectiveness and efficiency.

3. (U) FY 1983 Planned Program: Engineering development will continue on the Vehicle-Mounted Decontamination Apparatus and Multipurpose decontaminant. A Special In-Process Review will be conducted to assess the progress of the Sanator and to determine whether type classification should be considered. ED will be initiated on the Jet Engine Exhaust Decontamination Apparatus (XM16) and the Individual Decontamination Kit (XM258).

4. (U) FY 1984 Planned Program: The NBC Sanator will undergo a Developmental In-Process Review and a decision made as to its acceptance for type classification (TC) as a Lightweight Decontamination Apparatus. ED will continue on the Multipurpose Decontaminant, Vehicle-Mounted Decontamination Apparatus, Jet Engine Exhaust Decontamination Apparatus, and Individual Decontamination Kit. ED will be initiated on the Interior Surface Decontamination System (XM15).

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

6. (U) Major Milestones: Not applicable.

Project: #DF97 Title: Chemical Decontamination Materiel
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Programs

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	1127	1809	8237	5360	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	1893	1813	4739	-	Continuing	Not Applicable

The reduction of $766 thousand in FY 1981 is a result of reprograming to higher priority Army requirements. The decrease of $4 thousand in FY 1982 is a result of the amended budget request and the application of revised inflation indices. The increase of $3498 thousand in FY 1983 resulted from an increase in emphasis and scope of work in order to accelerate development of badly needed decontamination systems.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: D017 Title: Chemical-Biological Collective Protection
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Program

A. (U) DETAILED BACKGROUND AND DESCRIPTION: The reported use of Chemical agents in Laos and Afghanistan has intensified the efforts to enhance the capability of United States (US) forces to fight and win in a chemically contaminated environment. Consistent with the efforts to improve the US Chemical-Biological (CB) defense posture, the Army has a requirement for an overpressure type of collective protection for 59 systems (tactical vans, shelter, command posts, fire control stations, etc). This program supports the development of Chemical-Biological collective protection capability for the above systems. Modular Collective Protection Equipment (MCPE) addresses the above needs and provides Nuclear-Biological-Chemical (NBC) protection by providing filtered air under positive pressure to prevent infiltration of toxic chemical, biological agents and radioactive aerosols. MCPE allows individuals to engage in combat operations unencumbered by wearing individual CB protection equipment which severely degrades operational capabilities.

B. (U) RELATED ACTIVITIES: The Army's CB collective protection RDTE program includes meeting its own materiel development needs and performing basic research (6.1) through advanced development (6.3) and some engineering development (6.4) work for the other Services within DOD. DOD Directive 5160.5 established the joint RDTE program and assigned executive agent responsibility to the Army. The work in this project does not duplicate Service-unique work being done by the Air Force or Navy. Companion advanced development work is being done under program element 6.37.21.A, Chemical Defense Materiel Concepts, Project D604, Collective Chemical Protection Materiel. Related basic research is being done under Program Element 6.11.02.A, Defense Research Sciences, Project A71A, Defense Systems Chemical Warfare/Biological Warfare. Related Exploratory Development work is being done under Program Element 6.27.06.A, Chemical Biological Defense and General Investigations, Project A553, Chemical Biological Defense and General Investigations.

C. (U) WORK PERFORMED BY: In-house efforts are performed by the US Army Chemical Systems Laboratory, Edgewood, MD. Prime contractors are American Air Filter, Inc., Ellicott City, MD; Brunswick Corporation, Deland, FL; and National Space Technology Laboratory, Bay City, MS.

Project: D017
Program Element: #6.47.25.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Chemical-Biological Collective Protection
Title: Chemical Defense Materiel
Budget Activity: #4 - Tactical Program

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Modular Collective Protection Equipment (MCPE) for Tactical Fire Control System (TACFIRE) shelter was type classified during March 1976 and first production accomplished during August 1977. Type classification of MCPE for the AN/TSQ-73 (Missile Minder) shelter was accomplished in June 1978. Development of MCPE for the Patriot surface-to-air missile system was continued during FY 1979 through FY 1981. During FY 1981, cracks appeared in protective entrances for MCPE, and a problem evaluation resulted in change in materials from plastic to aluminium. All protective entrances will be constructed of aluminuim for all MCPE applications in future years. The original list of 43 systems for applications of MCPE was amended to 59 systems in early FY 1981. The diversity of application requirements necessitated a complete evaluation of all systems requirements. Compatibility and pressurization tests were initiated on the Patriot surface-to-air missile system. In addition, specific application design was initiated on Pershing II, Trailblazer, AN/TPQ-37 and AN/TPQ-36, Firefinder Radars, Remotely piloted Vehicles (RPV), and Directed Support-Automatic Test Support Systems (DS-ATSS).

2. (U) FY 1982 Program: All development related to MCPE for the Patriot surface-to-air missile system will be completed, and type classification will be accomplished. Work will continue on MCPE applications in consonance with the priorities established by the user. Continue application efforts on those systems initiated in FY 1981. Efforts will be directed toward developing MCPE for the following top-priority items from a list of 59 systems that have been identified by the user as requiring collective protection: (1) All-Source Analysis System (ASAS), (2) Trailblazer upgrade (intelligence and electronic warfare system), (3) Teampack, AN/MAQ103 (intelligence system), (4) Artillery Location Radar, AN/TPQ-37, and (5) ground control station for Remotely Piloted Vehicle.

3. (U) FY 1983 Planned Program: Development work will continue on those programs initiated in FY 1981 and 1982 until type classification of MCPE with those systems is accomplished. Additional applications will be initiated from the prioritized user list of 59 directed applications. Completion of application and subsequent type classification is the responsibility of the system proponent so this project will continue to support the application of MCPE until the system proponent is satisfied and assumes procurement action or terminates further effort.

Project: D017 Title: Chemical-Biological Collective Protection
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Program

4. (U) FY 1984 Planned Program: Development work will continue on MCPE applications in accordance with the user's priority and system proponent's request. New applications will be considered in the following tactical applications: (1) command post, (2) communications centers, (3) fire-control stations, (4) control complexes, (5) first aid stations, (6) field hospitals, and (7) rest and relief stations. In addition, any technology advanced which significantly improves MCPE capability over the life of the applications will be incorporated into MCPE under this project as R&D product improvements.

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

6. (U) Major Milestone: Not applicable.

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	1000	8315	3807	5671	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	1404	8340	3757	-	Continuing	Not Applicable

The reduction of $404 thousand in the FY 1981 funding level is a result of adjusted requirements/priorities established by the user and cost estimate refinement based upon the MCPE Application requirements assessment done in FY 1981. The funds difference was reprogramed to other Army priority requirements. The funding decrease of $25 thousand in FY 1982 is a result of the amended budget request and the application of revised inflation indices. The increase of $50 thousand in the FY 1983 funding level is the result of cost estimate refinement.

Other Appropriations: Not Applicable.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D020 Title: Chemical Detection Warning Sampling Devices
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Program

A. (U) DETAILED BACKGROUND AND DESCRIPTION: 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. By comparison, United States (US) forces possess inadequate, aging, and logistically burdensome NBC detection, warning, and identification equipment. The objective of this project is the Engineering Development (ED), through type classification, of new and improved chemical detection, warning, sampling, and identification devices to supplement or replace existing items for field and installation use.

B. (U) RELATED ACTIVITIES: The Army's chemical detection and warning RDTE program includes meeting its own materiel development needs and performing basic research (6.1) through advanced development (6.3) and some engineering development (6.4) work for the other Services within DOD. DOD Directive 5160.5 established the joint RDTE program and assigned executive agent responsibility to the Army. This project does not duplicate Service-unique work being done by the Air Force and Navy. Companion advanced development work is being done under Program Element 6.37.21.A, Chemical Defense Materiel Concepts, Project D601, Chemical Detection and Warning Materiel. Related basic research is being done under Program Element 6.11.02.A, Defense Research Sciences, Project A71.A, Defense Systems Chemical Warfare/Biological Warfare. Related Exploratory Development work is being done under Program Element 6.27.06.A, Chemical Defense and General Investigations, Project A553, Chemical Biological Defense and General Investigations.

C. (U) WORK PERFORMED BY: In-house efforts are performed by the US Army Chemical Systems Laboratory, Aberdeen Proving Ground, MD. Prime contractors are Bendix Corporation, Baltimore, MD; Mine Safety Appliance Co., Murrysville, PA; and Honeywell, Inc., Orlando, FL.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: During FY 1979: (1) Development and Operation Test II were completed on the Liquid Agent Detector (LAD, XM9) paper; and (2) engineering development (ED) was initiated on the Chemical Attack Warning and Transmission System (CAWTS, XM207). During FY 1980: (1) M9 Paper was accepted as an expendable item, included in the Common Table of Allowances (CTA) and initial production began; (2) ED was continued on the CAWTS (XM207); and (3)

Project: #D020 Title: Chemical Detection Warning Sampling Devices
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Program

ED was initiated on the M8 Chemical Alarm Simulator (XM81). During FY 1981: (1) ED was continued on the CAWTS (XM207) and M8 Chemical Alarm Simulator (XM81) and (2) ED was initiated on the M256 Detector Kit Simulator.

2. (U) FY 1982 Program: ED will be completed including type classification and initial production started on the: (1) Chemical Attack Warning Transmission System (CAWTS, XM207) and (2) M256 Detector Kit Simulator. ED will be continued on the M8 Chemical Alarm Simulator (XM81). ED will be initiated on the Water Testing Kit (XM272) after completion of advanced development (AD) in mid-FY 1982.

3. (U) FY 1983 Planned Program: ED will be completed including type classification and first production initiated on the M8 Chemical Alarm Simulator (XM81). ED will be continued on the Water Test Kit, XM272. ED will be initiated on a Combat Vehicle Alarm (CVA) based upon use of the M8A1 alarm, internal and external sampler, and sample processor. The CVA will be the first phase of integrating the alarm to the automatic operation of the vehicle collective protection system.

4. (U) FY 1984 Planned Program: ED will be continued on: (1) Water Testing Kit (XM272) and (2) Combat Vehicle Alarm (CVA). ED will be initiated on the Automatic Liquid Agent Detector (ALAD, XM82).

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

6. (U) Major Milestones: Not applicable

Project: #D020 Title: Chemical Detection Warning Sampling Devices
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Program

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	1210	12245	5269	17123	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	2678	12282	25035	-	Continuing	Not Applicable

The reduction of $1468 thousand in FY 1981 funding level is due to the XM21 Remote Sensing Alarm not completing advanced development under Program Element 6.37.21.A, Chemical Defense Materiel Concepts, Project D601, Chemical Detection and Warning Materiel. The fund difference was reprogramed to other Army priority projects. The decrease of $37 thousand in FY 1982 funding level is due to the amended budget request and the application of revised inflation indices. The reduction of $19766 thousand in the FY 1983 funding level is the result of the XM21 remaining in advanced development and the termination of the requirement for Contamination Monitor (COMS III) by the user.

Other Appropriations: Not Applicable.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D023 Title: Collective Protection Materiel-Armored Vehicles
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Programs

A. (U) DETAILED BACKGROUND AND DESCRIPTION: The Soviet Union continues to maintain a significant chemical warfare capability. The evidence is that they regard chemical weapons as an integral part of future tactical warfare. For example, they conduct extensive training exercises which stress operating proficiency in a chemical warfare protective posture and they have equipped their armored vehicles with collective protection systems. Other Warsaw Pact nations are similarly trained and equipped. To meet this threat, Congress directed in the FY 1978 Department of Defense (DOD) Appropriations Act (PL 95-79) that the Army prepare and fund a plan to provide nuclear-biological-chemical (NBC) protection for combat vehicles in development or procurement by 1981. Such a plan was provided in February 1978. Subsequently, enemy threat assessment and review of the Army's tactical doctrine for operating in a chemical contaminated environment resulted in an Army plan for providing NBC collective protection for the current vehicle fleet as well as developmental combat vehicles and their crews. This program is structured to support these specified needs to improve the Army's survivability on the battlefield in a contaminated environment. Specifically, this program provides engineering development of new and improved collective protection equipment for armored vehicles. This goal will be achieved through the development of improved air purification systems which can be used for positive pressurization of the vehicle, if it is assigned a rear area mission, or providing ventilated facepiece protection if it is assigned a forward area mission. The provision of the improved collective protection system will enable the crews to perform combat duties without the encumbrance of complete individual protective equipment when operating in an NBC-contaminated environment.

B. (U) RELATED ACTIVITIES: Related work has been done under Program Element (PE) 6.37.21.A, Chemical Defense Materiel Concepts, Project D604, Collective Chemical Protection Materiel, and PE 6.47.25.A, Chemical Defense Materiel, Project D017, CB Collective Protection. Related basic research is being done under Program Element 6.11.02.A, Defense Research Sciences, Project A71A, Defense Systems Chemical Warfare/Biological Warfare. Related Exploratory Development work is being done under Program Element 6.27.06.A, Chemical Biological Defense and General Investigations, Project A553, Chemical Biological Defense and General Investigations. Companion Advanced Development effort is performed under Program Element 6.37.21.A, Chemical Defense Materiel, Project DJ30, Collective Protection Materiel-Armored Vehicles. Foreign state of the art will be considered throughout the RDTE cycle. Related data are exchanged with allied countries via data exchange agreements and NATO Panel VII-NBC defense. Work being done in the collective protection program is coordinated with the other Services and NATO countries and is not duplicated in other research and development projects.

Project: #D023 Title: Collective Protection Materiel-Armored Vehicles
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Programs

C. (U) WORK PERFORMED BY: US Army Tank-Automotive Command, Warren, MI, is responsible for the development and overall management of this program. In-house RDTE work is being performed by Chemical Systems Laboratory, Aberdeen Proving Ground, MD. Major contractors are working under the auspices of the armored vehicle program managers and include: Boeing, Seattle, WA; and Hughes, Canoga Park, CA. Studies and limited investigative work are being performed by Donaldson, Minneapolis, MN. Honeywell, Minneapolis, MN, is the prime contractor for the development of the Hybrid Collective Protection Equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: This project was initiated in FY 1980, and the following significant activities were accomplished: Vehicle interface development was initiated in preparation for the application of nuclear, biological, and chemical (NBC) collective protection for the following armored vehicles which were in development or procurement in FY 1981: (1) Infantry Fighting Vehicle, (2) Cavalry Fighting Vehicle, (3) Multiple Launch Rocket System, (4) Improved TOW Vehicle, (5) US ROLAND, (6) M1 Main Battle Tank, (7) Division Air Defense, (8) M109 Self-Propelled Howitzer, and (9) M577A1 Command Post Carrier. The hybrid (combination ventilated facemask and positive pressure) is the collective protection system of choice for the M1 Tank, US ROLAND, Multiple Launch Rocket System (MLRS) Division Air Defense (DIVAD) Gun, Armored Forward Area Rearm Vehicle (AFARV), Forward Area Alerting Radar (FARR), NBC Reconnaissance Vehicle, Corps Support Weapon System (CSWS), Jet Exhaust Decontamination System (JEDS), and Cavalry Fighting Vehicle (CFV). A major thrust of the 1980 program was to reduce the US ROLAND vulnerability in a nuclear, biological, chemical (NBC) warfare environment. This was to ensure NBC-protective equipment on the US ROLAND is integrated in time for full production. Development was initiated on Technical Data Packages for incorporating the ventilated facemask on the designated vehicles. In FY 1981, work initiated in the previous year on the application of collective protective equipment for ROLAND continued.

2. (U) FY 1982 Program: Work will continue on vehicle interface development in preparation for the application of either the ventilated face mask or the hybrid type of NBC collective protection for the identified vehicles and new entries. The improved ventilated NBC system and associated interface hardware will be investigated for performance consistent with operational needs and doctrine. Development will continue on Technical Data Packages for incorporating the ventilated facemask on the designated vehicles. Preproduction engineering and support activities for the application of protection systems to the M1, Division Air Defense (DIVAD) Gun, and Cavalry Fighting Vehicle (CFV) will be initiated.

Project: #D023 Title: Collective Protection Materiel-Armored Vehicles
Program Element: #6.47.25.A Title: Chemical Defense Materiel
DOD Mission Area: #276 - Defensive Chemical and Biological Systems Budget Activity: #4 - Tactical Programs

3. (U) FY 1983 Planned Program: All Technical Data Package work initiated in prior years will be completed. Preproduction engineering and support activities for the application of protection systems to selected vehicles will continue as required. The current plan is to type classify the hybrid collective protective system directly from Advanced Development (AD) during FY 1983. All necessary experimental work will be performed, and the hybrid collective protection system will be ready for full-scale development during FY 1983.

4. (U) FY 1984 Planned Program: Continue preproduction engineering and support activities as required for the application of protective systems to selected vehicles.

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

6. (U) Major Milestones: Not applicable.

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	7230	10480	5677	13455	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	7230	10512	9021	-	Continuing	Not Applicable

The funding decrease of $32 thousand in FY 1982 is a result of the amended budget request and the application of revised inflation indices. The funding decrease of $3344 thousand in FY 1983 is the result of a change in the scope of the project.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.27.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	19564	14965	13650	26486	43359	154031
	QUANTITIES						
DC98	Position Location Reporting System (PLRS)	11785	9550	9362	6302	4900	71904
D183	Tactical Display System	467	2937	0	0	Not Applicable	
D184	Tactical Computer System/ Tactical Computer Terminal	7312	2478	1238	1254	2973	24399
D18	Military Computer Family	0	0	3050	18930	35486	57728

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 US Army and US Marine Corps development that will provide combat commanders in the 1980's with automatic, near-realtime, precise locations of their field forces on the battlefield, regardless of terrain, weather, or geographical location. This system is required as a realtime position/navigation command and control capability in a highly mobile environment to enable commanders to accurately and rapidly navigate and position weapons systems and maneuver elements to ensure rapid employment of combat power. The Tactical Display System (TDS) 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 Tactical Computer System/Tactical Computer Terminals (TCS/TCT) satisfy Army needs for intelligent terminals for automated field 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 utilized in a variety of support packages thus enabling the Army to achieve reduced life cycle costs, shorter 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 graceful insertion of Military Computer Family (MCF) components as they become available for long-term standardization. Full-scale development of

Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

the Army's MCF processors will begin in FY83. This project will provide a family of standardized automatic data processing equipment for battlefield automated systems so that both the affordability and survivability of these systems can be significantly increased.

C. (U) BASIS FOR FY 1983 RDTE REQUEST:

1. (U) For the Position Location Reporting System (PLRS), software for Automatic Test Equipment (ATE) will continue to be developed and tested. Development of Training Aids and Devices (TADs) will continue and planning for a Follow-On Evaluation (FOE) of the PLRS system will begin. Portable Test Unit (PTU) engineering development will continue. The Tactical Display System program is being realigned in FY82. Realignment of this project has discontinued funding for engineering development. Funds requested for the Tactical Computer System (TCS)/Tactical Computer Terminal (TCT) project will continue development of 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. The Military Computer Family (MCF) will transition from Advanced Development (AD), PE 6.37.23.A D186, by awarding two competitive full-scale development contracts to winners of the AD competition. An interim set of compatible peripherals will be fitted with MCF interfaces and evaluated.

2. (U) For PLRS, a baseline cost estimate was completed and validated by the cost analysis office of the Communications and Electronics Command. Program risk is considered low. For the Tactical Display System, an independent government cost estimate had been validated. That estimate accorded a moderate degree of risk associated with overall cost; subsequently, that estimate was considered low risk based on projections of Light-Emitting Diode module producibility techniques. During FY81 it became clear that, despite better techniques of module assembly, the risk associated with development of a large LED display within reasonable cost was excessive. For the TCS/TCT, the government estimate is based upon actual past experience of similar work, and the Army has high confidence that the program will be completed within the total cost estimate. Increase in estimate is attributed to added AN/MSM-105 test program set development and recognition that basic equipment changes may well be required as items accrue more evaluation data. For the Military Computer Family, cost estimate shown is for the first-generation components.

Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	19564	14965	13650	69845	154031
Funds (as shown in FY 1982 submission)	20638	15008	16560	21442	114103

The decrease in FY81 is attributable to the application of general Congressional reductions. The FY 1982 decrease is due to changes in inflation indices. The decrease in FY 1983 is due to reprograming to higher Army priorities together with realignment of program objectives in the Tactical Display System (TDS) project. The TDS realignment in FY82 is necessitated by Federal Republic of Germany (FRG) discontinuance of funding for the cooperative laser display effort together with increasingly strong indications that the Light-Emitting Diode (LED) prototype development was proceeding toward an unaffordable product solution. These factors have directed the program back to exploratory research in the field of electroluminescent technology for a long-term, affordable payoff and nearer term development capitalizing on recent advances with plasma technology. FY82 reprograming actions will fund the realignment. Increases in total estimated program cost and funds to completion are primarily attributable to the start of Project D187 beginning in FY 1983.

Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Army						
PLRS						
Funds (current requirements)	0	0	32400	27400	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	0	31300	46700	Not Shown	No Change	269600

Differences between estimates shown in FY 1982 and current requirements are attributable to deferment of procurement for one year per FY 1982 Congressional Joint Conference direction together with availability of more valid data upon which to base estimates. Procurement is anticipated to continue beyond FY 1987.

Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The Position Location Reporting System (PLRS) will augment conventional communications, provide reliable navigation information to friendly forces, and enhance the commander's ability to effectively control his maneuver elements. The Army requires a realtime positioning/navigation command and control capability in a highly mobile environment. This will allow for exploitation of technical superiority and act as a force multiplier to assist in defeating an enemy with a numerical advantage and greater firepower. The system employs a Master Station and an Alternate Master Station deployed in the division area for 100% backup and to insure system survivability and continuity of operations during rapid command post displacements. The air-transportable Master Station provides the commander with computer-controlled network management and dynamic situation display of deployed user units in manpack, vehicle, and airborne configurations distributed throughout the division's combat maneuver and fire support elements. The Master Station computes and continuously updates the position of each user unit. Units equipped with PLRS obtain: their location in coordinates, range and bearing to other friendly locations, coordinate locations of other user units, an alarm indication when entering a predesignated boundary area (i.e., minefield), and the ability to exchange abbreviated digital data messages. Airborne users are provided: position location, altitude, corridor guidance around obstacles/danger zones, and range bearing information to locations of ground users of designated coordinate locations for typical combat missions such as medical evacuation, air mobile operations, resupply extraction, and operations requiring voice radio silence. The system is crypto-secure and offers resistance to jamming and electronic vulnerability in a hostile electromsgnetic environment. The network automatically utilizes surface/airborne user units as integral relays to achieve over-the-horizon transmission and overcome terrain obstruction to line-of-site communications. The Position Location Reporting System (PLRS) entered full-scale engineering development in 1976. Two master units and 64 user units in various configurations completed Joint DT/OT II in December 1981. US Marine Corps amphibious testing will be completed in 2QFY1982. The Milestone III review is scheduled for spring FY 1982. The objective of the Tactical Display System (TDS) program is to develop a more effective means of displaying tactical situations in support of tactical automated systems. The Army assimilated development of the Tactical Computer System/Tactical Computer Terminal (TCS/TCT) as components of the Tactical Operations System (TOS). When TOS was denied authorization, without prejudice, in FY 1980, the Army notified the Congress that this project would continue and subsequently received approval of a $9.0 million congressional reprograming to support development in FY 1980. The need for a standard set of fully qualified ADP equipment had been recognized by the Army, and for the long term, the Army is committed to a military computer family (MCF) to satisfy that need. For the near term, TCS/TCT have similar general applicability, and the Army seeks to capitalize on this by making this equipment available to any system developer whose needs they can satisfy. The TCS/TCT will be equipment used for the Maneuver Control System. This is full LSI (Large Scale Integration) equipment, compact and militarized, thus enabling it to be employed in the M-577 armored command post carrier in the field at various echelons or in other shelter/van environments. Modular structure of the Tactical Computer

Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

System/Tactical Computer Terminals (TCS/TCT) permits them to be product-improved as requirements, technology changes, and life cycle cost consideration dictate. This structure further increases the flexibility for satisfying diverse systems requirements as well as long-range adaptability to emerging Military Computer Family (MCF) equipment. Without the availability of TCS/TCT, the Army would be forced to continue the proliferation of individual unique terminal and processor systems. This results in unacceptable duplication of research and development costs and increased development time and creates an intolerable logistics and training burden for multiple ADP equipment. This would restrict the Army's capability for realizing improved continuity of operations by sharing critical ADP resources when the need arises under adverse conditions. A full Integrated Logistics Support contract, to include Skill Performance Aids (SPA) manuals, training and logistics, was awarded in January 1979 as a cost-plus-incentive-fee (CPIF) contract. In February 1979, a separate contract, fixed price incentive (FPI) type, was awarded for the engineering development hardware. That hardware has since been accepted by the Army and introduced into Europe. The objective of the Military Computer Family program is to curb the proliferation of automation data processing equipment among battlefield automated systems by providing a wide range of processing capabilities via several subfamilies and standards (hardware and software) for both tactical applications and their related support centers. The wide range of processing capabilities is embodied in development of very small, powerful, reliable computers together with a standard set of compatible 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. This situation has made the introduction of sophisticated and rugged computer equipment pervasive throughout the field; as a consequence, there is proliferation of equipment types within a prescribed family of equipment. The Army's response is standardization with its MCF to limit equipment types within a prescribed family of equipment.

G. (U) RELATED ACTIVITIES: The US Marine Corps funds 40% of the Position Location Reporting System (PLRS) development under Program Element 6.47.19.M, Other Marine Corps Development (Engineering). Basic requirements and specifications for PLRS are stated in a 1976 USA/USMC Joint Services Operational Requirement. Concurrently, the Army is developing through a five-phase testbed program, the PLRS/Joint Tactical Information Distribution System (JTIDS) hybrid under PE 6.37.13.A. The hybrid consists of the PLRS system integrated with JTIDS, PLRS being modified slightly to interface with JTIDS and other emerging battlefield computer systems. The hybrid is intended to satisfy the Army's urgent requirements for secure, jam-resistant battlefield data distribution among its functional control systems to be fielded in the 80's timeframe. For the TCS/TCT, the initial maneuver control capabilities have been in Europe using engineering development models. This effort is funded under Program Element 2.37.40.A, D484. Advanced development of the Military Computer Family is funded in Program Element 6.37.23.A, D186.

Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

H. (U) WORK PERFORMED BY: Project Manager, Position Location Reporting System/Tactical Information Distribution System (PLRS/JTIDS), of the US Army Communications-Electronics Command (CECOM), Fort Monmouth, NJ. Primary contractor is Hughes Aircraft Company, Ground Systems Group, Fullerton, CA. Project Officer, Tactical Computer System/Tactical Computer Terminal (TCS/TCT), under Project Manager, Operations Tactical Data Systems (PM, OPTADS), US Army Communications and Electronics Command (CECOM), Fort Monmouth, NJ. Primary contractor is the Singer Co., Lieberscope Division, Glendale, CA. For the Military Computer Family (MCF), Project Officer under Director, Tactical Computer Systems Center, US Army Communications and Electronics Command (CECOM), Fort Monmouth, NJ.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: For PLRS to date, the contractor has conducted a trade-off analysis, and issued a Decision Plan and System Technical Description. Contractor tests of the Master Station software programs and fifteen Large-Scale Integration (LSI) chips were completed. An additional six-month development effort was initiated to complete the contractor effort. The internal PLRS Development Plan was updated to include joint Integration Logistics Support, Procurement, and Transition Plans. Electronic Warfare and TEMPEST test plans were completed. The development of a jammer for use during Development Testing/Operational Testing II (DT/OT II) was completed. 64 User Units were completed, and the master station software was developed. Contractor Prototype Qualification Tests were completed. Frequency Propagation Tests were completed at Eglin Air Force Base, FL. Government Qualifications Tests, DT II, began in April 1981 and were successfully completed on 18 September 1981. The system was shipped to Fort Hood, TX, for the October 1981 start of combined OT II. The production request for proposal was issued in September 1981. For the Tactical Display System, subsequent review of affordability of LED modules during FY 1981 and the attendant system costs confirmed that the LED display, as evolving, was too costly. Integration problems during FY 1981 with the laser display illustrated that technology not suitable to satisfy requirements for a compact, tactical large screen display. The Tactical Computer System/Tactical Computer Terminal (TCS/TCT) engineering development hardware was accepted by Army during FY 1981. Introduction into Europe began under PE 2.37.40.A, D484. DT II, Integrated Logistics Support (ILS), communications testing and maintenance engineering evaluations were in progress during this period. MCF advanced development accomplishments are discussed in PE 6.37.23.A, D186.

2. (U) FY 1982 Program: Combined DT II tests were completed at Fort Hood, TX, in December 1981. Marine Corps amphibious OT II will be conducted in January 1982. Milestone III is scheduled for spring 1982. ED equipment will be refurbished following completion of all testing, and all DT/OT II deficiencies will be corrected. Automatic Test Equipment

Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

(ATE) software development will begin along with militarization of the PLRS portable test unit (PTU). Development of TADs will commence. For the Tactical Computer System/Tactical Computer Terminal (TCS/TCT), actions include completion of the hardware contract, acquisition of Producibility Engineering and Planning (PEP) Data, completion of the ILS contract, except for software programing on the USM-410, which continues, completion of DT II, and full communications testing.

3. (U) FY 1983 Planned Program: PLRS: Software for Automatic Test Equipment (ATE) will continue to be developed and tested. Development of Training Aid Devices (TADs) will continue and planning for Follow-On Evaluation of the PLRS system will begin. PTU militarization development will continue. For TCS/TCT, initial software programing on the USM-410 will be completed, a production posture will be established, and transition phase will be initiated. For the Military Computer Family (MCF), competitive full-scale development contracts will be awarded for computer processor prototypes.

4. (U) FY 1984 Planned Program: PLRS: TADs, ATE Software, and planning for Follow-On Evaluation will be completed. Production of the militarized PTU will be completed. For the TCS/TCT, engineering development models will continue to be used as part of the Maneuver Control System prototype in Europe. Engineering efforts in support of TCS/TCT applications will be maintained. Additional test program sets will be prepared based on cumulative prototype availability data and trade-off analyses. Engineering development of MCF computer processors will continue. Interim MCF peripherals will be evaluated.

5. (U) Program to Completion: PLRS: A PLRS Follow-on Evaluation will be conducted, as required, concurrent with fielding activities. The TCS/TCT project will continue at minimal funding to conclude test program set development. MCF will accept delivery of FSD computer processor models. DT/OT II will be conducted for flyoff of two competitive prototypes.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #DC98 Title: Position Location Reporting System (PLRS)
Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command & Control Budget Activity: #4 - Tactical Programs

A. (U) DETAILED BACKGROUND AND DESCRIPTION: 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 effectively control maneuver elements by providing friendly force information in a secure, jam-protected network. Basic requirements and specifications for the system are stated in a 1976 USA/USMC Joint Services Operational Requirement (JSOR). The Army requires such a system in order to accurately and rapidly navigate and position weapons systems and maneuver elements to ensure rapid employment of combat power. The PLRS system employs a Master Station and an Alternate Master Station for 100% backup and to insure system survivability and continuity of operations during displacements. The air-transportable master station provides computer-controlled network management and a dynamic situation display of deployed User Units in manpack, vehicle, and airborne configurations distributed throughout a division's combat maneuver and fire support elements. Each User Unit automatically transmits a signal burst on a precision time-ordered schedule, measures time-of-arrival of designated User Unit transmissions, and automatically relays these measurements to the Master Station. The Master Station computes and continuously updates the position of each User Unit. Units equipped with PLRS obtain: their own location in UTM coordinates, range and bearing to other friendly locations, the UTM coordinate locations of other User Units, an alarm indication when entering a predesignated boundary area such as a minefield, and abbreviated data messages from other users. Airborne users are provided: position location, altitude, corridor guidance around obstacles/danger zones, and range and bearing information to locations of ground users or designated coordinate locations for combat missions such as medical evacuation, airmobile operations, resupply extraction, or operations requiring voice radio silence. The system is crypto-secure and is highly resistant to jamming. The network, under Master Station management, automatically utilizes surface/airborne User Unit relays to achieve over-the-horizon transmission and to overcome close-in terrain obstructions to line-of-site communications. PLRS entered full-scale engineering development in 1976. Two Master Stations and 64 User Units, in manpack, surface vehicle, and airborne configurations, completed primary joint testing (DT/OT II) in January 1982. An ASARC/MSARC III production decision is scheduled for spring 1982.

B. (U) RELATED ACTIVITIES: The US Marine Corps funds 40% of the PLRS development under Program Element 6.47.19.M, Other Marine Corps Development (Engineering). The Army is also developing the PLRS/Joint Tactical Information Distribution System (JTIDS) Hybrid under PE 6.37.13.A, Project D370. The hybrid, also known as the Army Data Distribution System (ADDS), is

Project: #DC98 Title: Position Location Reporting System (PLRS)
Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command & Control Budget Activity: #4 - Tactical Programs

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 1980's. ADDS consists of the PLRS integrated with the JTIDS Class 2 terminal. Army efforts on the JTIDS program are covered by PE.6.47.02.A, Project D451

C. (U) WORK PERFORMED BY: 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.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The contractor conducted a trade-off analysis, and issued a Design Plan and System Technical Description. Contractor tests of the Master Station software programs and fifteen Large-Scale Integration (LSI) chips were completed. The internal PLRS Development Plan was updated to include joint Integrated Logistics Support, Procurement, and Transition Plans. Electronic Warfare and TEMPEST test plans were completed. The development of a jammer for use during Development Testing/Operational Testing II (DT/OT II) was completed. Fabrication of sixty-four engineering development model (EDM) User Units and two Master Stations was completed. Master Station software was developed. Primary contractor Protytype Qualification Tests (PQT-C) were completed, and propagation testing was conducted at Eglin Air Force Base, FL. Government joint DT II (PQT-G) began in April 1981 with delivery of EDM equipment to the US Army Electronics Proving Ground (USAEPG) at Fort Huachuca, AZ, and was completed on 18 September 1981. The system was then shipped to Fort Hood, TX, for the start of joint OT II in October 1981. The production request for proposal (RFP) was issued in September 1981.

2. (U) FY 1982 Program: The production proposal was received in November 1981. Joint OT II tests were completed at Fort Hood, TX, in December. A specialized US Marine Corps amphibious OT II was conducted at Camp Lejeune, NC, in January 1982. The ASARC/MSARC III production decision is scheduled for spring 1982. The system will complete deferred (potentially destructive) testing by 4QFY1982. EDM equipment will be refurbished following completion of testing, and correction of deficiencies discovered during DT/OT II will commence on an accelerated basis. Utilization of EDM equipment by the 9th Infantry Division High Technology Test Bed is planned in FY82 for purposes of further doctrinal/concept refinements.

Project: #DC98 Title: Position Location Reporting System (PLRS)
Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command & Control Budget Activity: #4 - Tactical Programs

Software development, for use with Automatic Test Equipment (ATE), will begin, along with militarization of the PLRS Portable Test Unit (PTU). Development of Training Aids and Devices (TADs) is scheduled for initiation late in the fiscal year.

3. (U) FY 1983 Planned Program: Software development and test for ATE use will continue. Development of TADs will continue, and planning for follow-on evaluation of the PLRS system will be started. The PTU EDM Phase will continue. Begin production.

4. (U) FY 1984 Planned Program: TADs, software for ATE, and planning for follow-on evaluation will be completed. Development of the militarized PTU will also be completed.

5. (U) Program to Completion: Follow-on evaluation (FOE) will be conducted, if required, during initial fielding activities.

6. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Army Systems Acquisition Review Council (ASARC) III	3rd Qtr FY 82	2nd Qtr FY 82
Initial Operational Capability (IOC)	FY 85	4th Qtr FY 84

Change in ASARC date results from availability of principal member. IOC change results from Congressional denial of FY 1982 production funding.

Project: #DC98 Title: Position Location Reporting System (PLRS)
Program Element: #6.47.27.A Title: Command and Control
DOD Mission Area: #344 - Tactical Command & Control Budget Activity: #4 - Tactical Programs

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	11785	9550	9362	6302	490C	71904
Funds (as shown in FY 1982 submission)	10976	9578	9564	-	6520	58093
Quantities (current requirements)			NO CHANGE			
Quantities (as shown in FY 1982 submission)			2 Master Stations/64 User Units			

Increase in FY 1981 was due to service reprograming for cost growth resulting from renegotiations with prime contractor. Changes in FY 1982 thru 1983 are the result of minor service reprograming of funds to higher priority programs. Change in Cost to Complete and Total Estimated Cost results from addition of funding in FY 1985 for final RDTE activities, final FY 1980 adjustments, and correction of error in FY82 submission for prior year funding total.

Project: #DC98 — Title: Position Location Reporting System (PLRS)
Program Element: #6.47.27.A — Title: Command and Control
DOD Mission Area: #344 - Tactical Command & Control — Budget Activity: #4 - Tactical Programs

(U) Other Appropriations: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement-Army						
Funds (current requirements)	0	0	32400	27400	Continuing	Not Applicable
Funds (as shown in FY 82 submission)			NOT SHOWN			
Quantities (current requirements)						
Master Stations	0	0	2	1	Continuing	Not Applicable
Basic User Units	0	0	165	412	Continuing	Not Applicable
Installation Kits	0	0	385	887	Continuing	Not Applicable
Quantities (as shown in FY 1982 submission)			NOT SHOWN			
Aircraft Procurement, Army						
Funds (current requirements)	0	0	0	4300	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)			NOT SHOWN			
Quantities (current requirements)						
Installation Kits	0	0	0	184	Continuing	Not Applicable
Quantities (as shown in FY 1982 submission)			NOT SHOWN			

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.30.A
Title: Remotely Piloted Vehicles (RPV's)
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	56669	73094	77949	Under Revision	Continuing	Continuing
	QUANTITIES						
D040	Remotely Piloted Vehicle	56669	73094	73172	Under Revision	Under Revision	Under Revision
D041	Mission Payloads	0	0	4777	Under Revision	Continuing	Continuing

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for Full-Scale Development (FSD) of a Remotely Piloted Vehicle (RPV) System to fill the requirement for unmanned aerial target acquisition, target location, artillery adjustment, laser designation, and battlefield post-strike reconnaissance. The FSD of a night sensor, Forward Looking Infrared Sensor (FLIR), will fill the requirement to increase the effectiveness of the RPV system by adding a full night capability as well as augmented day capability to operate when degraded visibility and atmospheric conditions exist. Laser designation will be provided for a family of laser-seeking weapons including cannon-launched guided projectiles (COPPERHEAD) and helicopter-launched missiles (HELLFIRE). The RPV is required to extend the eyes of Brigade and Division Combat elements to the range of their direct support artillery weapons where ground-based systems cannot see and the risk to manned observation aircraft is high. This system multiplies the effectiveness of field artillery by providing target acquisition artillery adjustment and laser designation at the full range of the field artillery. By increasing the effectiveness of ammunition expended per target, the RPV assists in overcoming the numerical superiority of a potential enemy.

Program Element: #6.47.30.A Title: Remotely Piloted Vehicles (RPV's)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

C. (U) BASIS FOR FY 1983 RDTE REQUEST:

1. (U) Funds requested provide for the continuation of the FSD program for a daylight target acquisition designation and reconnaissance RPV System. Separate contracts were awarded for the RPV System and the associated antijam data link. The data link is funded under PE #6.47.05.A, Modular Integrated Communication and Navigation System (MICNS). Prior to FY82, the MICNS Full-Scale Development Program was funded from PE #6.47.48.A, Standoff Target Acquisition System (SOTAS), this PE, and PE #6.47.42.F, Precision Location System (PLSS). In-house support will include monitoring contractor performance using design reviews and controlling cost, technical work, and schedule.

2. (U) On 30 September 1981, the Army elected within its program prioritization to stretch-out the RPV program. Subsequent to the Army decision the Congress reinstated the funds. Net result of budget fluctuations is a delay in the FSD program. Additionally, the start of the Forward Looking Infrared (FLIR) mission payload development was delayed from FY82 to FY83.

	Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Project D040	1st Flight of Prototype	3QFY82	4QFY81
	OT Testing	To Be Determined	4QFY83
	Production Award	To Be Determined	1QFY84

The milestones differ from those provided in FY 1982 submission because the FSD phase was restructured due to budget fluctuations from September to December 1981 and due to some system integration problems encountered in the fall of 1981. Going into FY82, the prime contractor planned to increase the work effort and hire about 50% additional people. Instead, as a result of Army budget decrements, prime contractor manning was reduced by 50% and subcontractors were brought down to minimum manning. Also, prior to the budget decrement in September 1981, first flight of the RPV had been delayed due to system integration problems. With the restoration of funds by Congress, the Army is investigating what can be done to accelerate R&D, production, and fielding the RPV to include fielding of an early capability in FY83 with the High Technology Division (9th Infantry Division, Fort Lewis, Washington).

Program Element: #6.47.30.A Title: Remotely Piloted Vehicles (RPV's)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

Project			
D041	FSD Contract Award	4QFY83	3QFY82
	DT/OT II Completed	TBD	3QFY84
	Production Contract Award	TBD	4QFY84

Due to funding limitations in FY82, start of the FLIR mission payload development was delayed to FY83.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	56669	73094	77949	Under Revision	Under Revision
Funds (as shown in FY 1982 submission)	54670	73348	34329	22607	252854

The FY81 increase was due to reprograming for the RPV data link. FY82 decrease is due to the difference between the authorization and appropriation acts. FY83 increase is for development of automated test equipment computer program and for training devices. Also, one additional system is being developed for early testing in FY83. Program from FY84 to completion is under revision. The Army is investigating what can be done to accelerate R&D, production, and fielding of the RPV.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands) Procurement is to be funded in other procurement, Army (OPA) Appropriation. The Army is investigating what can be done to accelerate fielding of the RPV to include fielding of an early capability in FY83 with the High Technology Division (9th Infantry Division, Fort Lewis, Washington).

Program Element: #6.47.30.A Title: Remotely Piloted Vehicles (RPV's)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The program will accomplish the Full-Scale Development (FSD) of the RPV System begun in FY 1979 and the FLIR planned to start in FY 1983. The RPV System will fill the requirement for unmanned aerial target acquisition, target designation and location. Laser designation will be provided for a family of laser seeking weapons including cannon-launched guided projectiles (COPPERHEAD) and helicopter-launched missiles (HELLFIRE). The RPV system is required to extend the eyes of Brigade and Division combat elements to the range of their direct support artillery weapons where, during combat, ground-based systems cannot see and the risk to manned observation aircraft is high. This system multiplies the effectiveness of field artillery and assists the commander to optimally employ his forces by providing artillery adjustment and laser designation on targets at the full range of the field artillery. 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 fill the requirement of 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.

G. (U) RELATED ACTIVITIES:

PROJECT #D040: (U) The RPV was funded during Exploratory Development and Advanced Development in FY 1975-1978 under PE 6.27.32.A, Remotely Piloted Vehicle Supporting Technology, and 6.37.25, 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 PE's. The Air Force RPV programs consisting of PE 6.37.39.F, Advanced RPV's, and PE 6.47.46.F, 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 between the services. The data link is funded under PE 6.47.05.A, Modular Integrated Communication and Navigation System (MICNS). Prior to FY82 the MICNS engineering development program was funded from PE 6.47.48.A, Standoff Target Acquisition System (SOTAS), this PE, and PE 6.47.32.F, Precision Location Strike System (PLSS).

PROJECT #D041: (U) The FLIR sensor development is being funded during Exploratory Development and Advanced Development by PE 6.27.32A, Remotely Piloted Vehicle Supporting Technology, and 6.37.25, Remotely Piloted Vehicles. There is no unnecessary duplication of this effort within the Army or the Department of Defense.

Program Element: #6.47.30.A Title: Remotely Piloted Vehicles (RPV's)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

H. (U) WORK PERFORMED BY:

PROJECT #D040: (U) US Army Aviation Research and Development Command, Saint 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; Applied Technology Laboratory, Fort Eustis, VA; and the US Army Mobility Equipment Research and Development Command, Fort Belvoir, VA. Contracts were awarded to Lockheed Space and Missiles Company, Sunnydale, CA, for system development and to Harris Corporation, Melbourne, FL, for the Modular Integrated Communications and Navigation System (MICNS-antijam data link).

PROJECT #D041: (U) US Army Aviation Research and Development Command, Saint Louis, MO. Night Vision and Electro-Optics Laboratory, US Army Electronic Research and Development Command, Fort Belvoir, VA.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments:

Project #D040: (U) The full-scale development (FSD) program started in FY 1979, following the successful Systems Technology Demonstrator (STD) program accomplished under PE 6.37.25.A Remotely Piloted Vehicles/Drones, from FY 1975 through 1978. The Integrated Communications Navigation System (ICNS), an antijam data link, was flight tested in FY 1978 in a manned aircraft and during the STD. By the beginning of FY 1979, all necessary preengineering development work was completed for a daylight, target acquisition, laser designation and reconnaissance system. A separate contract for the data link, the Modular Integrated Communication and Navigation System (MICNS), was awarded on 1 May 1979. Source selection was conducted and the RPV system development contract was awarded 31 August 1979. The contract requires the design and fabricating of 22 air vehicles, 4 ground control stations, 3 launch and recovery systems and 18 daylight sensor systems. The contractor began design and engineering late in FY 1979. Preliminary design of hardware and software is continuing. Preliminary Design Review (PDR) and subsystem Critical Design Reviews (CDR) have been held for a number of subsystems. In addition, mockups have been constructed and mockup reviews were completed. First RPV system was fabricated. Hardware/software integration was started.

PROJECT #D041: (U) Not applicable to 6.47.30A.

Program Element: #6.47.30.A Title: Remotely Piloted Vehicles (RPV's)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

2. (U) FY 1982 Program:

Project #D040: (U) Because of funding limitations at the start of the fiscal year the full-scale development (FSD) program was restructured with the prime contractor reducing manpower by approximately 50% and renegotiating the subcontractors and suppliers renegotiated and restarted. Critical Design Reviews (CDR's) for the air vehicles, the launcher, and ground support equipment will be completed by midyear. The first mission payload will be delivered for testing. The RPV system CDR will be completed 4th quarter to include system software. Subsystem integration will continue with manned aircraft flights, and first flight of the RPV will be accomplished.

Project #D041: (U) The program to accomplish the full-scale development for the RPV with FLIR has been delayed from FY 1982 until FY 1983. This program will provide a night adverse weather capability for the RPV.

3. (U) FY 1983 Planned Program:

Project #D040: (U) RPV integration will continue with 1st quarter deliveries of the Modular Integrated Communications and Navigation System (MICNS) data link. Flight design reviews will be conducted. Element and component qualification testing will begin. Remaining sets of Full-Scale Development systems will be fabricated. MICNS module deliveries will continue through the fiscal year. Contractor development tests will be conducted. Training and maintenance requirements will be established; this will be done 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 4th quarter. One system will be delivered to the High Technology Division for testing.

Project #D041: (U) The RPV day system was approved for entry into FSD in FY 1978. Contingent upon this approval was the requirement that a FLIR sensor be developed to be deployed subsequent to the fielding of the day RPV System. All necessary experimental work required before moving into full-scale development of the FLIR program will be completed under program element 6.37.25.A, Remotely Piloted Vehicles/Drones. The Full-Scale Development program will start in FY 1983. The FSD contractor will be required to design and fabricate FLIR payloads to be integrated into the RPV system. FLIR payload will be interchangeable with the daylight sensor payloads. This capability will provide night/limited adverse weather capability to the RPV system.

Program Element: #6.47.30.A Title: Remotely Piloted Vehicles (RPV's)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

4. (U) FY 1984 Planned Program:

Project #D040: (U) Remaining Full-Scale Development air vehicles will be completed. MICNS deliveries will be completed. Contractor prototype qualification tests will be initiated after completion of all component level qualification tests. System-level qualification test will be completed. Government development tests will start.

Project #D041: (U) The FLIR FSD program will continue into FY84. System design and design reviews will be conducted. The FLIR will be made compatible with the day TV system already in FSD. The program will be monitored technically by a team of engineers who will be drawn from various government laboratories.

5. (U) Program to Completion:

Project #D040: (U) Government operational tests will be conducted. Final production readiness reviews and system-level configuration audit will be conducted. Initiatives for accelerating the R&D program, production, and fielding of the RPV are under study by the Army staff.

Project #D041: (U) The FLIR FSED program will continue. Contractor testing will be completed and the system fully integrated with the RPV system. DT/OT II will be complted, and a production contract will be awarded. Other mission payloads will be developed as the requirements are identified. This is a continuing program.

Program Element: #6.47.30.A
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance

Title: Remotely Piloted Vehicles (RPV's)
Budget Activity: #4 - Tactical Programs

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. (U) Development tests were conducted July-November 1977 at the US Army Electronic Proving Ground, Fort Huachuca, AZ, using the Aquila Advanced Development hardware. Data was collected and analyzed on the following:

(1) (U) Technical performance characteristics of the RPV system.

(2) (U) Ability of the RPV to be navigated to and from an area.

(3) (U) Ability of the RPV to detect, locate, recognize, and identify targets.

(4) (U) Health and safety hazards when operating the RPV system.

(5) (U) Reliability, availability, and maintainability (RAM) characteristics of the RPV system.

(6) (U) Performance characteristics of the launch and recovery system.

During the test, military personnel operated the system and performed organizational maintenance. Contractor personnel performed all maintenance beyond organization level.

b. (U) The following is a summary of the development test results:

(1) Technical Performance. The RPV generally performed satisfactorily to ranges and altitudes in excess of the design specifications of kilometers and 12,000 ft. above mean sea level. The system's worst case position location error for the air vehicle location was 160.7m at 20 km ground system to air vehicle range. This was caused by antenna misalignment and will be corrected to within in the full-scale development (FSD) models. The mean altitude error was 7m. The RPV followed the programed flight path with a mean guidance error (depending on flight direction) of from 3 to 45m with

one Ground Control Station (GCS) and from 1 to 311m with the other GCS. Errors were due to weak signals when the RPV antenna was turned away from the GCS and to errors in tracking in the GCS antenna system. These difficulties will be corrected in the engineering development models.

(2) (U) Sensor Performance.

(a) (U) With the stabilized TV camera with autotracking capability, 73.9 percent of the open area targets were detected and 50.0 percent of the cluttered area targets were detected. Of the detected targets, 79.1 percent were correctly identified. The average detection slant range was 3862 ft.

(b) (U) The mean error in the LASER rangefinder averaged position readout was 161.3m at 17km.

(3) (U) Health and Safety. Health and safety precautions required that exposed personnel be protected during launch (ears) and laser operations (eyes).

(4) (U) Reliability, availability, and maintainability. The reliability and availability of the air vehicle and the stabilized TV camera with boresighted laser rangefinder/target designator were considerably lower than the other components of the system. Organizational maintenance was not authorized on the sensors or the Ground Control Station electronics.

(5) (U) Launch and Recovery Systems. Performance of the launch and recovery systems was adequate.

c. (U) The AQUILA, referred to as the RPV system, is a lightweight, unmanned, airborne system which provides real or near-realtime reconnaissance, target acquisition, conventional artillery adjustment, and laser designation. This RPV system was designated a System Technology Demonstrator. It was not designed or intended to be a fieldable militarized system.

(1) (U) The RPV system consists of four major subsystems plus ancillary support equipment. The subsystems are:

(a) (U) Remotely piloted air vehicle.

Program Element: #6.47.30.A
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance

Title: Remotely Piloted Vehicles (RPV's)
Budget Activity: #4 - Tactical Programs

(b) (U) Ground control station (GCS).

(c) (U) Launcher.

(d) (U) Retrieval assembly.

(2) (U) The RPV is guided and tracked from the GCS. Control commands are processed through a computer in the GCS and transmitted via a radio data link. TV sensor data and RPV telemetry data are returned by a second data link. The GCS is equipped with TV displays and video tape recording equipment. Launching of the aircraft is achieved by a truck-mounted pneumatic catapult. Recovery is achieved by the use of a vertical net/horizontal strap retrieval assembly.

(3) (U) The system includes a preprogramable flight path control capability to include the following modes:

(a) (U) Waypoint navigation.

(b) (U) Repetitive search.

(c) (U) Loiter/orbit.

(d) (U) Ascend/level-off.

(e) (U) Visual landing approach/recovery.

(f) (U) Link loss maneuver.

The operator can also use the manual control system, overriding the automatic control.

(4) (U) The system was provided with the following sensor payloads:

(a) (U) Stabilized TV camera with autotracking capability.

(b) (U) Stabilized TV camera with boresighted laser rangefinder/target designator.

d. (U) The full-scale development hardware will include the following features:

(1) (U) A hardened system designed to sustain the rigors of combat.

(2) (U) Stringent reliability, availability, and maintainability requirements.

(3) (U) An antijam data link.

(4) (U) Tighter accuracy specifications.

(5) An increase in range of the system out to

e. (U) Development Tests II (DT II) will be conducted at Fort Bliss, Texas.

2. (U) Operational Test and Evaluation:

a. (U) In conjunction with the development tests at Fort Huachuca, Arizona, July-November 1977, the US Army Field Artillery Board conducted Force Development Testing and Experimentation (FDTE) of the RPV. The following were FDTE test objectives:

(1) (U) To assess the ability of the RPV system to conduct daytime-only reconnaissance, target acquisition, artillery adjustment and laser designation.

(2) (U) To identify the organizational and operational requirements for employment of the RPV system. During the test, military personnel operated the system and performed organizational maintenance.

b. During the conduct of FDTE, 47 RPV launches were accomplished resulting in 39 flights completed in which the target acquisition mission could be conducted. Three RPV's were crashed. The system demonstrated the viability of the

concept for an unmanned aerial vehicle to navigate to an area of interest up to from the launch site, to detect uncamouflaged targets of potential military significance, and to return to the recovery site.

c. (U) The RPV system detected and located approximately 62 percent of the targets it overflew. Both single and multiple vehicle targets in the proximity of terrain clutter were more difficult to detect than targets in the open.

d. (U) Targets were engaged with artillery using the RPV and standard adjustment techniques.

e. (U) The RPV system automatically tracked approximately 63 percent of the targets selected for simulated engagement with a terminally guided laser homing artillery projectile. Targets of high contrast to background terrain could be tracked adequately; targets of low contrast could not be adequately tracked for designation.

f. (U) An antijam data link was tested at Fort Huachuca, January-February 1978. Attempts were made to jam the Harris Corporation technology demonstrator which is the Integrated Communications Navigation System (ICNS). The ICNS was carried by both a manned aircraft and the RPV. Attempts to jam the video link were not successful.

g. (U) Survivability testing was conducted at Fort Bliss, Texas, February-March 1978. The RPV was engaged by antiaircraft guns and survived the engagements.

h. (U) In March 1976 at White Sands Missile Range, the RPV successfully designated for the Copperhead round. A direct hit was scored on the target tank.

i. (U) The full-scale engineering development models will undergo operational testing at Fort Hood, Texas. The Operational Test and Evaluation Agency will perform this independent evaluation.

Program Element: #6.47.30.A
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance

Title: Remotely Piloted Vehicles (RPV's)
Budget Activity: #4 - Tactical Programs

3. (U) System Characteristics:

Operational/Technical Characteristics	Objectives	Demonstrated Performance
Range GCS to air vehicle		
(U) Range vehicle to target		
a. Detection on road/off road		
b. Recognition		
c. Identification		
d. Designation		
Accuracy (CEP) at		
Emplacement/Displacement		
(U) Survivability	Survive A/A guns and Heat-Seeking Missiles	Survived A/A guns
Minimum radar and IR Signatures	Heat Seeking Missiles do not lock-on.	N/A
(U) Antijam data link	Not Jammable	Not Jammable

Program Element: #6.47.30.A
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance

Title: Remotely Piloted Vehicles (RPV's)
Budget Activity: #4 - Tactical Programs

Operational/Technical Characteristics	Objectives	Demonstrated Performance
(U) Nuclear, Ballistic, Chemical	MILSPEC	N/A
(U) Hardening		
(U) Endurance of no less than	3 hrs	3 hrs
(U) Altitude	12000 ft	12000 ft

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: # D040 Title: Remotely Piloted Vehicles (RPVs)
Program Element: # 6.47.30.A Title: Remotely Piloted Vehicles (RPVs)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

A. (U) DETAILED BACKGROUND AND DESCRIPTION: This program provides for Full-Scale Development (FSD) of a Remotely Piloted Vehicle (RPV) System to fill the requirement for unmanned aerial target acquisition, target designation and location. Laser designation will be provided for a family of laser seeking weapons including cannon-launched guided projectiles (COPPERHEAD) and helicopter-launched missiles (HELLFIRE). The RPV system is required to extend the eyes of Brigade and Division combat elements to the range of their direct support artillery weapons where, during combat, ground-based systems cannot see and the risk to manned observation aircraft is high. This system multiplies the effectiveness of field artillery and assists the commander to optimally employ his forces by providing artillery adjustment and laser designation on targets at the full range of the field artillery. The RPV assists in overcoming the numerical superiority of a potential enemy by enhancing the field artillery's ability to destroy tanks by reducing the amount of ammunition required to destroy each target.

B. (U) RELATED ACTIVITIES: The RPV was funded during Exploratory Development and Advanced Development in FY 1975-1978 under PE 6.27.32.A, Remotely Piloted Vehicle Supporting Technology, and 6.37.25, Remotely Piloted Vehicles. Development of different interchangeable payloads such as night and adverse weather sensors, jammers, radio relay, meteorological devices, etc., will continue under these two PEs. The Air Force RPV programs consisting of PE 6.37.39.F, Advanced RPVs, and PE 6.47.46.F, 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 between the services. The data link is funded under PE 6.47.05.A, Modular Integrated Communication and Navigation System (MICNS). Prior to FY82, the MICNS Engineering Development Program was funded from PE 6.47.48.A, Standoff Target Acquisition System (SOTAS), this PE, and PE 6.47.32.F, Precision Location and Strike System (PLSS).

C. (U) WORK PERFORMED BY: US Army Aviation Research and Development Command, Saint Louis, MO; Combat Surveillance Target Acquisition Laboratory, US Army Electronics Research and Development Command, Fort Monmouth, NJ; Night Vision and Electron-Optics Laboratories, US Army Electronic Research and Development Command, Fort Belvoir, VA; Research and Technology Laboratories, Aero Mechanics Laboratory, Moffett Field, CA; Applied Technology Laboratory, Fort Eustis, VA; and the US Army Mobility Equipment Research and Development Command, Fort Belvoir, VA. Contracts were awarded to Lockheed Missile and Space Company, Sunnyvale, CA, for system development and to Harris Corporation, Melbourne, FL, for the Modular Integrated Communication and Navigation System (MICNS-antijam data link).

Project: # D040 — Title: Remotely Piloted Vehicles (RPVs)
Program Element: # 6.47.30.A — Title: Remotely Piloted Vehicles (RPVs)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance — Budget Activity: #4 - Tactical Programs

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The full-scale development (FSD) program started in FY 1979, following the successful Systems Technology Demonstrator (STD) program accomplished under PE 6.37.25.A, Remotely Piloted Vehicles/Drones, from FY 1975 through 1978. An antijam data link, the Integrated Communications Navigation System (ICNS), was flight tested in FY 1978 in a manned aircraft and during the STD. By the beginning of FY 1979, all necessary preengineering development work was completed for a daylight, target acquisition, laser designation and reconnaissance system. A separate contract for the data link, the Modular Integrated Communication and Navigation System (MICNS), was awarded on 1 May 1979. Source selection was conducted, and the RPV system development contract was awarded on 31 August 1979. The contract requires the design and fabrication of 22 air vehicles, 4 ground control stations, 3 launch and recovery systems, and 18 daylight sensor systems. The contractor began design and engineering late in FY 1979. Preliminary design of hardware and software is continuing. Preliminary Design Review (PDR) and subsystem Critical Design Reviews (CDR) have been held for a number of subsystems. In addition mockups have been constructed and mockup reviews were completed. First RPV system was fabricated. Hardware/software integration was started.

2. (U) FY 1982 Program: Because of funding limitations at the start of the fiscal year, the Full-Scale Development (FSD) program was restructured with the prime contractor reducing manpower by approximately 50% and renegotiating with the subcontractors and suppliers to accommodate the reduced level of funding. With the restoral of funds, personnel were rehired, and subcontractors and suppliers renegotiated and restarted. Critical Design Reviews (CDRs) for the air vehicle, the launcher, and ground support equipment will be completed by midyear. The first mission payload will be delivered for testing. The RPV system CDR will be completed during the 4th quarter to include system software. System integration will continue with manned aircraft flights, and first flight of the RPV will be accomplished.

Project: # D040 Title: Remotely Piloted Vehicles (RPVs)
Program Element: # 6.47.30.A Title: Remotely Piloted Vehicles (RPVs)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

3. (U) FY 1983 Planned Program: RPV system integration will continue with 1st quarter deliveries of the Modular Integrated Communications and Navigation System (MICNS) data link. Flight design reviews will be conducted. Element and component qualification testing will begin. Remaining sets of Full-Scale Development systems will be fabricated. MICNS module deliveries will continue through the fiscal year. Contractor development tests will be conducted. Training and maintenance requirements will be established; this will be done 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 end of the 4th quarter. One system will be delivered to the High Technology Division for testing.

4. (U) FY 1984 Planned Program: Remaining Full-Scale Development air vehicles will be completed. MICNS deliveries will be completed. Contractor prototype qualification test will be initiated after completion of all component-level qualification tests. System-level qualification test will be completed. Government development tests will start.

5. (U) Program to Completion: Government operational tests will be conducted. Final production readiness reviews and system-level configuration audit will be conducted. Initiatives for accelerating the R&D program, production, and fielding of the RPV are under study by the Army Staff.

6. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
1st Flight of Prototype	3QFY82	4QFY81
OT Testing	To Be Determined	4QFY83
Production Award	To Be Determined	1QFY84

The milestones differ from those provided in the FY 1982 submission because the Full-Scale Development (FSD) phase was restructured due to budget fluctuations from September to December 1981 and due to some system integration problems encountered in the fall of 1981. Going into FY82, the prime contractor planned to increase the work effort and hire about 50% additional people. Instead, as a result of Army budget decrements, prime contractor manning was reduced by 50% and subcontractors were brought down to minimum manning. Also, prior to the budget decrement in September 1981, first flight of the RPV had been delayed due to system integration problems. With the restoral of funds by the Congress, the Army is investigating

Project: # D040 Title: Remotely Piloted Vehicles (RPVs)
Program Element: # 6.47.30.A Title: Remotely Piloted Vehicles (RPVs)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

what can be done to accelerate R&D, production, and fielding of the RPV to include fielding of an early capability in FY83 with the High Technology Division (9th Infantry Division, Fort Lewis, Washington).

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	56669	73094	73172	Under Revision	Under Revision	Under Revision
Funds (as shown in FY 1982 submission)	54670	58348	19846	N/A	0	200764
Quantities (current requirements)	-	-	-	-	-	22 Air Vehicles 5 Ground Control Stations 4 Launch Systems 4 Recovery Systems 20 Daylight Sensors
Quantities (as shown in FY 1982 submission)						22 Air Vehicles 4 Ground Control Stations 3 Launch Systems 3 Recovery Systems 18 Daylight Sensors

The FY81 increase was due to reprograming for the RPV data link. Increases for FY82 and FY83 were added for development of automated test equipment computer program and for training devices. Also, one additional system is being developed for early testing in FY83. Program from FY84 to completion is under revision. The Army is investigating what can be done to accelerate R&D, production, and fielding of the RPV.

Project: # D040 Title: Remotely Piloted Vehicles (RPVs)
Program Element: # 6.47.30.A Title: Remotely Piloted Vehicles (RPVs)
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

Other Appropriations: Procurement is to be funded in Other Procurement, Army (OPA) Appropriations. The Army is investigating what can be done to accelerate fielding of the RPV to include fielding of an early capability with the High Technology Division (9th Infantry Division, Fort Lewis, Washington).

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.40.A
Title: Tactical Surveillance System
DOD Mission Area: #342 - Surveillance and Reconaissance
Budget Activity: #4 - Tactical Programs

A. RESOURCES (PROJECT LISTING): ($ in thousands)

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	2466	4696			*Continuing*	*Not Applicable*
	QUANTITIES						Not Applicable
D662	Tactical Surveillance System	2466	4696			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 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 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 strengh 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.

Program Element: #6.47.40.A
DOD Mission Area: #342 - Surveillance and Reconaissance

Title: Tactical Surveillance System
Budget Activity: #4 - Tactical Programs

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Continue development of two Interim Tactical Imagery Exploitation Systems (ITacIES). Develop interfaces necessary to receive, process, and exploit TR-1/Advanced Synthetic Aperture Radar System (TR-1/ASARS) data in conjunction with USAF. Test and evaluate processing and exploitation concepts in conjunction with tactical exercises and Digital Imagery Test Bed Demonstrations.

D. COMPARISON WITH FY 1982 RDTE REQUEST:

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	2466	4696		Continuing	Not Applicable
Funds (as shown in FY82 submission	3393	5211		Continuing	Not Applicable

(U) The FY 1981 reduction is based on a Congressionally Approved Reprograming Action. The FY 1982 reduction is due to the application of revised inflation indices. The FY83 increase is based upon program restructuring.

Program Element: #6.47.40.A
DOD Mission Area: #342 - Surveillance and Reconaissance

Title: Tactical Surveillance System
Budget Activity: #4 - Tactical Programs

E. OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
Other Procurement, Army						
Funds (current requirements)	0	0			Continuing	Not Applicable
Funds (as shown in FY82 submission)	0	0		-	Continuing	Not Applicable
Quantities (current requirements)					Not Applicable	Not Applicable
Quantities (as shown in FY82 submission)						Not Shown

Program Element: #6.47.40.A
DOD Mission Area: #342 - Surveillance and Reconaissance

Title: Tactical Surveillance System
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Data originating from a variety of strategic and tactical surveillance sensors must be transmitted to central collection points where the data can be processed and analyzed. The resulting tactical intelligence must then be rapidly disseminated and fused into the command and control environment in such a timely and useful form as to materially influence the land battle. Techniques and equipment which will provide for this rapid receipt, processing, and dissemination of intelligence data are being developed under this program.

G. (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 search procedures, data link technologies, and tactical identification and positioning. The use of satellite communications is being considered. The initial efforts to provide the technical basis for the equipment and techniques were addressed under Program Element (PE) 6.37.30.A, Tactical Surveillance Systems, D560. This work is closely monitored by appropriate offices at the national level to preclude duplication of effort.

H. (U) WORK PERFORMED BY: RCA Corp., Camden, NJ; Aerospace Corp., El Segundo, CA; Ford Aerospace Corp., Palo Alto, CA; US Army Communication Development and Readiness Command (CORADCOM), Fort Monmouth, NJ.; DBA, Inc., Melbourne, FL.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Hardware/software interfaces with tactical processing systems were developed. Communications and support was provided to the Digital Imagery Test Bed (DITB) for deployment during Reforger 1980. The DITB was deployed and operated during fall 1980 in support of Reforger exercise Certain Rampart. Initial studies regarding interfaces with TR-1/ASARS were started, and a joint USA/USAF management plan for tactical exploitation of digital imagery data was completed. The DITB was deployed to XVIII Airborne Corps, Ft. Bragg, NC.

2. (U) FY 1982 Program: Continue engineering development of hardware/software interfaces for receipt, correlation, and dissemination of data from new theater sensor systems. Begin development of the Interim Tactical Imagery Exploitation System (ITacIES). Begin engineering development of interfaces with the Interim Tactical ELINT Processor (ITEP) and All-Source Analysis System (ASAS). Support operational evaluations and demonstrations of concepts and provide limited support to XVIII Airborne Corps with the DITB.

Program Element: #6.47.40.A
DOD Mission Area: #342 - Surveillance and Reconnaissance

Title: Tactical Surveillance System
Budget Activity: #4 - Tactical Programs

3. (U) FY 1983 Planned Program: Continue development of the ITacIES. Continue development of improved communications and interfaces with the ITEP and ASAS. Continue to test concepts, exploitation techniques, and software with the DITB in an operational environment. Develop software necessary to interface with TR-1/ASARS and integrate TR-1/ASARS data with data from other sensor sources. Continue to provide limited operational support to XVIII Airborne Corps and RDJTF with the DITB.

4. (U) FY 1984 Planned Program: Complete development of and field two Interim Tactical Imagery Exploitation Systems for operational evaluation. Integrated logistics planning and production engineering will begin for an operational TacIES.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.46.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	4983	2940	6812	Continuing	Not Applicable
D536	ATSS Family	0	4983	2940	6812	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 procurement of improved test equipment for fault detecting and location analysis. The current family of manual Test Measurement and Diagnostic Equipment and limited Automatic Test Equipment does not provide the capability to keep pace with the modernization efforts as the current capability is manpower intensive, relatively slow, and is often designed for only specific limited missions. Continuation of the current capability or increasing the density would not improve the situation or assist in obtaining increased weapon system operational availability. Automatic test capability forward of General Support is needed to insure the materiel readiness of new combat and combat support systems. To ensure adequate readiness, program managers have independently selected automatic test equipment to maintain their systems. This system-peculiar approach to selecting Automatic Tes. Equipment (ATE) has resulted in a proliferation of special-purpose ATE. To effectively handle future maintenance problems with any type of standardized approach, it will be essential to develop standard criteria for terminology, 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.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: STE-X is a follow-on development of the Simplified Test Equipment-Internal Combustion Engines (STE-ICE). STE-ICE has been fielded and has proven its cost effectiveness over the past two years. STE-X will expand this concept to include combat vehicle electrical systems and organizational-level weapons systems tests. This program will provide the Army with a standard piece of organizational automatic test equipment to be used on all combat vehicles. The Simplified Test Equipment-Expandable will continue engineering development initiated in FY82.

Program Element: #6.47.46.A
DoD Mission Area: #215 - Land Warfare Support

Title: Automatic Test Support Systems (ATSS)
Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	0	4983	2940	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	0	4998	9016	Continuing	Not Applicable

Decrease in FY82 is a result of application of revised inflation and civilian pay pricing indices. FY83 reduction is due to significant requirement reductions.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands) None.

Program Element: #6.47.46.A
DOD Mission Area: #215 - Land Warfare Support

Title: Automatic Test Support System (ATSS)
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The Simplified Test Equipment-Internal Combustion Engine (STE-ICE) program demonstrated the advantages of organizational-level automatic test equipment (ATE) for combat vehicles. STE-ICE allowed expanded maintenance testing in shorter time periods by personnel with limited training. The Simplified Test Equipment-Expandable (STE-X) will expand STE-ICE to include vehicle electrical and fire control systems and will support all combat vehicles. STE-X will provide the Army with a standard piece of ATE at the organizational level.

G. (U) RELATED ACTIVITIES: Advanced development of ATE systems is performed under PE 6.37.48.A, Mobility and Logistics Technology Demonstrations. The ATE systems developed under this program will be used by all program managers and thereby eliminate the duplication inherent in the present practice of each program manager developing system-specific ATE.

H. (U) WORK PERFORMED BY: In-house work is performed by the Army Communications Research and Development Command, Ft. Monmouth, NJ, in conjunction with the US Army Tank-Automotive Command, Warren, MI. STE-X contractor is RCA Corporation, Burlington, MA.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Transitioned from 6.37.48.A.

2. (U) FY 1982 Program: Begin engineering development of Simplified Test Equipment-Expandable. Prepare implementation plan for integration of STE-X into the Army Maintenance system.

3. (U) FY 1983 Planned Program: Continue engineering development of Simplified Test Equipment-Expandable (STE-X).

4. (U) FY 1984 Planned Program: Transition STE-X to limited production. Continue with expanded application.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.50.A
Title: Tactical Electronic Countermeasures Systems
DOD Mission Area: #374 - Electronic Warfare - Multi-Mission Technology and Support
Budget Activity: #4 - Tactical Programs

A. RESOURCES (PROJECT LISTING): ($ in thousands)

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5250				Continuing	Not Applicable
	QUANTITIES						Not Applicable
DL12	Communications Electronic Countermeasures Systems	5250				Continuing	Not Applicable
DL13	Noncommunications Electronic Countermeasures Systems	0				Continuing	Not Applicable
DL14	Expendable Jammers	0				Continuing	Not Applicable
D540	Protective Electronic Warfare Systems	0				Continuing	Not Applicable

B. 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. These electronic countermeasures (ECM) systems and equipment are for use by brigade, division, corps, and higher commanders. 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.

AD-A114 689 DEPUTY CHIEF OF STAFF FOR RESEARCH DEVELOPMENT AND AC--ETC F/G 5/1
DESCRIPTIVE SUMMARIES OF THE RESEARCH DEVELOPMENT TEST & EVALUA--ETC(U)
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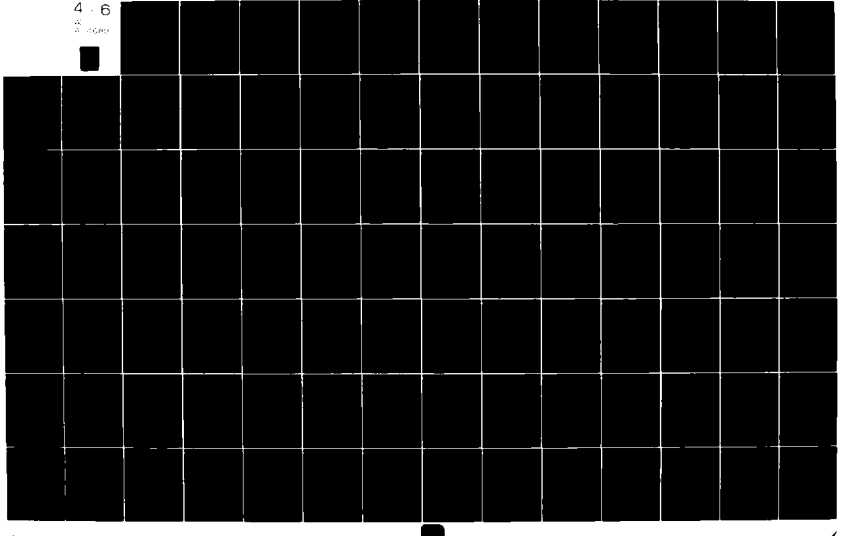

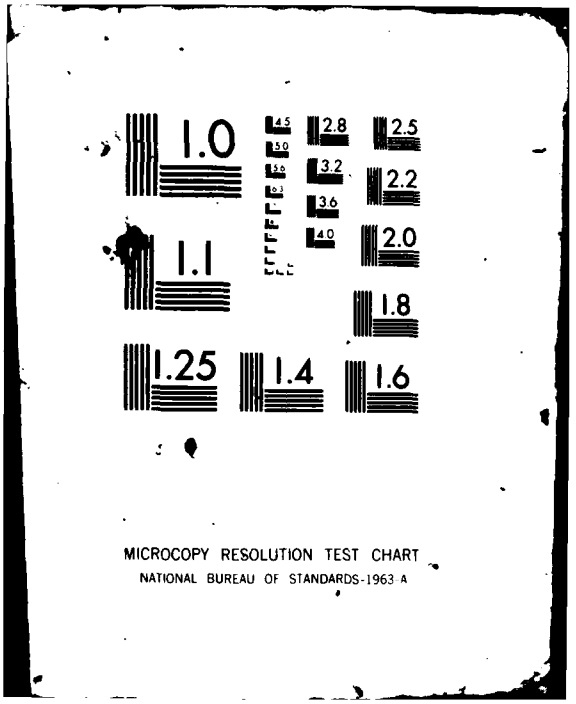
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Program Element: #6.47.50.A Title: Tactical Electronic Countermeasures Systems
DOD Mission Area: #374 - Electronic Warfare - Multi-Mission Technology and Support Budget Activity: #4 - Tactical Programs

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Complete hand-emplaced expendable jammer engineering development. Begin engineering development of the artillery-delivered expendable jammers. Reconfigure the AN/TLQ-17A division-level high and very high frequency (HF & UHF) communications jammer from one-quarter-ton wheeled vehicle to an armored shelter mounted on tracks. Complete conversion of the QUICK FIX helicopter-borne jammer to the UH-60 BLACKHAWK helicopter.

D. COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	5250			Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	3255			Continuing	Not Applicable

FY 1981 increase due to $1995 thousand internal reprograming to support QUICK FIX conversion to the BLACKHAWK helicopter.

FY 1982 and FY 1983 reductions are due to the decision not to field the AN/MLQ-33, and reprograming to higher priority Army Programs.

Program Element: #6.47.50.A
DOD Mission Area: #374 - Electronic Warfare - Multi-Mission Technology and Support

Title: Tactical Electronic Countermeasures Systems
Budget Activity: #4 - Tactical Programs

E. OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement Army 1/						
Funds (current requirements)	0	0	0	0		
Funds (as shown in FY 1982 submission)	0	0	0	0		
Quantities (current requirements)	0	0	0	0		
Quantities (as shown in FY 1982 submission)	0	0	0	Not Shown		

1/ Funds/Quantities shown were for the AN/MLQ-33 (CAS ECM) program which is being terminated.

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement, Army 2/						
Funds (current requirements)	0	0				
Funds (as shown in FY 1982 submission)	Not Shown	Not Shown	Not Shown	Not Shown	Not Shown	Not Shown
Quantities (current requirements)	0	0				
Quantities (as shown in FY 1982 submission)	Not Shown	Not Shown	Not Shown	Not Shown	Not Shown	Not Shown

Program Element: #6.47.50.A
DOD Mission Area: #374 - Electronic Warfare - Multi-Mission Technology and Support

Title: Tactical Electronic Countermeasures Systems
Budget Activity: #4 - Tactical Programs

2/ Funds/Quantities shown are for the hand-emplaced expendable jammer. Quantities and funding are based on a level II validated US Army ERADCOM cost estimate contained in the Required Operational Capability dated 17 November 1981. Figures may be revised during approval of the Basis of Issue Plan.

Program Element: #6.47.50.A
DOD Mission Area: #374 - Electronic Warfare - Multi-Mission Technology and Support

Title: Tactical Electronic Countermeasures Systems
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The objective of this program is to conduct full-scale development of tactical electronic countermeasures (ECM) equipment and systems to deny or degrade the enemy's use of his electromagnetic devices. Equipment includes ground vehicular-mounted and airborne ECM systems such as the close air support communications jammer (CAS ECM) prototype; helicopter communications jamming system (QUICK FIX); Tactical Army Communications Jammer (TACJAM), quick-erectable antenna masts and assemblies; automated test equipment software development for all systems; expendable jammers, artillery, mortar, aircraft and/or hand-emplanted warning devices as self-protection measures for tactical vehicles and installations; and countermeasures against hostile antitank guided missiles.

G. (U) RELATED ACTIVITIES: Related electronic warfare developments are conducted by the Navy and Air Force. Navy developments are conducted in Program Elements 6.45.54.N, Surface Electronic Warfare; 2.45.75.N, Electronic Warfare Support; and 6.45.73.N, Shipboard Electronic Warfare Improvement. Air Force developments are conducted in Program Element 6.47.38.F, Protective Systems; 6.47.39.F, Tactical Protective Systems; and 6.47.10.F, 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.

H. (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.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1981 and Prior Accomplishments: AN/GLQ-3 and AN/TLQ-15 were developed and fielded. The AN/TLQ-17 (transportable communications jammer) completed development and was fielded. A contract for Full-Scale Development of the AN/MLQ-33 (CAS ECM) system was awarded in September 1979. The conversion of the Army's standard division-level heliborne communications intercept, jamming, and direction-finding

system QUICK FIX from the EH-1 to the UH-60A BLACKHAWK was started. Engineering development of a joint Army/Marine Corps hand-emplaced expendable jammer was started.

2. (U) FY 1982 Program: The program to convert QUICK FIX from its current EH-1 platform to the UH-60A BLACKHAWK will continue. Development of the AN/MLQ-33 countermeasures system will be terminated. Engineering development of hand-emplaced expendable jammers will continue, and Developmental and Operational testing will be conducted.

3. FY 1983 Planned Program: Complete the program to convert QUICK FIX to the BLACKHAWK helicopter. Engineering development of the artillery-delivered expendable jammers will continue. A program to reconfigure the AN/TLQ-17A division-level high frequency (HF and UHF) and very high frequency communications jammer from one-quarter-ton wheeled vehicle to an armored shelter which will be track mounted will continue. Engineering development of the artillery-delivered expendable jammers will begin. Begin engineering development of

4. FY 1984 Planned Program: Engineering development of the Air Defense Electronics Warfare System to Reconfiguration of AN/TLQ-17A will continue. Engineering development of artillery-delivered expendable and radar jammers will continue. Development of a system to defeat will begin.

5. (U) Program to Completion: This is a continuing program. Developments under this program element will normally have been transferred from advanced development, Program Element 6.37.55.A, Tactical Electronic Countermeasures Systems.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: # 6.47.53.A
Title: Battlefield Data System
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	0	0	27868	43333	TBD	TBD TBD
64753	Battlefield Data System	0	0	27868	43333	TBD	TBD

B. BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The US Army lacks the capability to locate moving targets beyond ground line-of-sight because the speed of modern combat makes it critically important that the division and corps commanders have a responsive, near-realtime capability to detect, locate, and monitor moving formations out to the enemy's second-echelon units in order to concentrate combat power at critical times and places, and employ their firepower out to maximum ranges. Within the Battlefield Data System (BDS) program element, the Army will develop an airborne target acquisition system that will provide this critically needed capability. The system will locate moving targets at extended ranges during the day or night, under most weather conditions. It will be designed to perform successfully in the air defense environments forecast for the By scanning moving targets, it will provide the motion history analysis necessary to determine the enemy's tactical development and to allow estimation of his intentions in time to position friendly forces and firepower to engage him. Display of video data at ground Command Interface Modules (CIM) will permit the efficient and timely use of the information. During the Advanced Development phase, a prior program (Standoff Target Acquisition System (SOTAS)) successfully used off-the-shelf hardware to extensively field-test the concept

and ensure that the requirements were well defined. Continued tactical experience gained from the advanced development systems deployed to 7th Army Europe--designated as the Interim-Interim SOTAS systems--has further verified the tactical payoff of a SOTAS-like system to the operational commander.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: The FY 1983 program will be based on the results of reviews conducted in FY 1982 to develop lower cost alternatives to the recently terminated Standoff Target Acquisition System (SOTAS). The FY 1983 budget request anticipates completion of system definition in 1QFY83, and development efforts in the areas of ground Command Interface Modules (CIM) hardware and software, data link, and airborne subsystems. It is anticipated that the CIM and data link will focus on development of a common family of equipment to provide processing, display, and distribution of moving target information for brigade, division, and corps users. The potential for developing the capability to develop a common module for the processing of all moving target information generated by Army and Air Force airborne sensors is being examined. Airborne subsystem development is expected to initiate adaptation of existing sensors and platforms.

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Complete System Definition	1QFY83	N//A
Initiate Development of Selected Components	1QFY83	N/A

Program Element: # 6.47.53.A Title: Battlefield Data System
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	FY 1984	Additional To Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	0	0	27868	43333	TBD	TBD
Funds (as shown in FY 1982 submission)	0	0	0	0	0	0

This is a new start in FY 1983. On 3 November 1981, the FY 1982 Joint Authorization Conference directed that the SOTAS program be terminated, and therefore no further funding authorization for the SOTAS program element was provided. The conferees also recommended creation of a new program element, "Battlefield Data System," to allow the Army to study lower cost alternatives to meet its battlefield surveillance requirements.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands): To be determined.

Program Element: # 6.47.53.A Title: Battlefield Data System
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The system to be defined and developed within the Battlefield Data System (BDS) program element will conceptually consist of an airborne moving target indicator (MTI) sensor, a platform, a position location system, a data link, and a command interface module for data processing and display. The advanced development model of the Standoff Target Acquisition System (SOTAS) has demonstrated the capability to detect and locate moving targets accurately at ranges well beyond ground line-of-sight in a wide variety of tactical conditions. A significant feature of the processing concept, which has been operationally verified, will be its ability to store ground referenced data imagery and then display that data at high display rates (time-compression.) This display concept enhances the probability of target detection and minimizes the probability of false targets. Because of its near-realtime detection and location capability, the system will provide the data necessary for the effective engagement of targets located beyond the ground line-of-sight by both Army and Air Force weapons systems as well as permit the tactical commander to mass his ground maneuver elements at critical times and places.

G. (U) RELATED ACTIVITIES: The ground station, or Command Interface Module (CIM), to be developed under the program has potential application to receive and process radar data from both Army and Air Force moving target indicator radars, thereby providing a common module for the processing of all Army- or Air Force-generated airborne MTI data. The system design will incorporate, in production, a data link currently being developed under the Modular Integrated Communication and Navigation Systems (MICNS) program in PE 6.47.05.A. The use of this common data link will significantly enhance logistic supportability in the field. Current plans are to use a substitute data link developed by the Cubic Corporation for the Engineering Development (ED) phase. If ED models of the MICNS data link are available, they will be incorporated in the EC MSTAR instead of the Cubic data link.

H. (U) WORK PERFORMED BY: Not applicable as this is a new start, and contractors have not been selected.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Prior accomplishments go back to FY74 and consist of having established the technical feasibility of using airborne Moving Target Indicator (MTI) radar data transmitted to a ground-based Command Interface Module (CIM). Initial tests at the Hunter-Liggett Military Reservation established that an MSTAR-like system could detect, locate, and engage targets at distances well beyond the Forward Line of Troops (FLOT). Following this test, there was a successful demonstration at White Sands of integrating such a system with the Air Force's Advanced Location

Program Element: # 6.47.53.A
DOD Mission Area: #217 - Land Warfare Surveillance and Reconnaissance

Title: Battlefield Data System
Budget Activity: #4 - Tactical Programs

Strike System (ALSS). In 1976, this same system was first demonstrated in Korea and then allowed to participate in both the REFORGER 76 and 77 exercises. In 1978, two advanced development (AD) models were deployed to Europe and are currently part of the operational capability of the 1st AD and the 3rd ID. A complete Simulation/Trainer for the CIM has been developed by Honeywell Systems Research. This system is currently in operation at the Honeywell plant in St. Anthony, MN. It is not only capable of simulating the CIM for training purposes, but can be used for development testing of new concepts and application of the CIM.

2. (U) FY 1982 Program: A General Officer Steering Group has been formed to direct and coordinate Army efforts to develop lower cost alternatives to the recently terminated Standoff Target Acquisition System (SOTAS). Conceptually, the system will consist of at least five component subsystems: sensor, platform, ground station, data link, and positioning/data stabilization subsystems. Candidate approaches, to include improvements to the Army's UPD-7 corps surveillance system and systems and technology being developed by other Services (Pave Mover, sensors already in production, etc.), will be assessed for cost, schedule, and suitability to fill the operational requirement. The objective will be to define a modular, evolutionary system which can be further improved over time to fill the target acquisition and surveillance requirements of division and corps commanders for the collection, distribution, and processing of moving target information.

3. (U) FY 1983 Planned Program: Based on the results of the reviews conducted in FY 1982, system definition will be completed and development of the system will be initiated. The FY 1983 funding request is based upon development of ground station and data link hardware and software, and adapting an existing sensor and platform.

4. (U) FY 1984 Planned Program: In FY84 there will be a continuation of the FY83 development efforts.

5. (U) Program to Completion: To be determined as the options are evaluated.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.66.A
Title: Tactical Electronic Surveillance Systems
DOD Mission Area: #322 - TIARA for Tactical Land Warfare
Budget Activity: # 4 - Tactical Programs

A. RESOURCES (PROJECT LISTING): ($ in thousands)

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	16748	7780			Continuing	Not Applicable
	QUANTITIES						Not Applicable
D909	Tactical Electronic Surveillance Systems	16748	7780			Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program was in Program Element #6.47.45.A prior to FY 1983. 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 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/i mation 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.

Program Element: #6.47.66.A Title: Tactical Electronic Surveillance Systems
DOD Mission Area: #322 - TIARA for Tactical Land Warfare Budget Activity: # 4 - Tactical Programs

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Continue development work on hardware/software interfaces between existing and future strategic and theater sensor systems and Army Tactical exploitation systems. Perform technical analysis of potential utility of developing strategic systems. Begin implementation of interfaces with the Interim Tactical Imagery Exploitation System and the All Source Analysis System.

D. COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	16748	7780	--	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	9250	13932		Continuing	Not Applicable

(U) The increase in FY 1981 is due to a Congressionaly approved reprograming action to support building three additional Interim Tactical Electronics Intelligence (ELINT) Processors (ITEPs). The decreases in FY 1982 due to Congressionally directed reduction. The decreases in FY 1983 are due to the application of revised inflation and civilian pay pricing indices.

Program Element: #6.47.66.A Title: Tactical Electronic Surveillance Systems
DOD Mission Area: #322 - TIARA for Tactical Land Warfare Budget Activity: # 4 - Tactical Programs

E. OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
Other Appropriations:						
Other Procurement, Army						
Funds (current requirements)	1800	2200			Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	1800	2300			Continuing	Not Applicable
Quantities (current requirements)					Not Applicable	Not Applicable
Quantities (as shown in FY 1982 submission)						Not Shown

Decrease in FY82 is due to the amended budget request and the application of revised inflation and civilian pay pricing indices.

Program Element: #6.47.66.A Title: Tactical Electronic Surveillance Systems
DOD Mission Area: #322 - TIARA for Tactical Land Warfare Budget Activity: # 4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: This project supports the Army's Tactical Exploitation of National Capabilities (TENCAP) program engineering development (ED) work which is directed toward developing a tactical support system to collect, process, and disseminate electronic intelligence/information which locates and identifies enemy units, activity, and targets representing a general tactical threat. The systems developed will be the primary source of intelligence on enemy second-echelon forces. Data originating from a variety of strategic and tactical electronic surveillance sensors must be transmitted to central field processing points where the data can be processed and analyzed. The resulting tactical intelligence must then be rapidly disseminated and fused into the command and control environment in a timely and useful form so as to materially influence the land battle. Techniques and equipment which provide for this rapid receipt, processing, and dissemination of intelligence data are being developed under this program.

G. (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 techniques are addressed under PE #6.37.66.A, D907, Tactical Electronic Surveillance Systems. This work is coordinated with the appropriate offices at the national level to avoid duplication of effort.

H. (U) WORK PERFORMED BY: Aerospace Corporation, El Segundo, CA; US Army Electronics Research and Development Command (ERADCOM), Adelphi, MD; US Army Communications Research and Development Command, Fort Monmouth, NJ; MRJ, Inc., Fairfax, VA.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Initiated fabrication and engineering development of two prototype Interim Tactical Electronic Intelligence (ELINT) Processing (ITEP) systems. Delivered the first ITEP to Europe, where it was immediately used in a tactical exercise. Delivered second ITEP to XVIII Airborne Corps. Both ITEPs completed DIA security accreditation and DCA Autodin certification testing and are providing excellent support to the two Army Corps. Completed hardware purchase and began fabrication of additional Interim Tactical ELINT Processors (ITEPs).

2. (U) FY 1982 Program: Continue joint programs to improve strategic sensor interfaces to enhance tactical utility and reduce communications requirements. Deploy three additional ITEPs in first/second/fourth quarters. Continue joint programs to enhance tactical utility of strategic sensors. Continue development of interfaces between ITEP, Interim Tactical

Program Element: #6.47.66.A Title: Tactical Electronic Surveillance Systems
DOD Mission Area: #322 - TIARA for Tactical Land Warfare Budget Activity: # 4 - Tactical Programs

Imagery Exploitation System (ITacIES) and the All Source Analysis System (ASAS). Perform technical analysis of potential utility of developing strategic sensors.

3. (U) FY 1983 Planned Program: Continue ITEP software improvements in response to user requirements and operational evaluations. Begin implementation of interfaces with ITacIES and ASAS. Continue joint programs to enhance the tactical utility of developing strategic sensor mix.

4. (U) FY 1984 Planned Program: Based on ITEP experience and approved strategic system configuration, initiate engineering development of hardware/software for a Tactical ELINT Processor (TEP). Continue joint programs to enhance tactical utility of strategic sensors.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.79.A 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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	23176	29465	30066	48038	Continuing	Not Applicable
	QUANTITIES						
D298	JINTACCS (NATO)	2286	3542	5096	12964	Continuing	Not Applicable
D309	JINTACCS (ARMY)	6620	11795	13201	19421	Continuing	Not Applicable
D310	JINTACCS (Executive Agent)	14270	14128	11769	15653	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program contains three projects which provide for: The unique tasks of the Chief of Staff, US Army, as the Joint Chief of Staff Executive Agent; the tasks of the Army as a program participant; and the work directed to achieving interoperability between US and NATO systems. The JINTACCS program was established for the purpose of insuring the compatibility and interoperability of tactical command and control systems and has been developing information exchange requirements, message formats and data elements, communications parameters, interface points, and interface operating procedures to achieve this goal. JINTACCS has also provided a technical capability for addressing and coordinating US/NATO interoperability requirements for tactical command and control systems. The program has the additional tasks of developing and testing the message standards for the Joint Tactical Information Distribution System (JTIDS) and of performing testing in support of JCS configuration management of the joint standards developed for Tactical Air Control System/Tactical Air Defense Systems (TACS/TADS). Testing support for configuration management of the joint interface standards developed by the TACS/TADS interface program is currently being transitioned into the JINTACCS program as directed by the JCS. As a participant, the Army will provide operational facilities and supporting automated systems configured to exchange tactical information with other Service Agency operational facilities and systems. Each participating Army facility and system must be designed or modified to utilize JINTACCS-developed standards. Compatibility and interoperability (C&I) testing of these standards began with tests of the Intelligence segment in July 1979. Tests will be continued in an iterative manner on each of the five JINTACCS functional groups (Intelligence, Air Operations, Amphibious Operations, Fire Support, and Operations Control) over the period FY79 through FY84. Following each group's C&I tests, an

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

Operational Effectiveness Demonstration (OED) will be conducted by the Commander in Chief Atlantic (CINCLANT) during one of its joint (Solid Shield series) exercises, to demonstrate the enhanced capabilities of a joint tactical force utilizing the JINTACCS-developed standards. The JINTACCS program is a highly complex undertaking by the US, one that will ultimately lead to joint standardization and provide force multiplier effects contributing to the US defense posture.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: During FY83, C&I testing of the Operations Control segment will be conducted, an testing of the Fire Support and Amphibious segments will be started. An OED will be conducted (by CINCLANT) during Solid Shield '83 which will include the Air Operations standards as well as the previously demonstrated Intelligence standards. The OED's are cumulative in nature in that all previously demonstrated standards are included along with those standards being demonstrated for the first time. During October 1982 the test support for configuration management of the TACS/TADS standards will transition to the JINTACCS program. Throughout FY83, work will be underway on the development of test plans for the JTIDS message standards. Publication of a JTIDS Technical Interface Design Plan-Test Edition (TIDP-TE) is scheduled for July 1982. Participation in the NATO arena will continue through the analysis and incorporation of NATO requirements (where possible) into JINTACCS documentation, the development of US position and inputs to NATO forums, and the technical support of US delegates to NATO organizations dealing with tactical C2 system interoperability. The Army as a Service will continue to participate in all JINTACCS activities. It will make system engineering recommendations for implementation of JINTACCS-developed standards into Army systems (Maneuver Control, Tactical Fire Direction System, Missile Minder, TACFIRE, etc.). It will develop training material and coordinate and manage Army participation in C&I testing as well as configuration management efforts and operational effectiveness demonstrations.

Program Element: #6.47.79.A 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 1982 Submission
Begin compatibility and interoperability testing of air operations segment	November 1981	November 1981
Publish the JTIDS TIDP-TE	July 1982	(Not reported)
Begin configuration management testing of the TACS/TADS standards	October 1982	(Not reported)
Begin compatibility and interoperability testing of operations control segment	November 1982	November 1981
OED of the Intelligence and Air Operations segments	May 1983	(Not reported)
OED of the Intelligence and Air Operations Segments	May 1983	(Not Reported)
Begin compatibility and interoperability testing of amphibious/fire support segment	October 1983*	October 1983
OED of all 5 JINTACCS segments	May 1985	(Not reported)

*Change to this milestone is a result of continuing refinement of the program schedule.

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	23176	29465	30066	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	21307	29554	36563	Continuing	Not Applicable

The FY81 increase of funds was due to cost growth in the contract for the Joint Interface Test System. The FY83 decrease of funds is due to reprograming of higher priority Army programs.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands): Not Applicable.

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: In 1977, the Ground and Amphibious Military Operations program was reorganized into the Joint Interoperability of Tactical Command and Control Systems (JINTACCS) program in response to Congressional direction. The Joint Interface Test Force (JITF) staff was expanded by the Services/Agencies, and an initial procurement of equipment to support the Intelligence C&I tests was begun. All program documentation was revised to reflect the reorganization, and work was started to provide the facility for the Joint Interface Test Center (JITC). Test plans were prepared for Intelligence C&I testing. In FY 1978, work continued on the engineering design plans for all five functional segments, and the plan for the Intelligence segment was completed and approved for testing. Development of message standards for JTIDS was continued. JINTACCS involvement in NATO standardization activities was expanded. In FY 1979 the JITC was activated and began C&I testing of the Intelligence standard in July. The JINTACCS NATO Support Plan was approved and distributed in March 1979. The JITF organizational plan was completed and approved. In FY 1980 the design plans for the remaining functional segments were completed and approved. Testing of the Intelligence segment was completed, and plans were begun for tests of the Air Operations segment. In FY81 the first OED (Intelligence) was conducted by CINCLANT. The initial results appeared to be favorable; CINCLANT's formal report of the OED will be published in March 1982. Also during FY81, plans for the C&I tests of the Air Operations segment were completed, and a memorandum of understanding between the directors of the JINTACCS and TACS/TADS Programs was entered into, describing the transition of TACS/TADS testing to the JINTACCS program.

G. (U) RELATED ACTIVITIES: This program is related to the Army's Tactical Command, Control and Communications (C3) Systems Engineering program, which is funded under Program Element 6.47.12.A, whose goals complement the JINTACCS program by striving for interoperability among Army tactical C2 systems. Close liaison precludes duplication of effort.

H. (U) WORK PERFORMED BY: Overall coordination and management of the NATO and joint aspects of the program are accomplished by the Program Director, who is also the Army's Assistant Deputy Chief of Staff for Operations and Plans for Command, Control, Communications, and Computers. He has, as an Army Staff element, the JINTACCS Architecture/Engineering Office, which is supported by a contract with the System Development Corporation, McLean, VA. He also has, as an Army field operating agency, the Joint Interface Test Force (JITF), Ft Monmouth, NJ. The JITF is supported by contracts with the Planning Research Corporation from its office at Ft Monmouth and with the Command, Control and Communications Corp., Torrance, CA, which is supplying the Joint Interface Test System Management of the Army portion of the program. Management is provided by Policy Division of DAMO C4 with major support from the Communications Electronics Command (CECOM), Ft Monmouth, NJ, which is supported by contracts with the BDM Corp., McLean, VA; CALCULON, Philadelphia, PA; TECHDYN Systems, Ft Monmouth, NJ; Applied Sciences Assoc., Ft Monmouth, NJ; and the MITRE Corp., Ft Monmouth, NJ.

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: In 1977 the Ground and Amphibious Military Operations (GAMO) program was reorganized, at Congressional direction, and the JINTACCS program was formed. The JINTACCS goals were similar to those of GAMO, but the management structure was streamlined, the program director was given greater decisionmaking authority, and the program schedule was accelerated. In 1977 the Joint Interface Test Force was activated at Ft Monmouth, NJ, and plans for testing the JINTACCS-developed standards were begun. Through 1978 development of the engineering baseline, the Technical Interface Design Plan (TIDP), progressed, and work was undertaken on the development of message standards for JTIDS. In 1979 the C&I tests of Intelligence functional segment were begun. The JINTACCS NATO support plan was approved and distributed and the program began furnishing technical support to US delegates to NATO forums on interoperability. In FY80 the fifth and final volume of the TIDP was completed and approved, tests of the Intelligence segment were concluded, and the documentation for that segment was forwarded to CINCLANT for an OED. In FY 1981 the standards described in the Intelligence segment were demonstrated by CINCLANT during Solid Shield '81. Work continued on development of the JTIDS message standards, and support to US/NATO efforts grew with JINTACCS, furnishing technical support to US delegates to some 17 NATO organizations. An Army Test Unit was organized at Ft Monmouth, NJ, to manage Army participation in the JINTACCS C&I testing program. A representative Corps G2 operational facility was organized to participate in the intelligence C&I test. A training program was developed, and all Army OED participants were trained. The Army conducted an independent evaluation of the CINCLANT-conducted OED.

2. (U) FY 1982 Program: This year will see the delivery of the last increments of the Joint Interface Test System, which will allow full testing of bit-oriented as well as character-oriented exchanges, at the JITF. The JTIDS TIDP which will contain the message standards for that system is scheduled for completion in July 1982. C&I tests of the Air Operations standards were begun in November 1981 and will be completed in June 1982. Test plans for the Operations Control segment will be produced. The Army will organize representative operational facilities for a Corps G3, Airspace Management element, Air Coordination Center, and an Army Air Defense Command Post to participate in the Air Operation C&I test. A Tactical Computer System (TCS) has been procured and is being programed to provide an automated assist for the C&I test. The AN/TSQ-73 will participate in TACS/TADS transition testing/certification. Work will be initiated in reprograming an Army TACFIRE system to participate in the FY84 Fire Support C&I test.

3. (U) FY 1983 Planned Program: This year will see the assumption of testing in support of TACS/TADS configuration

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

management as well as the C&I testing of the Operations Control Segment. Planning for C&I tests of the JTIDS message standards will be underway. The OED of the Air Operations segment will be conducted by CINCLANT during Solid Shield 83. The previously demonstrated intelligence standards will be included in that OED. Testing in support of configuration management of the previously approved standards will be conducted at the JITF. Army OED participants will be trained and an Army independent evaluation conducted. A representative operational facility for the Corps G3 will be organized to represent the Army during Operations Control C&I test. Reprograming work on the TACFIRE system will continue. The Test Units TCS will be reprogramed to provide automated support to the ATU during Operations Control C&I tests.

4. (U) FY 1984 Planned Program: This year will see the C&I testing of the Amphibious/Fire Support segments and preparations for the final OED (May 85). Configuration management testing of JINTACCS standards as well as TACS/TADS standards will be conducted. The JINTACCS program will continue active participation in the development of NATO interoperability standards through the analysis of US national requirements and the support of US delegates. The JINTACCS program will provide the focal point for US planning for participation in NATO interoperability tests. Representatives of Army operational facilities for an FDC, FSE, Shore Party, G3, and Helicopter Support Party will be organized to participate in scheduled C&I tests. An extensive training package will be developed for the final OED in FY85.

5. (U) Program to Completion: This is a continuing program; however, Congressional direction requires that testing be completed by the end of FY85.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D298 Title: Joint Interoperability of Tactical Command and Control Systems (EA, NATO)

Program Element: #6.47.79.A 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) DETAILED BACKGROUND AND DESCRIPTION: The NATO project within the JINTACCS program was first funded in FY77. The NATO JINTACCS will provide a technical capability for addressing and coordinating US/North Atlantic Treaty Organization (NATO) interoperability for tactical command and control systems. The objectives of this project include:

1. (U) Design and development of interoperability standards between US and other national/NATO tactical Command and Control (C2) systems.

2. (U) Provision of detailed technical support to US delegates of NATO organizations dealing with tactical C2 systems interoperability.

3. (U) Provision of appropriate US (JINTACCS) program methodology design standards, data base software capabilities, and documentation to NATO tactical C2 forums.

4. (U) Monitoring of US bilateral (e.g., US Army and UK Army) agreements for tactical C2 interoperability for specific systems in order to assess their impact on US standards.

B. (U) RELATED ACTIVITIES: This is the only project dealing with US/NATO tactical C2 interoperability efforts. There is no duplication of effort with any other project or element.

C. (U) WORK PERFORMED BY: Overall coordination and management of this project is accomplished by the JINTACCS Program Director (ADCSOPS, C4) and the JINTACCS architect/engineer, whose office is located within the office of the Assistant Deputy Chief of Staff for Operations and Plans (C4), Headquarters, Department of the Army. The contractor supporting this project is System Development Corporation of McLean, VA.

Project: #D298 Title: Joint Interoperability of Tactical Command and Control Systems (EA, NATO)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: From FY77 through FY81, JINTACCS provided detailed technical analysis support to US delegates in the development of Allied Data Systems Interoperability Agency (ADSIA), which is the NATO counterpart to the US (JINTACCS) interoperability program. From FY79 to FY81, through the permanent US representative to ADSIA, US (JINTACCS) methodology was transferred to NATO, resulting in a virtual tracking of the two programs. The benefit realized by this effort is minimization of perturbations to the US (JINTACCS) Program. With the formation of ADSIA, the US has been and will continue to be able to forward JINTACCS-developed standards as candidates for adoption as NATO tactical C2 interoperability standards.

2. (U) FY 1982 Program: Currently this project provides detailed analysis of the work of 21 NATO tactical C2 interoperability forums and provides technical support to the US delegates to these bodies. JINTACCS is providing ADSIA software for maintaining the NATO data element data base, enabling the US to pursue a tactical C2 interoperability vocabulary standardization program. JINTACCS, in support of the OJCS, is monitoring Service and Agency bilateral (international) activities to assess the impact on US interoperability standards development and making appropriate recommendations. Specifically, monitoring bilateral activities between the US Army and the UK Army (TACFIRE/BATES) and the US Army and the German Army (TACFIRE/ADLER) has resulted in proposed changes to NATO STANAG 4130 (surface-to-surface artillery interoperability standards). Efforts are continuing to provide US (JINTACCS) program design standards and documentation for the development of NATO tactical C2 interoperability standards.

3. (U) FY 1983 Planned Program: During FY83, the project will support US participation in NATO tactical C2 interoperability efforts which will be progressing through conceptual development and into a standards design phase. Activities described for the FY82 program will be continued through the FY83 program but at an accelerated pace due to the increased activity in the NATO standards design phase.

4. (U) FY 1984 Planned Program: The efforts described for FY82 and FY83 will continue through FY84. This year will, however, mark the full-scale development of NATO standards design. It is anticipated that up to four functionally segmented message standards design efforts will be ongoing in addition to the other interoperability standardization efforts. This

Project: #D298 Title: Joint Interoperability of Tactical Command and Control Systems (EA, NATO)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

year will see the commencement of NATO interoperability standards testing; the significant increase of funds from FY83 to FY84 is for the US participation in this testing.

5. (U) Program to Completion: This is a continuing program; however, Congressional direction requires testing to be completed by the end of FY85.

6. (U) Major Milestones: The following are NATO milestones which have been agreed to by the United States. The activities described for FY81-FY84 represent the United States efforts to achieve these goals.

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Development and Approval of a NATO Interoperability Management Plan (NIMP)	Jun 82	*
NATO Interoperatbility Planning Document (NIPD)	Sep 83	*
Development of Initial Draft STANAG containing NATO Interoperability Standards	Apr 83	*
NATO Interoperability Testing	Dec 84	*

* No previous sumission has been made for this project.

Project: #D298 Title: Joint Interoperability of Tactical Command and Control Systems (EA, NATO)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	2286	3542	5096	12964	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	2128	3552	6090	-	Continuing	Not Applicable

Difference in funding in FY81 submission is due to program refinement. Difference in funding in FY82 submission is due to application of revised inflation and civilian pay pricing indices. Reduction in funding in FY83 is due to funding of higher priority programs.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D309 Title: Joint Interoperability of Tactical Command and Control Systems (Army)

Program Element: #6.47.79.A 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) DETAILED BACKGROUND AND DESCRIPTION: For a detailed description of the JINTACCS Program, see the summary PE 6.47.79A. 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 Army also is executive agent for the JINTACCS Program. The tasks and resources required for Army participation in JINTACCS are described below; the tasks and resources for the executive agent activities are described in the JINTACCS descriptive summary for Program Element (PE) 6.47.79/D310 (JINTACCS (Executive Agent)). 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 Manuever Control System), all to be configured to exchange tactical information with other service/agency operational facilities and systems. The JINTACCS Program has been developing information exchange requirements, message formats and data elements, communications parameters, interface points, and interface operating procedures to achieve compatibility and interoperability among joint tactical facilities and systems. In addition, the Tactical Air Control System/Tactical Air Defense System (TACS/TADS) interface program is currently being transitioned into the JINTACCS Program as directed by the JCS. 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 starts in the fourth quarter of FY79. The C&I tests will be conducted in an iterative manner on each of five JINTACCS functional groups (Intelligence, Air Operations, Amphibious Operations, Fire Support Operations, and Operations Control) over a period from FY79 through FY84. 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 81) to demonstrate the enhanced capabilities of an interoperable US joint tactical force. The JINTACCS program is a highly complex undertaking, but one that will ultimately lead to joint standardization and provide force multiplier effects contributing to the US defense posture.

B. (U) RELATED ACTIVITIES: This program is related to the Army's Tactical C3 System Engineering program, which is funded under Program Element 6.47.12.A, whose goals complement the Army's JINTACCS Program by striving for interoperability among Army tactical C2 systems. Close liaison precludes duplication of effort.

Project: #D309 Title: Joint Interoperability of Tactical Command and Control Systems (Army)

Program Element: #6.47.79.A 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) WORK PERFORMED BY: Contractors: System Development Corporation, Eatontown, NJ; Control Data Corporation, Shrewsbury, NJ; MITRE Corporation, Fort Monmouth, NJ. In-house organization: US Army Communications Research and Development Command, Fort Monmouth, NJ.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: In 1979 the Army participated in numerous developments of plans and policies, to include; the JINTACCS Army Management Plan (JAMP), JINTACCS Configuration Management Plan, and the JINTACCS-NATO Ad Hoc Group Management Plan. The activation and the initial training of the Army Test Unit (ATU) were accomplished to support the JINTACCS Program. In 1980 the development of the Army position for various technical aspects of the five functional JINTACCS areas (intelligence, air operations, fire support, amphibious, and operations control) continued. Testing in the compatibility and interoperability (C&I) of the intelligence function was initiated. In 1981 the following was accomplished: Continued the intelligence C&I testing; conducted Operational Effectiveness Demonstration testing for the intelligence segment; continued planning and training for testing of compatibility and interoperability of the intelligence, air operations, and control segments.

2. (U) FY 1982 Program: Tasks that will be completed during FY82 are: Complete final test report detailing the results of the Intelligence OED; incorporate technical interface design system test modification for ASAS and AN/TSQ-73/PATRIOT. Tasks continuing through FY83 are: Participate in the continuation of Air Operations C&I testing; develop plans for Air Operations OED; finalize plans for Combined Intelligence and Air Operations OED; complete preliminary and initiate final plans for Amphibious and Fire Support C&I testing; complete preliminary and initiate final plans for JTIDS Message Standards C&I testing; initiate training of ATU personnel on employment of JTIDS Message Standards; compile Army-oriented test data for Air Operations C&I testing. Tasks being performed in FY82 and continuing beyond are: FY83--Participate in Operations Control C&I testing using ATU resources; initiate the conduct of training for ATU Support personnel and Operational Facility/system team personnel for participation in Amphibious and Fire Support C&I testing; compile Army-oriented test data for Operations Control C&I testing using ATU resources.

3. (U) FY 1983 Planned Program: Tasks that will be completed during FY83 are: Complete final test report detailing

Project: #D309 Title: Joint Interoperability of Tactical Command and Control Systems (Army)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

C&I test results for Air Operations; complete all preparations for Air Operations Intelligence OED; complete all preparations for beginning Fire Support and Amphibious C&I Functional Segment testing; participate in Operations Control C&I testing using ATU resources; initiate the conduct of training for ATU support personnel and Operational Facility/system team personnel for participation in Amphibious and Fire Support C&I testing; compile Army-oriented test data for Operations Control C&I testing using ATU resources.

4. (U) FY 1984 Planned Program: Tasks that will be completed during FY84 are: Complete Amphibious, Fire Support, and JTIDS C&I test; compile Army-oriented test data for Amphibious, Fire Support, and JTIDS C&I tests; complete software development for JINTACCS messages implementation in TCT/TCS for Operation Control Intelligence, and Fire Support functions; complete preparation for SOLID SHIELD 85 OED. Tasks being performed in FY83 and continuing beyond FY84 are: Update and refine JINTACCS Army Management Plan (JAMP); complete SOLID SHIELD 85 OED; participate in Joint Configuration Management of JINTACCS TIDPS; manage and operate the Army ATU; manage Army CM test activities in JINTACCS and TCT/TCS; specify JINTACCS standards in CCS2 architecture; develop JTIDS hardware interface; continue software post-deployment effort for implementing JINTACCS standards TS-73, JTIDS, TCT/TCS, and TACFIRE/MIFASS interface configuration management.

5. (U) Program to Completion: This is a continuing program; however, Congressional direction requires that testing be completed by the end of FY85.

Project: #D309 Title: Joint Interoperability of Tactical Command and Control Systems (Army)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

6. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Initiate Compatibility and Interoperability Testing	4Q FY79	3Q FY79 thru 1Q FY85
Complete Intel (CENSEI) C&I Tests	2Q FY80	2Q FY80
Complete Intel (SCI) C&I Tests	1Q FY81	-
Complete Air Ops C&I Tests	3Q FY82	-
Complete Ops Control C&I Tests	2Q FY83	-
Complete Fire Support/Amphib C&I Tests	2Q FY84	-
Data Communication Standards Validation (tentative)	1Q FY83	2Q FY80
Joint Tactical Information Distribution System (JTIDS)-Message Standards	1Q FY82	3Q FY80
Complete JTIDS C&I Tests	3Q FY85	-
TACS/TADS Transition to JINTACCS Progr	1Q FY82	-
Operational Effectiveness Demonstrations	3Q FY81 thru 3Q FY85	3Q FY81 thru 3Q FY85
Configuration Management Testing	2Q FY80	3Q FY81 thru 3Q FY85
Army Operational Facility/System Implementation	2Q FY79 thru 3Q FY85	4Q FY80 thru 2Q FY84
JCS Approval of Final Addition TIDP/JINTACCS Standards	1Q FY86	

The milestone slippages identified above are based upon funding and resources limitations resulting from an increase in JINTACCS requirements with no subsequent increase in funding. These new requirements in concert with the shortfall now present are due to funding cuts identified in paragraph 7 below.

Project: #D309 Title: Joint Interoperability of Tactical Command and Control Systems (Army)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	6620	11795	13201	19421	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	8864	11831	18445	-	Continuing	Not Applicable

The decreases in funding for FY 1981, 1982, and 1983 are due to reprograming of funds to higher Army priority program.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D310 Title: Joint Interoperability of Tactical Command and Control Systems (Executive Agent)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Program

A. (U) DETAILED BACKGROUND AND DESCRIPTION: For a detailed description of the JINTACCS program, see the summary for PE 6.47.79A. The JINTACCS Executive Agent project contains the funds necessary for the Chief of Staff of the Army to accomplish the executive agent responsibilities set forth by the Joint Chiefs of Staff (JCS) as follows: "The Executive Agent will insure the achievement of compatibility and interoperability of the tactical command and control systems used in joint military operations. Further, he will insure the development and testing of joint message standards for the Joint Tactical Information Distribution System (JTIDS). In accomplishing those tasks, the Executive Agent will consider US/NATO interoperability requirements to the maximum extent practicable." Collaterally, the JINTACCS Executive Agent has assumed responsibility for the testing support required for configuration management of the JCS standards for Tactical Air Control System/Tactical Air Defense System (TACS/TADS) operations. The JINTACCS Program will develop the technical standards necessary for the Service and Defense Agency tactical command and control systems to be compatible and interoperable with one another and thus mutually supporting on the battlefield. The Executive Agent will test the developmental standards and then forward them to CINCLANT for demonstration during a major joint exercise. After successful demonstration, the standards will be forwarded to the JCS for approval and promulgation as US joint standards for interoperability of tactical Command and Control (C2) systems. The NATO portion of the JINTACCS Executive Agent responsibilities is funded by Project D298.

B. (U) RELATED ACTIVITIES: This program is related to the Army's Tactical Command, Control, Communications (C3) Systems Engineering program which is funded under Program Element 6.47.12.A, whose goals complement the JINTACCS program by striving for interoperability among Army tactical C2 systems. Close liaison precludes duplication of effort.

C. (U) WORK PERFORMED BY: Overall coordination and management of the program are accomplished by the JINTACCS program Director who is the Assistant Deputy Chief of Staff for Operations and Plans (C4), and is tasked with staff management of the program. The primary contractors performing work for this project are the System Development Corp., which supports the JINTACCS Architect/Engineer from its offices at McLean, VA; the Planning Research Corp which supports the program test effort from its offices at Ft Monmouth, NJ; and the Command Control and Communications Corp of Torrance, CA, which is furnishing the Joint Interface Test System (JITS) for program testing.

Project: #D310 Title: Joint Interoperability of Tactical Command and Control Systems (Executive Agent)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: In 1977 the Ground and Amphibious Military Operations (GAMO) program was reorganized into the JINTACCS program in response to Congressional direction. At that time, the JINTACCS Joint Interface Test Force (JITF) was established at Ft. Monmouth, NJ. Plans were begun for the compatibility and interoperability testing of the first (Intelligence) functional segment and initial equipment to conduct testing as procured. In FY 1978 work continued on the engineering design plans for all the functional segments as well as the JTIDS message standards, and the design plan for the Intelligence segment was completed and approved for testing. In July 1979 tests of the Intelligence segment were begun. In FY 1980 the design plans for the remaining functional segments were completed and approved. Testing of the Intelligence segment was concluded, and plans were begun for tests of the Air Operations segment. Also in 1980, a plan for transitioning the configuration management test responsibilities for the TACS/TADS interface was agreed upon by the Navy (TACS/TADS Executive Agent) and the Army. In May 1981 the first JINTACCS Operational Effectiveness Demonstration (OED) was conducted by CINCLANT during its Exercise Solid Shield '81. This OED demonstrated the developmental standards for the Intelligence segment. Preliminary evaluations of the OED have been favorable. The final report (by CINCLANT) will be published in March 1982.

2. (U) FY 1982 Program: Air Operations Compatibility and Interoperability (C&I) testing will commence in November 1981 and run through June 1982. This segment will then be refined and documentation forwarded to CINCLANT for demonstration, along with the previously demonstrated Intelligence segment, during the OED scdeduled with Solid Shield '83. During FY82 the final deliveries will be made on the JITS, a sophisticated test system, which will allow the JINTACCS Joint Interface Test Force (at Ft Monmouth, NJ) to conduct the more difficult C&I tests of the JINTACCS program as well as configuration management tests of the TACS/TADS standards. While the main elements of the JITS will be with the test center at Ft Monmouth, other elements will be located with Service test units at various locations across the country. Testing will continue to be conducted in a decentralized fashion with the Service test units connected to the test center over leased communications lines. Also during FY82, the remaining JINTACCS segments will undergo further refinement, and work will continue on development of the JTIDS message standards design plan. The JTIDS standards are expected to be completed with publication of the JTIDS Technical Interface Design Plan (test edition) in July 1982.

Project: #D310 Title: Joint Interoperability of Tactical Command and Control Systems (Executive Agent)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

3. (U) FY 1983 Planned Program: In October 1982 the configuration management test support of the TACS/TADS standards will be transferred to the JINTACCS JITF at Ft Monmouth. The Operations Control segment will undergo C&I testing between November 1982 and March 1983. In May 1983 CINCLANT will conduct the second JINTACCS OED, demonstrating the Air Operations standards as well as the Intelligence standards. C&I testing of the last two segments, Fire Support and Amphibious, will commence in September 1983 and extend to January 1984.

4. (U) FY 1984 Planned Program: The program will continue configuration management support of the TACS/TADS standards as well as the JINTACCS developmental standards and will be developing plans for testing of the JTIDS standards. The standards for the Fire Support and Amphibious segments will be refined and forwarded to CINCLANT for OED during Solid Shield '85.

5. (U) Program to Completion: This is a continuing program; however, Congressional direction requires that testing be completed by the end of FY85.

Project: #D310 Title: Joint Interoperability of Tactical Command and Control Systems (Executive Agent)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

6. (U) Major Milestones:

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Begin compatibility and interoperability testing air operations segment	November 1981	November 1981
Publish the JTIDS TIDP-TE	July 1982	(Not reported)
Begin Configuration Management testing of the TACS/TADS standards	October 1982	(Not reported)
Begin compatibility and interoperability testing operations control segment	November 1982	November 1982
Begin compatibility and interoperability testing amphibious/fire support segments	September 1983*	October 1983

*Change to this milestone is a result of continuing refinement of the program schedule.

Project: #D310 Title: Joint Interoperability of Tactical Command and Control Systems (Executive Agent)

Program Element: #6.47.79.A Title: Joint Interoperability of Tactical Command and Control Systems

DOD Mission Area: #344 - Tactical Command and Control Budget Activity: #4 - Tactical Programs

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	14270	14128	11769	15653	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	10315	14171	12028	-	Continuing	Not Applicable
Quantities (current requirements)						Not Applicable
Quantities (as shown in FY 1982 submission)						-

The significant increase in 1981 funds was caused by cost growth on the JITS contracts. FY 1982 and 1983 changes are due to inflation index adjustments.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.57.10.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Joint Chemical/Biological Point of Contact/Test/Assessment
Budget Activity: #4 - Tactical Programs

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	729	1413	1451	2218	Continuing	Not Applicable
D049	Joint Chemical/Biological Contact Point and Test	729	1413	1451	2218	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Potential adversaries (USSR and Warsaw Pact countries) have significant chemical-biological (CB) equipment and practice CB offensive and defensive procedures to develop proficiency for operating in a CB environment. United States (US) forces must also be able to survive and accomplish their mission in a chemical 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 Unified Commander's and Services' identified needs 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 and 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. This data also supports 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 the stated user needs. This program covers direct 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 in RDTE support of development of chemical weapons and chemical and biological defense (CW/CBD) equipment for the Services.

Program Element: #6.57.10.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Joint Chemical/Biological Point of Contact/Test/Assessment
Budget Activity: #4 - Tactical Programs

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Five operational tests, two studies, and one technical data source book will be in progress and/or completed. The tests will evaluate mission degradation associated with wearing of chemical protective clothing, aircraft operations in a toxic environment, and problems of conducting medical operations in a toxic environment. The technical data source book will review and access available technology regarding protective equipment.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	729	1413	1451	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	729	1417	1423	Continuing	Not Applicable

The decrease in FY 1982 of $4 thousand resulted from the amended budget request and the application of revised inflation indices. The increase of $28 thousand in FY 1983 resulted from refinement of funding estimates to support program objectives.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.57.10.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Joint Chemical/Biological Point of Contact/Test/Assessment
Budget Activity: #4 - Tactical Programs

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The objectives of this program are 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 test 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 point accomplishes the publication and maintenance of CB technical data source books and provides data evaluation studies in support of CB data inquiries. In addition to providing quick solutions to critical operational requirements, data from the studies and tests also provide a significant input for defining and clarifying concepts being developed in Basic Research (6.1) through Engineering Development (6.4). To support the entire Army field testing program, this project conducts a continuous test effort to review, evaluate, and select suitable chemical agent simulants.

G. (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. Coordination and cooperation is also maintained with the United Kingdom, Canada, and Australia through the Quadripartite Working Group (QWG), The Technical Cooperation Program (TTCP), and with the North Atlantic Treaty Organization (NATO).

H. (U) WORK PERFORMED BY: In-house efforts are conducted at Dugway Proving Ground, UT. No contract work is performed in this program.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accmplishments: From the program initiation in FY 1976, a total of twenty-one data source books have been completed and published. During FY 1981, three operational tests and one data source book were initiated and/or completed. The tests and studies support the development of improved chemical and biological defense materiel and operational procedures. The data obtained and evaluated provide the basis for a critical operational evaluation of how well chemical warfare/chemical-biological defense items and/or systems meet the technical characteristics required by the user.

Program Element: #6.57.10.A
DOD Mission Area: #276 - Defensive Chemical and Biological Systems

Title: Joint Chemical/Biological Point of Contact/Test/Assessment
Budget Activity: #4 - Tactical Programs

2. (U) FY 1982-FY 1984 Program: Three operational tests and publication of one technical data source book are scheduled for FY 1982. The tests will evaluate mission degradation associated with wearing chemical protective clothing, and problems encountered when operating aircraft and conducting amphibious operations in a toxic environment. The technical data source book will assess the operational capability of currently available detection and warning devices and identify requirements for new developments. Five tests, two studies, and one source book are planned for initiation and/or completion in FY 1983. The tests will evaluate the effects of a toxic environment on various combat and combat support operations. The studies will address decontamination concepts and equipment. Protective equipment will be the subject of the data source book. Six tests, four studies, and one source book are planned for initiation, and/or completion in FY 1984. The tests will evaluate the effects of a toxic environment on various combat and combat support operations, the effects of agent on support equipment and alkaline paint, and the techniques for decontamination of interior surfaces of combat vehicles. The studies will address both offensive and defensive operations under special toxic environments. Simulants will be the subject of the data source book effort.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #3.13.07.A
Title: Foreign Science and Technology Center
DOD Mission Area: #312 - General Defense Intelligence Program
Budget Activity: #5 - Intelligence and Communications

A. RESOURCES (PROJECT LISTING): ($ in thousands)

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	308	66			Continuing	Not Applicable
D381	Scientific/Technical Intelligence	308	66			Continuing	Not Applicable

B. BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This is a continuing program covering , exploitation, and valuation of foreign systems in support of intelligence and threat assessment requirements. The program is aimed at obtaining technology employed in foreign systems which could constitute a military threat, determination of the extent of threat posed by those systems, and making the foreign technology available for use in development of countermeasures or adversary systems. This program element was 3.10.22A, Scientific and Technical Intelligence, in FY 1981 and prior submissions.

C. BASIS FOR FY 1983 RDTE REQUEST: Funding will support evaluation of foreign systems, . The foreign systems will be analyzed , and evaluated to determine component and subsystem characteristics, and to the extent possible, tested operationally to determine performance and effectiveness.

Program Element: #3.13.07.A Title: Foreign Science and Technology Center
DOD Mission Area: #312 - General Defense Intelligence Program Budget Activity: #5 - Intelligence and Communications

D. COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	308	66		Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	58	67		Continuing	Not Applicable

FY 1981: The project evolves around targets of opportunity. A situation occurred whereby it was considered advantageous to reprogram funds into the project to capitalize on the of several highly critical threat systems.
FY 1982: The funding level difference is attributable to minor budgetary adjustments.
FY 1983: Funding was programmed to support exploitation of anticipated targets of opportunity.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands): Not Applicable.

Program Element: #3.13.07.A Title: Foreign Science and Technology Center
DOD Mission Area: #312 - General Defense Intelligence Program Budget Activity: #5 - Intelligence and Communications

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Evaluation and exploitation of foreign material is conducted to assess the state of the art of threat technology and assimilate knowledge of capabilities and vulnerabilities in support of intelligence requirements and long-range threat analyses. The Army must be prepared to exploit and defeat foreign threat systems through a thorough knowledge of their capabilities, characteristics, and vulnerabilities. Further, detailed knowledge of the capabilities and performance characteristics of threat systems is essential for development of defensive measures. All evaluation efforts are based on stated requirements of intelligence forecast, threat assessment, force development, Research, Development, Test, and Evaluation (RDTE), or other requirements as appropriate. Results of evaluation are published in reports and disseminated to all interested parties throughout the Department of Defense.

G. (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. There is no unnecessary duplication of effort among services and agencies.

. (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 and duplication of effort is minimized. The US Army Foreign Science and Technology Center, Charlottesville, VA, has overall management responsibility for project D381.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1981 and Prior Accomplishments: In FY 1978 and FY 1979 foreign threat weapons systems were , evaluated in detail, and tested operationally in support of US development programs. There were threat systems evaluated in FY 1980. Additionally, in FY 1981,

Program Element: #3.13.07.A
DOD Mission Area: #312 - General Defense Intelligence Program

Title: Foreign Science and Technology Center
Budget Activity: #5 - Intelligence and Communications

2. FY 1982 Program: Ongoing projects for FY 1982 include exploitation of the following items:

3. FY 1983 Planned Program: evaluation, and exploitation of foreign threat systems will continue. The thrust of this program is to contribute to technologically sound assessment of the threat posed by certain foreign systems thereby assuring that US development programs are directed at the most economic and effective objective. Specific plans include

4. (U) FY 1984 Planned Program: Testing and evaluation for foreign systems will continue. The FY 1984 program will be flexible so that, as foreign systems become available, they will be exploited and tested in a timely manner. The program offers a high payoff for the resources invested.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #3.13.27.A
Title: Technical Reconnaissance & Surveillance (TECRAS)
DOD Mission Area: #312 - General Defense Intelligence Program
Budget Activity: #5 - Intelligence and Communications

A. RESOURCES (PROJECT LISTING): ($ in thousands)

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	150	0			Continuing	Not applicable
D382	TECRAS	150	0			Continuing	Not applicable

B. BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: TECRAS is a continuing program to support the development of systems, countermeasures and tactical doctrine.

C. BASIS FOR FY 1983 RDTE REQUEST: Funding will support development investigation of new technology areas to develop applications for meeting requirements; and providing a quick-reaction capability

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands) Not applicable. This is an FY 1983 new start in RDTE.

Program Element: #3.13.27.A
DOD Mission Area: # 312 - General Defense Intelligence Program

Title: Technical Reconnaissance & Surveillance (TECRAS)
Budget Activity: #5 - Intelligence and Communications

E. OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement, Army	0	1085	-	-	Continuing	Not applicable
Funds (current requirements) 1/						
Funds (as shown in FY 1982 submission) 2/						

1/

2/ (U) Not applicable. No FY 1982 submission.

Program Element: #3.13.27.A
DOD Mission Area: # 312 - General Defense Intelligence Program

Title: Technical Reconnaissance & Surveillance (TECRAS)
Budget Activity: #5 - Intelligence and Communications

F. DETAILED BACKGROUND AND DESCRIPTION:

G. RELATED ACTIVITIES: a DIA effort, is a related program. As applies to the investigation of new technologies portion of TECRAS, 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 will ensure that efforts are not duplicated by other Services/Agencies.

H. (U) WORK PERFORMED BY: The developing organization having the major responsibility under this TECRAS program is the Night Vision & Electro-Optics Laboratory (NV&EOL), Ft. Belvoir, VA. NV&EOL has beeen 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.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1981 and Prior Accomplishments: Two TECRAS tasks were initiated to provide approach studies It should be noted that these efforts were initially programed in FY 1981 with OMA funds; however, Congress directed conversion to RDTE appropriations.

2. (U) FY 1982 Program: None. RDTE scheduled to begin in FY 1983.

Program Element: #3.13.27.A
DOD Mission Area: # 312 - General Defense Intelligence Program

Title: Technical Reconnaissance & Surveillance (TECRAS)
Budget Activity: #5 - Intelligence and Communications

3. FY 1983 Planned Program: Continue development

Initiate development of quick-reaction capability
Begin investigation of new technologies

4. FY 1984 Planned Program: Continue development
and investigation of new technologies and applications.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #3.31.11.A
Title: Strategic Communications (STARCOM)
DOD Mission Area: #363 - Common User Communications
Budget Activity: #5 - Intelligence and Communications

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	684	788	812	954	Continuing	Not Applicable
D481	Strategic Communications (STARCOM)	684	788	812	954	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 interoperative 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) BASIS FOR FY 1983 RDTE REQUEST: Efforts will be directed toward: development and evaluation of a base data transmission and switching subsystem; investigation of EAC interfaces; and interoperability, development, and evaluation of long-wavelength fiber optics techniques/applications to support Army base, theater, and contingency communications requirements.

Program Element: #3.31.11.A Title: Strategic Communications (STARCOM)
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	684	788	812	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	638	789	834	Continuing	Not Applicable

Increase in FY 1981 funding was to initiate concept definition for the base data switching and transmission subsystem. In FY 1983 limited funds were reprogramed to higher priority programs.

E. (U) OTHER APPROPRIATION FUNDS: Not applicable.

Program Element: #3.31.11.A
DOD Mission Area: #363 - Common User Communications

Title: Strategic Communications (STARCOM)
Budget Activity: #5 - Intelligence and Communications

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The objective of this program is to develop nontactical communications concepts, equipment, and systems in response to requirements identified by the US Army Communications Command (USACC). Equipment and systems developed are for worldwide deployment in both fixed (base) Army environments and in transportable configurations used for EAC communication interfaces with the DCS. Maximum use is made of commercially developed communications equipment and technology from both US and foreign industries. Limited development efforts are applied to meet unique Army requirements which cannot be satisfied by purely commercial equipment. Specific tasks include EAC Interface/Interoperability and Base Communications and Interconnect Fiber Optics. Future tasks will support STARCOM requirements for Communications Endurance under Stress (Survivability).

G. (U) RELATED ACTIVITIES: None

H. (U) WORK PERFORMED BY: Project Manager DCS (Army), Fort Monmouth, NJ; US Army Communications-Electronics Engineering Installation Agency (USACEEIA), Fort Huachuca, AZ; and the US Army Communications-Electronics Command (USACECOM), Fort Monmouth, NJ. Contractors include Institute of Telecommunications Sciences, Boulder, CO, and various industrial contractors.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Analyzed available commercial fiber optic applications for USACC. Awarded contract for installation of a 90-Mbps fiber optic link for test and evaluation with existing base telephone equipment. Initiated analysis of millimeter-wave radio potential for base communications and initiated the evaluation of base data transmission and switching techniques to reduce the need for individual data subscriber circuits.

2. (U) FY 1982 Program: Complete installation of 90-Mbps fiber optic link and begin test and evaluation. Conduct risk analysis of fiber optic applications in the Korean theater. Develop specifications for millimeter-wave radio equipment for base communications. Develop and refine concepts and techniques for use of the base data switching and transmission subsystem. Initiate analysis and definition of interfaces required for interoperability enhancements at EAC.

3. (U) FY 1983 Planned Program: Initiate test and evaluation of long-wavelength (1.3 micrometer) optical equipment for fiber optic applications up to 25 km. Fabricate and test an omnidirectional millimeter-wave radio antenna for base communications. Acquire, test and evaluate the base data transmission and switching subsystem. Design a digital subscriber applique interface for the AN/TRC-170 Digital Tropo Radio Set used at EAC.

Program Element: #3.31.11.A Title: Strategic Communications (STARCOM)
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

4. (U) FY 1984 Planned Program: Complete evaluation and user test of long-wavelength fiber optic equipment. Integrate and test an omnidirectional millimeter-wave radio system with a distributed, electronic base switching system. Type classify and field the base data switching and transmission subsystem. Fabricate, test, and evaluate the digital sybsystem applique interface for the AN/TRC-170 Radio Set.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #3.31.26.A
Title: Long Haul Communications (DCS)
DOD Mission Area: #363 - Common User Communications
Budget Activity: #5 - Intelligence and Communications

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM EIEMENT QUANTITIES	7267	7460	7578	7492	Continuing	Not Applicable
D149	Army Support for DCS (Defense Communication Systems)	7267	7460	7578	7492	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF EIEMENT 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 and install 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 NATO and civilian agencies. The approach taken will provide commanders at all levels with creditable 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) BASIS FOR FY 1983 REQUEST: Initiate validation of Defense Switched Network Access Area (DSNAA) concepts in the United States (CONUS). Continue contractual efforts for development of a DCS reconstitution radio which is compatible with fixed-site AN/FRC-170 series digital line of Sight (LOS) DCS radios. Initiate evaluation of DCS facility survivability enhancements. Support MD-918 Digital Data Modem user testing on the Bocksburg-Berlin troposcatter link.

Program Element: #3.31.26.A
DOD Mission Area: #363 - Common User Communications

Title: Long Haul Communications (DCS)
Budget Activity: #5 - Intelligence and Communications

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	7267	7460	7578	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	7473	7483	6923	Continuing	Not Applicable

Decreases in FY 1981/82 were due to reprograming to higher priority programs. Net increase in FY 1983 reflects $1.4M reprograming to higher priority programs thereby deferring additional product improvement work on AN/FCC-98, 99 and AN/FRC-170, and a $2.1M increase to continue functional demonstration of the Movements Information Network (MINET) testbed through the CINC initiatives task.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands) Not applicable

Program Element: #3.31.26.A Title: Long Haul Communications (DCS)
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The objective of this project is to develop nontactical communications concepts, equipment, and systems in response to requirements identified by the Defense Communications Agency (DCA) and subsequently assigned to the Army for implementation. Equipment and systems involved are for worldwide deployment in fixed and recoverable military base environments. Maximum use is made of commercially developed equipment and technology. Limited development efforts are applied to satisfy requirements which cannot be met with purely commercial equipment. To effectively support forces already deployed and potential quick-reaction force deployments, equipment must be capable of interoperating with both NATO and civilian agency systems. The approach will provide worldwide connectivity at minimal cost and with minimal technical delay. Specific development areas include the DSNAA; DCS Reconstitution Radio; AN/FCC-98,-99, and AN/FRC-170 Product Improvement Programs; DCS Facility Survivability Enhancements and support of CINC initiatives.

G. (U) RELATED ACTIVITIES: None

H. (U) WORK PERFORMED BY: Project Manager DCS (Army), Fort Monmouth, NJ; US Army Electronics Engineering Installation Agency (USAEEIA), Fort Huachuca, AZ; US Army Communications-Electronics Command (USACECOM), Fort Monmouth, NJ; and Huntsville Div, US Army Corps of Engineers, Huntsville, AL. Contractors include Institute of Telecommunications Sciences, Boulder, CO, and various industrial contractors.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

1. (U) FY 1981 and Prior Accomplishment: Completed development testing of MD-918()/GRC Digital Modems for DCS troposcatter links. Awarded competitive contracts for the DSNAA concept development. Prepared and coordinated development specification for the DCS Reconstitution Radio. Initiated development of DCS Facility Survivability Enhancements. Initiated European DCS/Theater interoperability analysis. Initiated design analysis for modular DCS/tactical Electronic Counter-Countermeasures (ECCM) microwave radio. Provided funds in support of CINC initiatives.

2. (U) FY 1982 Program: Complete preparation for MD-918 on-site user testing and materiel fielding. Complete DSNAA concept development, and initiate concept validation planning. Initiate DCS Reconstitution Radio prototype design and fabrication. Conduct survey of selected DCS facilities in CONUS/OCONUS and develop facility survivability criteria. Develop European DCS/Theater interoperability performance criteria. Continue design analysis for future modular DCS tactical ECCM microwave radio.

Program Element: #3.31.26.A
DOD Mission Area: #363 - Common User Communications

Title: Long Haul Communications (DCS)
Budget Activity: #5 - Intelligence and Communications

3. (U) FY 1983 Planned Program: Support MD-918 on-site user testing on the Bocksburg-Berlin Troposcatter link. Initiate validation of DSNAA concepts in CONUS. Complete fabrication and testing of DCS Reconstitution Radio prototype, and initiate fabrication of engineering development models (EDM). Implement DCS Facility Survivability Enhancements at selected DCS sites and evaluate results. Prepare DCS multiplexer specification based upon DCS/Theater interoperability criteria. Fabricate advanced development models (ADM) of DCS ECCM microwave radio. Continue support of CINC initiatives.

4. (U) FY 1984 Planned Program: Extend validation of DSNAA concepts to OCONUS and integrate with European Telephone System (ETS). Complete fabrication and testing of DCS Reconstitution Radio EDMs, and deliver to USAF for integration into the Digital European Backbone (DEB) reconstitution packages. Initiate development of DCS multiplexer. Test and evaluate ADMs of DCS ECCM microwave radio. Continue support of CINC initiatives.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #3.31.42.A
Title: Satellite Communications Ground Environment
DOD Mission Area: #363 - Common User Communications
Budget Activity: #5 - Intelligence and Communications

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	23562	41524	35545	57043	Continuing	Not Applicable Diverse Items
D253	Defense Satellite Communications System-Defense Communications System (DSCS-DCS) (Phase II)	13016	24123	16941	31947	Continuing	Not Applicable
D450	Satellite Communications	383	934	1121	1131	Continuing	Not Applicable
D456	Tactical Satellite Communications (TACSATCOM)	10161	16467	17483	23965	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program includes the development of strategic and tactical satellite communications ground terminals by the Army for all Services/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 (DCS). Existing communications systems do not have the capability nor survivability required, particularly in a jamming environment or in the highly fluid modern battlefield where line-of-sight terrestrial communications are limited.

Program Element: #3.31.42.A
DOD Mission Area: #363 - Common User Communications
Title: Satellite Communications Ground Environment
Budget Activity: #5 - Intelligence and Communications

C. (U) BASIS FOR FY 1983 RDTE REQUEST:

1. (U) Project #D253 - Defense Satellite Communications System (DSCS): Funding is required to continue system design of the Real Time Adaptive Control System (RTACS); complete Engineering Development (ED) of the Adaptive Link Power Control (ALPC) system; begin ED of the Multifunction High Rate Coder (MHRC), Limited Network Control Element, and the Programable Filter; began Advanced Development (AD) of the 30/20-GHz system; and continue development of the user-to-user testbed and Jammer Analysis and Monitoring System.

2. (U) Project #456 - Tactical Satellite Communications (TACSATCOM): Funding is required to complete ED of the Antijam (AJ) Capability for the Multichannel Initial System (MCIS) with procurement to begin in FY 1984; continue AD of the Single Channel Objective Tactical Terminal (SCOTT); initiate Full-Scale Development (FSD) of a Multichannel SHF Demand Assigned Multiple Access (DAMA) Modem; continue ED of a Quick Erect Antenna; and initiate AD of an advanced manpack terminal.

3. (U) Project #450 - Satellite Communications: Funding is required to complete development of a 20-GHz transmitter feasibility model; continue electromagnetic compatibility analysis of Ground Mobile Forces terminals; and complete projects on advanced manpack, an unattended earth terminal, and AJ efforts.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	FY 1984	Additional To Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	23562	41524	35545	57043	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	25480	36438	50128	-	Continuing	Not Applicable

Decrease in 1981 reflects contracts being awarded for less than programed. Increase in 1982 reflects addition of study efforts for Office of the Joint Chiefs of Staff. Decrease in 1983 reflects Office of the Secretary of Defense reductions by Program Budget Decision.

Program Element: #3.31.42.A Title: Satellite Communications Ground Environment
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

F. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement, Army:						
Funds (current requirements)	161700	209500	276400	157000	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	163800	137600	198700	----	Continuing	Not Applicable
Quantities*						

*Large number of diverse items.

D253 1982, 1983 increases are due to acceleration of procurement of Medium Terminal because of FY 1982 Congressional Supplemental Budget.

D456 1981 reduction is due to cancellation of AN/MSC65 and removal of AN/PSC-3 funds. 1982 increase is due to addition of TD1337, increase in buy of AN/GSC-40 and AN/MSC-64 in FY 1982 Congressional Supplemental Budget. 1983 increase is due to addition of a "Mod-In-Service" line for AJ modems.

Program Element: #3.31.42.A Title: Satellite Communications Ground Environment
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The capability to provide rapid, reliable communications, command, and control--especially in a hostile environment--presently does not exist. This program includes the development of strategic and tactical ground terminals for use with satellite communications systems. The two principal projects included in this program element (PE) are: the Defense Satellite Communications System (DSCS) Phase II (D253) and the Tactical Satellite Communication System (TACSATCOM) (D456). Ground terminal requirements for all Services are developed within these projects. Efforts to advance the state-of-the-art in those technological areas necessary to improve ground environment of the DSCS program, and to develop satellite communications equipment suitable for TACSATCOM and other satellite applications, are conducted within the Satellite Communications Project (D450). The emphasis is to improve efficient use of resources in these non-line-of-sight systems, enhance their ability to operate in a stressed (jamming) mode, and explore a new frequency range for relief of spectrum congestion and overall system improvement.

G. (U) RELATED ACTIVITIES: Management of the Army TACSATCOM program is vested in the Project Manager - Satellite Communications, Fort Monmouth, NJ. The Army is responsible for ground terminal development for all Services. The Defense Communications Agency (DCA) is the program manager for the Defense Satellite Communication System (DSCS). In the DSCS, the Army (SATCOMA) is responsible for development of the ground environment, the Air Force is responsible for the development and launching of the satellites, and the Navy for the development of shipboard terminals.

H. (U) WORK PERFORMED BY: The US Army Satellite Communication Agency, Ft Monmouth, NJ. Contractors include Harris Corporation, Melbourne, FL; Magnavox, Torrance, CA; Magnavox, Ft Wayne, IN, Comtech Laboratories, Inc., Smithtown, NY; Martin Marietta Corporation, Orlando, FL, and seven others at $60 million.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments:

a. (U) The Phase I DSCS became operational in July 1967, and in 1969 it was expanded to include high rate data. Engineering Development (ED) of a heavy terminal began in 1970. In 1972, an ED contract for a Time Division Multiple Access (TDMA) capability was awarded. In 1973, ED of the AN/USC-28 Spread Spectrum equipment and the light terminal was begun, and in 1974, ED of Quadra-Phase Shift Keying (OPSK) equipment began. Development of the heavy and light terminals, TDMA, and OPSK was completed in 1975, when development began on antennas for the medium and light terminals. The medium terminal antenna was completed in 1976, and the AN/USC-28 and light terminal antenna developments were completed in 1977. In 1978,

Program Element: #3.31.42.A
DOD Mission Area: #363 - Common User Communications

Title: Satellite Communications Ground Environment
Budget Activity: #5 - Intelligence and Communications

Advanced Development (AD) of the Pilot Control System (PCS) was completed. In 1980 the Jam-Resistant Secure Communications program was added to the procurement appropriation. In 1981, PCS was declared operational, and an ED contract for the Adaptive Link Power Control (ALPC) and a design contract for the Real Time Adaptive Control System (RTACS) were awarded.

b. (U) In 1972, a TACSATCOM terminal ED contract was awarded. In 1974, a Communications Control Facility (CCF) was added to the contract, ED was begun on a UHF antenna, a signal processor, and a UHF manpack transceiver, and AD was begun on a Control/Network terminal modem. In 1976 the SHF multichannel terminal was type-classified Standard, and Low-Rate Initial Production was begun. In 1977, the CCF was type-classified Standard. In 1978, ED was begun on the Antijam/Control (AJ) Modem. DT/OT II of a UHF manpack was conducted in 1979, exploratory development for a Multichannel Objective System (MCOS) was begun, and Full-Scale Production of the Multichannel Initial System (MCIS) was begun. In 1981, AD of the Single Channel Objective Tactical Terminal (SCOTT) began.

2. (U) FY 1982 Program:

a. (U) DSCS: Design of the RTACS and ED of the ALPC will continue. AD of the Multifunction High Rate Coder (MHRC) and a 30/20-GHz system will begin. Antijam (AJ) efforts for the AN/USC-28 and the Burst Error Coder will begin, and the Integrated Test Facility will be expanded into a User-to-User Test Bed.

b. (U) TACSATCOM: ED of the AJ Modem for the Multichannel Initial System will continue. A Demand Assigned Multiple Access (DAMA) modem for the MCOS will be demonstrated, and AD of the SCOTT will continue.

3. (U) FY 1983 Planned Program:

a. (U) DSCS: Funding is required to continue system design of the RTACS; complete ED of the ALPC; begin ED of the MHRC, Limited Network Control Element (LNCE), and Programable Filter; begin AD of the 30/20-GHz system; and continue development of the User-to-User Test Bed and Jammer Analysis and Monitoring System.

b. (U) TACSATCOM: Funding is required to continue AD of the SCOTT, complete ED of the AJ capability for the MCIS, with procurement delayed until 1984, initiate FSD of a Multichannel SHF DAMA Modem, continue ED of a Quick Erect Antenna, and initiate AD of an Advanced manpack terminal.

Program Element: #3.31.42.A Title: Satellite Communications Ground Environment
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

c. (U) Satellite Communications. Funding is required to complete development of a 30-GHz transmitter feasibility model, continue electromagnetic compatibility analysis of Ground Mobile Forces terminals, and complete advanced manpack efforts.

4. (U) FY 1984 Planned Program:

a. (U) DSCS: ED of the MHRC, LNCE, and Programable Filter will be completed; support to the User-to-User Test Bed will continue; ED contracts for the 30/20-GHz terminal and Modulation subsystem will be awarded.

b. (U) TACSATCOM: FSD of the SCOTT will begin; MCOS and Advanced manpack AD will continue.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D253 Title: Defense Satellite Communications System
Defense Communications System (Phase II)

Program Element: #3.31.42.A Title: Satellite Communications Ground Environment

DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

A. (U) DETAILED BACKGROUND AND DESCRIPTION: The Initial Defense Communications Satellite Project (IDCSP) was initiated in 1962 to establish research and development in military satellite communications and to provide a limited operational capability. Investigation of satellite communications was necessary to: improve service, quality, capacity, and reliability of segments of the Defense Communications System (DCS); provide contingency communications required during crisis or limited war; and provide communication for high-priority users. The IDCSP evolved into the Phase I, Defense Satellite Communications System (DSCS), which became operational in 1967. To improve the capacity, reliability, and quality of the DSCS, a Phase II Program was approved in June 1968 and initiated in FY 1969. Phase II DSCS employs new satellites, terminals, and modulation equipment. In the DSCS program, the Army develops the satellite communications ground terminals and associated equipment in response to requirements developed by the Defense Communications Agency (DCA) and approved by the Office of the Secretary of Defense (OSD). The Phase I DSCS ground complex consisted of two types of terminals, heavy and medium terminals. In Phase II, DSCS, the Army has developed heavy, medium, and light terminals, and associated modulation equipment to convert the DSCS to a digital system with a higher capacity and reliability. These improved terminals are required to satisfy known and contingency operational needs of the World Wide Military Command and Control System (WWMCCS), the National Communications System (NCS), and other elements of the DCS. In order to optimize the capacity and efficiency of the DSCS, the Army is charged with the development of a control system that will provide an effective control capability for the expanded DSCS of the 1980's. Past efforts resulted in the development of a manual control system for the IDCSP and for Phase II, DSCS, the first automated Pilot Control System. Present and future efforts are directed toward employing the Pilot Control System for limited interim use and developing a Real Time Control System to automate, expand, and increase the speed and accuracy of the control functions for the DSCS to include automated reaction to jamming. Following the US Air Force development of the DSCS III satellite and the Satellite Configuration Control Element (SCCE), the Army will procure the SCCE. The SCCE will provide the DSCS Control System with an improved and automated capability for allocating satellite resources. The SCCE will provide operational command and control of the DSCS III satellites to optimize utilization of premium satellite resources in support of realtime user requirements. Present and future efforts are also directed toward providing other increased capabilities. Spread Spectrum Conferencing and Beacon Entry equipment will provide a communications conferencing capability and an alternative means of establishing communication links with the Spread Spectrum Multi-Access (SSMA), AN/USC-28, antijam equipment. This conferencing capability is needed for the WWMCCS and to expand the utility of secure communications. The Low-Rate Multiplexer is a programable multiplexer that will be used for low-data-rate users

Project: #D253 Title: Defense Satellite Communications System
Defense Communications System (Phase II)

Program Element: #3.31.42.A Title: Satellite Communications Ground Environment
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

providing an ability to change data rates without manual restrapping. It provides an alternative to existing new equipment and is to be used with the USC-28. The Burst Error Correction Coder provides both forward error correction coding and protection against burst jamming. It is needed for use with the AN/USC-28. The 30/20-GHz terminal and modulation developments will make it possible for certain of the DSCS users to operate in the less crowded K-band. The Limited Network Control Element will provide mobile, less vulnerable facilities as an alternative to the fixed facilities provided as part of RTACS.

B. (U) RELATED ACTIVITIES: The Defense Communications Agency (DCA) is the Defense Satellite Communications System (DSCS) Program Manager. In support of the DSCS, the Army is responsible for development of the ground environment; the Air Force is responsible for development and launching of the satellite; and the Navy is responsible for development of the shipboard terminals. The ground environment consists of the earth terminals, modulation equipment, Antijam (A/J) equipment, and the Jam-Resistant Secure Communications (JRSC) equipment being procured for the World Wide Military Command and Control System (WWMCCS).

C. (U) WORK PERFORMED BY: The US Army Satellite Communications Agency, Fort Monmouth, NJ, has been designated the project office for the development of the ground complex of the Defense Satellite Communications System. The Commander of the Agency is the Project Manager. Primary contractors for the Phase II system are: Ford Aerospace Corporation, Western Development Laboratories Division, Palo Alto, CA, for the Pilot Control System extension (PCS-X); Linkabit, La Jolla, CA, for the Burst Error Correction Coder and rate .9 coder; Magnavox Research Laboratories, Torrance, CA, for the spread spectrum conferencing and beacon entry capability for the USC-28; Harris Corporation, Melbourne, FL, for the Adaptive Link Power Control (ALPC) and Real Time Adaptive Control System (RTACS).

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The Phase I DSCS became operational in July 1967 and was expanded to include wideband transmission of high-resolution photographic data. In FY 1970, a contract was awarded for engineering development of a heavy terminal, followed in FY 1972 by an engineering development contract for a Time Division Multiple Access (TDMA) capability (technology to significantly increase subscriber use of resources) . In FY 1973 engineering development of the AN/USC-28 Spread Spectrum equipment (to provide A/J capability) and the light terminal was initiated. In FY 1974 an engineering development contract was awarded for Quadra-Phase Shift Keying (QPSK) equipment (a modulation

Project: #D253 Title: Defense Satellite Communications System
Defense Communications System (Phase II)

Program Element: #3.31.42.A Title: Satellite Communications Ground Environment
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

scheme to increase use of communications channels). The OPSK and AN/USC-28 are included in the Digital Communications Subsystems, under fabrication by Tobyhanna Army Depot and will be used with the heavy terminal (AN/FSC-78) and medium terminal (AN/GSC-39). Developments were initiated in FY 1975 for G/T 34 and G/T 26 antennas which are required for use with the medium and light terminals. These antennas were completed in FY 1976 and 1977 respectively. Development of the AN/USC-28 was completed in FY 1977. Design approaches for Burst Error correction equipment (to provide protection against burst interference--natural or manmade) and Low-Rate Multiplexer (to buffer low-rate users into the high-rate system) were also completed in FY 1977. This equipment is required to increase accuracy and efficiency during antijam operations. In FY 1978 advanced development of the Pilot Control System (PCS) (to provide more efficient management of communications channels) was completed. Contracts were also awarded for extension of the PCS, continuation of the low-rate multiplexer development, advanced development of a Burst Error Correction Coder, and interface of the Satellite Configuration Control Element (SCCE) and the AN/FSC-78 terminals. In FY80 the development of the PCS was continued to enable interim use of the system for the Atlantic satellite, as well as award of JRSC contracts for AN/USC-28, AN/TSC-86, and associated equipment. A contract was awarded for design of an Adaptive Channelized Estimator, and funds were provided for definition of the Batson II interface with the SCCE. In FY81, awards of RTACS and ALPC contracts were the major actions.

2. (U) FY 1982 Program: Continue design of the RTACS and engineering development of the ALPC. Award competitive contracts for advanced development of the Multifunction High Rate Coder. Development of a wideband jamming canceller will be initiated based on the Navy's narrowband effort. Contracts will be awarded for critical component development for the terminals and modulation subsystem for a 30/20-GHz system. Contracts will be awarded for an Acquisition Modification for the AN/USC-28 and for Nuclear Mitigation for the AN/USC-28 and Burst Error Coder. Establishment of a User-to-User Test capability for the Integrated Test Facility will be initiated in FY82.

3. (U) FY 1983 Planned Program: Funding is required to complete the system design of the RTACS and begin preparation of applications software and procurement of hardware. The Validation/Verification contract will continue to support the RTACS effort. Funding is required to complete the ALPC engineering development. Plan to award engineering development contracts for the Multifunction High Rate Coder, for the Limited Network Control Element, and the Programable Filter. Continue development of a User-to-User Testbed. Award design definition and component development contracts for the 30/20 GHz-system. Funds are required to continue development of the Jammer Analysis and Monitoring System and for generation of test program sets.

Project: #D253 Title: Defense Satellite Communications System
Defense Communications System (Phase II)

Program Element: #3.31.42.A Title: Satellite Communications Ground Environment
DOD Mission Area: #256 - Tactical Communications Budget Activity: #4 - Tactical Programs

4. (U) FY 1984 Planned Program: Continue generation of applications software for RTACS. Continue V&V/SETA support of RTACS software. Complete engineering development of the Multifunction High Rate Coder, Limited Network Control Element, and the Programable Filter. Continue development of a User-to-User Testbed. Award engineering development contracts for 30/20 GHz Terminals and Modulation Subsystem. Complete development of the Jammer Analysis and Monitoring System. Production efforts will continue for the Digital Communications Subsystem, System Control, and MOD in service.

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

6. (U) Major Milestones: Not Applicable.

7. (U) Resources $ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	13018	24123	16941	31947	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	14047	20190	22514	-	Continuing	Not Applicable
Quantities*						
Other Procurement, Army						
Funds (current requirements)	110900	141000	189200	119700	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	103218	98700	164900	-	Continuing	Not Applicable

* Large number of diverse items.

Increase in procurement is a result of accelerating procurement of medium terminal. Decrease in 1981 RDTE is due to contracts for RTACS and ALPC being awarded for less than programmed. Increase in 1982 is due to addition of a study for Office of the Joint Chiefs of Staff. Decrease in 1983 is due to Office of the Secretary of Defense reduction by Program Budget Decision.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D456 Title: Tactical Satellite Communication Systems
Program Element: #3.31.42.A Title: Satellite Communications Ground Environment
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

A. (U) DETAILED BACKGROUND AND DESCRIPTION: The Army, along with the Air Force and Marine Corps, requires a family of manpack and mobile Tactical Satellite Communications (TACSATCOM) terminals to improve the effectiveness and reliability of the communications equipment needed to meet critical tactical command and control and intelligence requirements. TACSATCOM will provide communications links over difficult terrain profiles with quick setup/teardown times and will offer the highest possible assurance of positive and continuous communications between widely dispersed and fast-moving tactical forces. TACSATCOM will further reduce the threat of physical damage by allowing personnel to deploy terminal equipment at sites less exposed to detection and direct fire. The objectives of this program are: (a) to develop and procure single-channel and multichannel tactical satellite communication capabilities for use by Ground Mobile Forces, (b) to develop operational concepts, and (c) to support special military operational needs. This equipment will replace existing line-of-sight equipment where it is more cost effective or where it meets essential military requirements that are not being actively accomplished by other means.

B. (U) RELATED ACTIVITIES: Management of the Army TACSATCOM Program is vested in the Project Manager, Satellite Communications, Fort Monmouth, NJ. The Army is responsible for development of ground terminals for all services. Similarly, the Air Force and Navy are developing airborne and shipborne terminals respectively. The Air Force is also responsible for the development and launching of the satellites required to support all services.

C. (U) WORK PERFORMED BY: The US Army Satellite Communications Agency, Fort Monmouth, NJ, is the project office for the development and procurement of all ground terminals for the services. Contractors include: RCA, Camden, NJ; Magnavox Government and Industrial Electronics Company, Fort Wayne, IN; Harris Corporation, Melbourne, FL; Martin Marietta Corporation, Orlando, FL; and Cincinnati-Electronics, Cincinnati, OH. Also, work is performed by Tobyhanna Army Depot, Tobyhanna, PA, and Naval Ocean Systems Center, San Diego, CA.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: As a result of a joint-service program, the Army and the Air Force contracted for advanced development models of ground and airborne terminals in the Ultra High Frequency (UHF) and Super High Frequency (SHF) spectrums. Subsequent tests results proved the feasibility of using satellite communications to meet

Project: #D456 Title: Tactical Satellite Communication Systems
Program Element: #3.31.42.A Title: Satellite Communications Ground Environment
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

tactical requirements. A System Development Plan was prepared, and in December 1972, an advanced development contract was awarded to RCA Corporation, Camden, NJ, for SHF ground terminals to be mounted in 1/4-ton trailers and 1 1/4-ton trucks. In FY 1974, the RCA SHF small terminal contract was expanded to include an engineering development for an SHF Communications Control Facility required to better utilize the full capability of existing and planned satellites. Engineering development contracts were also awarded for: Ultra-High Frequency (UHF) antennas to Harris Corporation, Melbourne, FL; Tactical Satellite (TACSAT) Signal Processor (TSSP) to Martin Marietta Corporation, Orlando, FL; and UHF Manpack transceiver to Cincinnati-Electronics, Cincinnati, OH. An advanced development contract was awarded for an Antijam (AJ)/Control Modem with Harris Corporation, Melbourne, FL. In FY 1976, the SHF Satellite Communication Terminals were type classified and a contract was awarded for a Low-Rate Initial Production (LRIP) quantity of SHF terminals. In FY 1977, developmental contractual efforts were completed on the Manpack transceiver and the AJ/Control Modem, and the Communication Control Facility (AN/MSQ-114) was type classified. In FY 1978, an engineering development contract was awarded for an AJ/Control Modem for the multichannel SHF initial terminals. Development and Operational Test II (DT/OT II) of the UHF Manpack system was initiated in FY 1978 and continued into FY 1979. Engineering development was conducted on the AJ/Control Modem for the Multichannel Initial System terminals. In FY 1980 and FY 1981, effort continued on AJ/Control Modem and the production contract for AN/TSC-85 and 93 and associated equipment was awarded. Effort continued on Single-Channel Objective Tactical Terminal (SCOTT) effort; contract was awarded for PSC-3.

2. (U) FY 1982 Program: Continue AJ/Control Modem contract. Award AD Contract for Single-Channel Objective Tactical Terminal (SCOTT), complete terminal system design plan effort for Multichannel Objective System (MCOS), award ED contract for Quick-Erect Antenna, continue contractual effort in production of AN/TSC-85 and 93. Continue contract of PSC-3 and VSC-7; continue funding AN/MSC-64. Continue engineering development effort for Quick-Erect Antenna.

3. (U) FY 1983 Planned Program: Complete advanced devlopment of Single-Channel Objective Tactical Terminal (SCOTT) and conduct development/operational testing. Initiate preparations for Army System Acquisition Review Council (ASARC) II. Initiate Multichannel Objective System (MCOS) engineering development effort. Complete ED for Quick-Erect Antenna (QEA). Initiate advanced development for the acquisition of an Advanced Manpack Satellite Terminal.

4. (U) FY 1984 Planned Program: Continue advanced development of Advanced Manpack, and engineering development of MCDS and SCOTT. Provide internal system engineering support including test and evaluation, specification development, program monitoring, briefings, and installation support.

Project: #D456 Title: Tactical Satellite Communication Systems
Program Element: #3.31.42.A Title: Satellite Communications Ground Environment
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

5. (U) Program to Completion: This is a continuing program. Completion of all engineering development contracts, DT/OT's, and introduction of the family of terminals in the Army inventory remain to be accomplished. Related research and development efforts in the area of modems, exciter drivers, etc., will continue toward more efficient use of satellite power.

6. (U) Major Milestones: Not Applicable.

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	10161	16467	17483	23965	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	10687	15313	26468	-	Continuing	Not Applicable
Quantities *						
Other Procurement, Army:						
Funds (current requirements)	50800	68500	86800	37300	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	60474	47300	33800	-	Continuing	Not Applicable
Quantities *						

*Large number of diverse items.

Decrease in FY 1981 procurement is due to cancellation of AN/MSC-65 and removal of AN/PSC-1 dollars.

Project: #D456 Title: Tactical Satellite Communication Systems
Program Element: #3.31.42.A Title: Satellite Communications Ground Environment
DOD Mission Area: #363 - Common User Communications Budget Activity: #5 - Intelligence and Communications

Increase in FY 1982 procurement is due to additional procurement of AN/MSC-64, AN/GSC-40, and AN/PSC-3; n FY 1983 to addition of Mod-In-Service line and additional AN/TSC 85/93.

Decrease in 1981 RDTE is due to inflation adjustment.

Increase in 1982 is due to addition of a study for Office of the Joint Chiefs of Staff.

Decrease in 1983 is due to Office of the Secretary of Defense reduction by Program Budget Decision.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #3.34.01.A
Title: Communications Security (COMSEC) Equipment
DOD Mission Area: #364 - Communications Security
Budget Activity: #5 - Intelligence and Communications

A. RESOURCES (PROJECT LISTING): ($ in thousands)

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT					Continuing	Not Applicable
	QUANTITIES						
D491	Communications Security Equipment Technology					Continuing	Not Applicable

B. 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 (C^3) Systems. This program meets the stated needs by providing TEMPEST (a code word) RDTE support to all developers per requirements of AR 530-4, 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 AR 530-2, "National Tactical COMSEC Plan."

Program Element: #3.34.01.A
DOD Mission Area: #364 - Communications Security

Title: Communications Security (COMSEC) Equipment
Budget Activity: #5 - Intelligence and Communications

C. BASIS FOR FY 1983 RDTE REQUESTS: Continue TEMPEST and COMSEC support to Army C3 equipment/system developers. Continue integration kit development for fielding PARKHILL/VINSON security devices and new encryption devices such as the KY-90/KG-84 coming into the inventory. Continue development of: Secure terminals for , TEMPEST Automated Data Acquisition and Analysis System (TADAAS), and the . Complete advanced development of the Multiple User Storage Equipment (MUSE). Initiate a . Continue systems engineering efforts for COMSEC interoperability of new equipment/systems entering the Army inventory.

D. COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)				Continuing	Not Applicable
Funds (as shown i FY 1982 submission)				Continuing	Not Applicable

Decrease in FY 1982 resulted from minor service reprograming. Reduction in FY 1983 resulted from service reprograming to higher priority programs, resulting in reduction of the , limited support to the US Army Test and Evaluation Command's (USATECOM) mobile TEMPEST facility (no upgrade efforts), deferred start of field TADAAS and an overall reduction in general technical support to system developers.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands): Not Applicable.

Program Element: #3.34.01.A
DOD Mission Area: #364 - Communications Security

Title: Communications Security (COMSEC) Equipment
Budget Activity: #5 - Intelligence and Communications

F. DETAILED BACKGROUND AND DESCRIPTION: 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. Exploratory development efforts include
Advanced and engineering development models are provided for
. COMSEC systems engineering support is provided to Army materiel developers. Integration engineering, installation kit hardware development, and fielding support are furnished for applications of encryption devices to tactical systems. Engineering support is provided to all Army organizations having special COMSEC needs . The program also includes TEMPEST (a code word for the detection and analysis of compromising emanations) RDTE support to developers and the development of automated TEMPEST instrumentation systems. The program addresses total Army RDTE needs in the tactical COMSEC area and

G. (U) RELATED ACTIVITIES: All COMSEC RDTE within DOD is the responsibility of NSA under DOD Directive C-5200.5. Program Element 3.34.01.A, 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 6.47.01.A, 2.80.10.A, 6.47.79.A, and 6.37.46.A 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.

H. (U) WORK PERFORMED BY: Contractors currently performing work on this program are: Honeywell Inc., Annapolis, MD; ITT, Fort Wayne, IN; and Cincinnati-Electronics Corp., Cincinnati, OH. Other contracts are to be awarded during FY 1983 to various industrial firms. The primary in-house developing organization is the US Army Communications-Electronics Command (USACECOM), Fort Monmouth, NJ. Assisting in specific efforts are elements of the US Army Aviation Research and Development Command (USAVRADCOM), Fort Monmouth, NJ; elements of the US Army Electronics Research and Development Command (USAERADCOM), Fort Monmouth, NJ; US Army Test and Evaluation Command (USATECOM), Aberdeen Proving Ground, MD; Naval Ocean Systems Center, San Diego, CA; and NSA, Washington, DC.

Program Element: #3.34.01.A
DOD Mission Area: #364 - Communications Security

Title: Communications Security (COMSEC) Equipment
Budget Activity: #5 - Intelligence and Communications

1. PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1981 and Prior Accomplishments: To date, the program has addressed secure tactical communications in the areas of COMSEC technology, COMSEC systems engineering support, and TEMPEST design and evaluation. Installation kits were developed for VINSON and PARKHILL voice security devices. NESTOR installation kits were upgraded.

. 50% of the TADAAS development has been completed.

. Support was given to many major communications-electronics system developers.

2. FY 1982 Program: Effort will continue in all COMSEC RDTE areas--technology base, systems engineering support, hardware development, and TEMPEST. In particular, a quick-reaction TEMPEST Test and Evaluation capability will be maintained; TADAAS development will continue;

3. FY 1983 Planned Program: Continue RDTE efforts in COMSEC technology, COMSEC hardware development, COMSEC systems engineering support, and TEMPEST to support national COMSEC objectives. Emphasis will be placed on completing the laboratory model of TADAAS,

The Army Test and Evaluation Command's Mobile TEMPEST Test Facility will be maintained.

Systems engineering support will continue for TRI-TAC COMSEC in Army tactical communications.

4. FY 1984 Planned Program: Continue all phases of TEMPEST test and evaluation support including TADAAS development.

Program Element: #3.34.01.A
DOD Mission Area: #364 - Communications Security

Title: Communications Security (COMSEC) Equipment
Budget Activity: #5 - Intelligence and Communications

. Initiate engineering (full scale) development of the MUSE.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.37.12.A
Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing
Budget Activity: #5 - Intelligence and Communications

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1999	1042	3424	1065	Continuing	Not Applicable
	QUANTITIES	Protogype Quick Reaction Multicolor Printer (QRMP)				Continuing	1
		Prototype Digital Topographic Support System				Continuing	2
D580	Field Army Mapping	1999	1042	2183	819	Continuing	Not Applicable
DT44	Digital Topographic Support System	0	0	1241	246	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element supports the advanced development and testing of equipment and techniques in support of the field Army in the areas of point position fixing and land navigation, mapping, 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 topographic requirements by facilitating the timely reproduction of multicolor topographic maps, terrain intelligence products, and operations overlays; and (2) the Digital Topographic Support System (DTSS), which will draw on the Defense Mapping Agency (DMA) Land Combat Data Base (LCDB) to provide digital topographic support for materiel systems which will be deployed in the mid-80's and beyond. This program addresses the development of improved capability to generate and disseminate up-to-date general and special purpose map data which will enable Commanders to use the terrain to their advantage against numerically superior forces and to provide coordinates, elevations, and azimuths faster and more accurately in order to allow indirect fires to be delivered for maximum effect.

C. (U) BASIS FOR FY 1983 RDTE REQUESTS: FY 1983 RDTE funds will be used to develop a Quick Response Multicolor Printer (QRMP) capability to meet military requirements for multicolor reproduction of items, such as topographic maps, terrain intelligence information and map overlays. Technology to meet the current Army requirements for graphic products in a more

Program Element: #6.37.12.A Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing Budget Activity: #5 - Intelligence and Communications

timely and cost effective manner is now available to quickly and economically reproduce multicolor products in limited quantities on an as-needed basis. The QRMP will provide the capability of printing up to 300 copies per hour without the time and dollar investment of setting up the press; thus, it will economically provide urgently needed small-quantity products and reduce or eliminate storage problems. Also, FY83 RDTE funds of $1247K will be used to begin a new project (DT44) for the advanced development effort of two prototype models for the Digital Topographic Support System (DTSS).

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Complete DT I/OT I of QRMP	1Q FY 1984	3Q FY 1983
Complete DT I/OT I of DTSS	4Q FY 1987	Not Shown

(U) Lack of adequate funding for the development contract in FY 1982 will cause a six-month delay in completing DT I/OT I for the Quick Response Multicolor Printer (QRMP).

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1999	1042	3424	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	0	1044	0	Continuing	Not Applicable

(U) During the latter stages of the FY 1981 Budget preparation, RDTE funds for the advanced development of the Quick Response Multicolor Printer (QRMP) were deleted for FY 1981 due to lack of an approved Letter Of Agreement (LOA). The QRMP LOA was subsequently approved and FY 1981 funds of $1999K were reprogramed from program element 6.47.16.A, Field Army Mapping Systems, Project D579. FY 1983 increase reflects a higher priority for this program during the planning and programing process preceding budget submission.

Program Element: #6.37.12.A
DOD Mission Area: #361 - Navigation and Position Fixing

Title: Mapping and Geodesy
Budget Activity: #5 - Intelligence and Communications

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands): Not applicable.

Program Element: #6.37.12.A
Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing
Budget Activity: #5 - Intelligence and Communications

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The need for a faster way of copying topgraphic maps and map overlays was identified in an official post-war study of World War II map usage. The study revealed that only 10 percent of topographic maps available in the European Theater of Operations had been used. Compiled and printed in advance, these maps became obsolete by the time they were needed for military engagements. The Army's need for quickly reproduced, up-to-date maps is even more acute today. Commanders require printed maps overlaid with current information on enemy dispositions, damage to routes, and many other recent changes to the terrain on which the battle will be fought. Currently, tactical overlays are drawn in color on transparent sheets. The drawback to using transparent overlays with printed maps is that they cannot be duplicated quickly in the field. Each additional copy of the overlay must be redrafted by hand. Technology to meet the current Army requirements for graphic products in a more timely and cost-effective manner is now available. This technology enables development of a Quick Response Multicolor Printer (QRMP) which will permit rapid reproduction of relatively small quantities of topographic, cartographic terrain intelligence and other printed matter directly from a wide range of input. The QRMP is needed to replace the current topographic printing press as the reproduction equiment for direct support topographic units. The second thrust of this program is to initiate advanced development of a Digital Topographic Support Sysstem to support an increasing battlefield need for production and use of Digital Topographic Data (DTD) (elevation, natural, and cultural features). Support requirements in this relatively new technical area are grouped in the subareas: Direct support on the battlefield to operations/intelligence planning, direct/general support to materiel systems on/off the battlefield, and direct support to Army models/simulations. Battlefield intelligence techniques plan to use DTD to provide near-real terrain analysis based on an all-source intelligence system. Materiel systems use DTD to provide greater operations accuracy and efficiency during siting, targeting, and effect analyses. Army combat modelers and simulators use DTD during wargames, combat models, scenario evaluations, and equipment cost and operational effectiveness analysis (COEA) portions of materiel system developmental/acquisition process.

G. (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 6.37.01.B, Mapping, Charting and Geodesy Investigations and Prototype Development; DMA Program Element 6.47.01.A, Mapping, Charting and Geodesy Engineering Development and Test; Army Program Element 6.27.07.A, Mapping and Geodesy; and Army Program Element 6.47.16.A, Mapping and Geodesy.

H. (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: Litton Systems, Incorporated, Woodland Hills, CA; IDEAS, Incorporated, Beltsville, MD; Bausch and Lomb, Rochester, NY; DBA Inc., Melbourne, FL; and Xerox Corp., Pasadena, CA.

Program Element: #6.37.12.A
Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing
Budget Activity: #5 - Intelligence and Communications

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Initiated development of prototype special map productions in 1970. Design and development of a prototype Position and Azimuth Determining System (PADS) were initiated in 1971. Prototype special map products to support battlefield sensor, infantry, and airmobile operations were completed in FY 1972. In 1974, completed the test, evaluation, and trade-off analysis for the Jeep-mounted PADS. Initiated contractual studies and experimentation on the problems of operating a PADS in a helicopter. In 1975, completed studies on helicopter operation of the Position and Azimuth Determining System. Initiated advanced development of an Advanced Analytical Photogrammetric Positioning System. In FY 1976, completed component studies for development of a Forward Observer Vehicle Kit and assembled an in-house correlation facility to support development of a target reference scene generation capability for the Pershing II missile. Hardware to demonstrate the Army Terrain Information System concept was procured. In FY 1977, began contractual development of the Advanced Analytical Photogrammetric Position System. In FY 1979, completed contractual development of the Advanced Analytical Photogrammetric Positioning System. In FY 1980, began development of the Quick Response Multicolor Printer (QRMP) (i.e., the Engineering Typographic Laboratory awarded a contract to Xerox Corporation on 29 Aug 80 for its design and fabrication of QRMP prototype). Continued advanced development effort of the QRMP in FY 1981. A design and In-Process Review (IPR) of the QRMP was conducted in the fourth quarter of FY 1981.

2. (U) FY 1982 Program: Continue Program Management and administrative activities involving the advanced development effort of the QRMP. Provide funds for the second increment of the contract for the QRMP, and continue monitoring the contractor's activities.

3. (U) FY 1983 Planned Program: Continue Program Management and administrative activities pertaining to the advanced development of the QRMP. Provide funds for the third increment of the contract for the QRMP and continue monitoring the contractor activities. Begin a new project (DT44) start for the advanced development effort of two prototype models for the Digital Topographic Support System (DTSS).

4. (U) FY 1984 Planned Program: Complete fabrication of the QRMP prototype and begin testing it. The US Army Mobility Equipment Research and Development Command (MERADCOM) will: Conduct validation and In-Process Reviews of the QRMP; complete contract funding of the advanced development phase of the QRMP; and complete program management, administrative, and coordination activities related to the advanced development of the QRMP. Engineering Topographic Laboratories will continue advanced development effort of prototype models for the Digital Topographic Support System.

Program Element: #6.37.12.A
Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing
Budget Activity: #5 - Intelligence and Communications

5. (U) Program to Completion: This is a continuing program. This program element also includes work on the following future Army systems: (1) Development of a system for Field Exploitation of Elevation Data (FEED), which will provide a capability to display elevation data in formats to facilitate its use in tactical planning; and other advanced components to improve the responsiveness and extend the Digital Topographic (DTD) capabilities of the Topographic Support System (TSS) and its subsystems. Other systems such as the low-Cost Northseeker and advanced components for the DTSS will be developed in later years.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.42.01.A
Title: Aircraft Avionics
DOD Mission Area: #361 - Navigation & Position Fixing
Budget Activity: #5 - Intelligence and Communications

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4512	11503	3799	20302	Continuing	Not Applicable
DC96	Aircraft Navigation & Control Systems	4167	8618	2570	15585	Continuing	Not Applicable
DC97	Avionics Systems	345	2885	1229	4717	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: DC96 provides engineering development (ED) of equipment and systems which will significantly improve the combat capability of the Army in the areas of weapon location and aircraft night operations, safety, and survivability. DC97 provides for engineering development leading to production of avionics equipment. The goal is to provide aircraft subsystems and ground equipment which improve mission performance of tactical helicopters and special mission aircraft operating in an anticipated enemy air defense and electronic warfare environment.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: DC96 - Engineering development models of the Integrated Inertial Navigation System (IINS) will be refurbished and delivered to the QUICK FIX program for production EH-60A aircraft installation. The Army Microwave Landing System will enter the engineering development phase (currently being reviewed). DC97 - Complete the DT II/OT II for the C10414 Communication System Control and transition it into production. Engineering development of a SINCGARS-V Antenna will continue for compatibility with the airborne SINCGARS-V Radio.

Program Element: #6.42.01.A
DOD Mission Area: #361 - Navigation & Position Fixing

Title: Aircraft Avionics
Budget Activity: #5 - Intelligence and Communications

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	4512	11503	3799	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	3729	11537	18685	Continuing	Not Applicable

FY 1981 increase was due to a reprograming from PM,SEMA to meet ASN-132 contractor requirements. The decrease in FY 1983 resulted from dropping the Advanced Map Display System due to lack of user requirement, and delay of ED efforts on the Joint Tactical Microwave Landing System (JTMLS). FY 1982 AD funds were zeroed, without prejudice by Congress. Alternatives to meet the Army's landing requirement are being evaluated within the overall context of the developing Position/Navigation architecture. A decision is expected in March and may require Congressional support for funding in FY 1982 and/or FY 1983.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.42.01.A Title: Aircraft Avionics
DOD Mission Area: #361 - Navigation & Position Fixing Budget Activity: #5 - Intelligence and Communications

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The object of project DC 97 (Avionics Systems) is to develop, in response to the needs of Army aviation, engineering development models of various avionics systems and subsystems for future aircraft and block changes to existing aircraft. Efforts include development of communications accessories and antennas (including radio processing and Electronic Counter-Countermeasures (ECCM) improvements) and multiple antenna units to maintain line of sight. Integrated Inertial Navigation System (IINS) will be developed under DC96.

G. (U) RELATED ACTIVITIES: In order to avoid unnecessary duplication of effort, related programs of the Air Force, Navy, Federal Aviation Agency, and other organizations are monitored by the Army through committees and working groups. Cost reduction is pursued through joint developments and hardware standardization. This program element is related to program element 6.22.02.A (Aircraft Avionics Technology), 6.32.07.A (Aircraft Avionics Equipment), and 6.32.21.A (Aircraft Navigation and Control Equipment).

H. (U) WORK PERFORMED BY: US Army Avionics Research and Development Activity (Project DC97), Fort Monmouth, NJ. Contractors include: Grumman Aerospace Corporation, Bethpage, NY; American Electronic Laboratories, Inc., Lansdale, PA; Collins Radio, Cedar Rapids, IA; AEL Service Corporation, Wall, NJ; Raycomm, Freehold, NJ; Litton Systems, Woodland, CA; Telephonics, Huntington, LI, NY.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Completed development of AN/ASN-128 Lightweight Doppler Navigation System and the AN/TSW-7A Air Terminal Facility. Completed production qualification and customer tests of the AN/ASQ-166 Integrated Avionics Control System (IACS). Functional purchase descriptions and technical data packages were prepared for Nap-of-the-Earth (NOE) communications engineering. Defined integration installation requirements of the AN/ASN-132 IINS in all Special Electronic Mission Aircraft (SEMA). Initiated the design and fabrication of IINS interface with EH-60A flight instruments. Initiated IINS/Global Positioning System (GPS) integration study.

2. (U) FY 1982 Program: DC97 - Award ED contract for a SINCGARS-V Antenna to provide the Army with a lightweight, reliable, secure, and cost effective airborne VHF/FM antenna compatible with the frequency hopping system of the SINCGARS-V Radio. Monitor ED contract for the C-10414()/ARC Communications System Control and begin DT/OT II. Design, fabricate, and test a test set for the C-10414()/ARC. DC96 - Install prototype ED models of the AN/ASN-132 IINS into EH-60 aircraft and

Program Element: #6.42.01.A Title: Aircraft Avionics
DOD Mission Area: #361 - Navigation & Position Fixing Budget Activity: #5 - Intelligence and Communications

interface with QUICK FIX mission equipment. Start DT/OT II for an Inertial TACAN configuration of the AN/ASN-132. Initiate development of software for an Inertial/GPS Hybrid.

3. (U) FY 1983 Planned Program: DC97: Continue ED contract for the SINCGARS-V Antenna. Complete DT/II II testing of the C-10414()/ARC Communications Systems Control. DC96 - Complete DT/OT II for the Inertial/TACAN configuration of the AN/ASN-132. Complete software coding for the Inertial/GPS Hybrid configuration. Award ED contract for the Joint Tactical Microwave Landing System (JTMLS), pending outcome of landing requirement review. FY 1982 AD funds were zeroed, without prejudice (see paragraph D, above).

4. (U) FY 1984 Planned Program: DC97: - Conduct IPR for SINCGARS-V Antenna and award production contract. Award ED contract for a Multiple Antenna Unit for Army aircraft for reception of line-of-sight signals from externally referenced navigation systems. DC96: - Refurbish ED models of the AN/ASN-132 and deliver to QUICK FIX program for production EH-60A aircraft installation. Modify one ED model of the AN/ASN-132 for Inertial/GPS use. Continue ED contract for JTMLS.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: # DC96 Title: Aircraft Navigation & Control
Program Element: # 6.42.01.A Title: Aircraft Avionics
DOD Mission Area: #361 - Navigation and Position Fixing Budget Activity: #5 - Intelligence and Communications

A. (U) DETAILED BACKGROUND AND DESCRIPTION: The object is to provide equipment to allow the most efficient use of the complex and expensive new family of aircraft and for block improvement of existing aircraft. This project develops engineering development models of various systems used for navigation and control. Specifically, the Integrated Inertial Navigation System (IINS) and the Joint Tactical Microwave Landing System (JTMLS) will be developed under project DC96. JTMLS is currently delayed due to Congressional cut, without prejudice, of Advanced Development (AD) funds.

B. (U) RELATED ACTIVITIES: In order to avoid unnecessary duplication of effort, related programs of the Air Force, Navy, Federal Aviation Agency, and other organizations are monitored by the Army through committees and working groups. Cost reduction is pursued through joint developments and hardware standardization. This program element is related to program element # 6.32.21.A, Aircraft Navigation and Control Equipment. There is no unnecessary duplication of effort.

C. (U) WORK PERFORMED BY: US Army Avionics Research and Development Activity, Fort Monmouth, NJ. Contractors include: Litton G&C Division, Woodland, CA.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Defined integration/installation requirements of the AN/ASN-132 Improved Inertial Navigation System (IINS) in all Special Electronic Mission Aircraft (SEMA). Initiated the design and fabrication of IINS interface with EH-60A flight instruments. Initiated IINS/Global Positioning System (GPS) integration study. Completed development of AN/ASN-128 Lightweight Doppler Navigation System and the AN/TSW-7A Air Terminal Facility.

2. (U) FY 1982 Program: Install prototype Engineering Development (ED) models of the AN/ASN-132 IINS into EH-60 aircraft and interface Quick Fix mission equipment. Start Development Test/Operational Test (DT/OT II) for an Inertial/TACAN configuration of the AN/ASN-132. Initiate development of software for an Inertial/GPS Hybrid.

3. (U) FY 1983 Planned Program: Complete DT/OT II for the Inertial/TACAN configuration of the AN/ASN-132. Complete software coding for the Inertial/GPS Hybrid configuration.

4. (U) FY 1984 Planned Program: Refurbish ED models of the AN/ASN-132 and deliver to Quick Fix program for production EH-60A aircraft installation. Modify one ED model of the AN/ASN-132 for Inertial/GPS use. Plan to award ED contract for

Project: # DC96 Title: Aircraft Navigation & Control
Program Element: # 6.42.01.A Title: Aircraft Avionics
DOD Mission Area: #361 - Navigation and Position Fixing Budget Activity: #5 - Intelligence and Communications

the Joint Tactical Microwave Landing System (JTMLS), pending outcome of landing requirements review. FY82 AD funds for this program were zeroed, without prejudice (see paragraph 7).

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

6. (U) Major Milestones: N/A

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total FY Estimated Cost
RDTE						
Funds (current requirements)	4167	8618	2570	15585	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	2995	8644	16347	-	Continuing	Not Applicable

Increase in FY 1981 funds was primarily due to accelerated Engineering Development (ED) efforts in the lightweight doppler (AN/ASN-128) and the TSW-7A program to meet production milestones. The decrease in FY 1983 is primarily due to the Congressional decision to zero FY 1982 Advanced Developement (AD) funds for JTMLS without prejudice, thus delaying a requirement to initiate ED. The Army is evaluating alternatives for its landing requirement within the context of the overall Position/Navigation architecture which is developing in the immediate future. A decision is expected in March and may require Congressional support for funding in FY82 and/or FY83.

Other Appropriations: Not Applicable

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.16.A
Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing
Budget Activity: #5 - Intelligence and Communication

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	309	100	0	3599	Continuing	Not Applicable
	QUANTITIES						
	Azimuth Determining Device (ADD)						5
	Digital Elevation Data Dubbing Facility (DEDDF)						1
	Digital Topographic Support System (DTSS)						2
	Quick Response Multicolor Printer (QRMP)						2
D579	Field Army Mapping Systems	309	100	0	3599	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEEDS: 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 6.37.12.A, 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) BASIS FOR FY 1983 RDTE REQUEST: FY 1983 RDTE funds will be used to develop an outline development plan for engineering development of the Quick Response Multicolor Printer (QRMP). The QRMP will be a mobile, field-deployable multicolor copier, similar in configuration to a conventional office machine. The QRMP will weigh about 2,000 pounds and will be housed in a truck or a semitrailer van. QRMP technology employs a laser beam recorder which scans the original material

Program Element: #6.47.16.A
Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing
Budget Activity: #5 - Intelligence and Communication

copier, similar in configuration to a conventional office machine. The ORMP will weigh about 2,000 pounds and will be housed in a truck or a semitrailer van. ORMP technology employs a laser beam recorder which scans the original material providing an even exposure from the center to the edges. The printer will reproduce material as large as 24 x 30 inches, the size of a standard topographic map sheet. With one run through the printer, 300 five-color copies can be reproduced in one hour. Compared to printing presses now in use in the field, the ORMP would require less manpower and a lower skill level to operate and maintain. The ORMP will be utilized at Corps and Division headquarters and in topographic battalions. Fielding of the ORMP is expected to be by 1987.

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Standardize Quick Response Multicolor Printer (QRMP) Prototype delivery	4Q FY 1988	1Q FY 1987
Digital Topographic Elevation Data Dubbing Facility (DTEDDF) Prototype delivery	4Q FY 1982	3Q FY 1982
Standard Azimuth Determining Device Prototype delivery	2Q FY 1987	Not Shown

Delay in initial funding for advanced development of the Quick Response Multicolor Printer has delayed its expected completion date. Planned Development of Interactive Graphics Equipment has been deferred awaiting completion of requirements.

Program Element: #6.47.16.A Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing Budget Activity: #5 - Intelligence and Communication

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	309	100	0	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	215	100	3611	Continuing	Not Applicable

The original plan was to fund part of FY 1981 development cost for the Digital Elevation Data Dubbing (DEDD) Facility with OPA funds, but DARCOM later ruled that this was an improper procedure and that all engineering development cost for the DEDD facility was to be made with RDTE funds. FY 1983 RDTE funding was deleted for higher priority Army requirements.

Program Element: #6.47.16.A
DOD Mission Area: #361 - Navigation and Position Fixing

Title: Mapping and Geodesy
Budget Activity: #5 - Intelligence and Communication

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement, Army						
a. Position and Azimuth Determining System (PADS)						
Funds (current requirements)	19100	7800	23300	27500	253900	239400
Funds (as shown in FY 1982 submission)	20000	4000	4800	14800	278300	349600
Quantities (current requirements)	60	22	60	69	716	948
Quantities (as shown in FY 1982 submission)	60	12	12	40	785	948

Program Element: #6.47.16.A
Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing
Budget Activity: #5 - Intelligence and Communication

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
b. Topographic Support Systems						
Funds (current requirements)	18700	22900	30800	36800	6300	136500
Funds (as shown in FY 1982 submission)	21500	26500	28900	38600	0	136500
					9 Equivalent Systems (TSS)	

Current revised FY 1981 and FY 1982 programs for PADS and Topographic Support Systems are based on actual contract award costs. PADS is one of 13 systems which have been studied by the HQDA staff for cost avoidance through increased production rates. Because of higher priority Army requirements for PADS, a Distribution Plan was approved in the first quarter of FY81 which greatly increased the production rates and funds for FY 1982, FY 1983, and FY 1984. Because of this, the fielding of PADS will occur earlier than previously scheduled.

Program Element: #6.47.16.A
Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing
Budget Activity: #5 - Intelligence and Communication

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The field offset lithographic printing press currently in use is the same basic equipment used by the Army since World War II. While this equipment is economical for printing large quantities of maps, it is not suitable for small press runs. Since the plate-making and press set-up processes are time-consuming, these presses do not provide tactical commanders with a quick-response reproduction capability. The Quick Response Multicolor Printer (QRMP) effort is a development to assemble an electrostatic copier to meet the combat commanders' requirements for quick color copies of topographic maps and related terrain intelligence products. The Printer will replace the topographic printing presses used in direct support of field topographic units for small runs. The Army is attempting to program more reliable capabilities into the tactical-level topographic support units with improved mission, organization, readiness, and equipment. Topographic equipment is being procured to replace, through "off-the-shelf" buys, WW II-vintage equipment. This equipment is packaged as the Topographic Support System (TSS). Topographic readiness will be improved by assigning Department of the Army Consolidated Topographic Support Program (DACONTP) Areas of Responsibilities (AOR's) to each topographic unit to allow for geographic focus as well as for advance preparation of terrain data bases. Topographic missions have been changed to place primary emphasis on intelligence preparation of the battlefield by providing combat-oriented terrain information/intelligence, primarily in graphic form. The traditional Army topographic mission of map compilation, revision, reproduction, and survey is reduced. The Army depends on the Defense Mapping Agency (DMA) to accomplish a majority of these latter functions. The systems retained in this program element include: (1) A Quick Response Multicolor Printer for rapid reproduction of limited quantities of topographic and terrain information products in response to specific requests; (2) a Digital Elevation Data Dubbing Facility for converting digital elevation data to the proper format for use by FIREFINDER mortar/artillery-locating radar systems to locate enemy gun positions, which will result in faster and more accurate enemy gun location; (3) an Azimuth Determining Device that will precisely determine azimuths worldwide under all weather and lighting conditions for use in orienting target detection, acquisition, and servicing systems; and (4) a Digital Topographic Support System (DTSS), which will draw on the Defense Mapping Agency's Land Combat Data Base to provide digital topographic support for systems which will be deployed in FY 1985 and beyond.

G. (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 Director, Defense Research and Engineering, in the functional area of mapping, geodesy, and position location. Specific related program elements are as follows: DMA Program Element 6.37.02.B, Mapping, Charting, and Geodesy Investigation and Prototype Development; DMA Program Element 6.47.01.B, Mapping, Charting, and Geodesy Engineering Development and Test; Army Program Element 6.27.07.A, Mapping and Geodesy, and the Army Program Element 6.37.12.A, Mapping and Geodesy.

Program Element: 6.47.16.A
Title: Mapping and Geodesy
DOD Mission Area: 361 - Navigation and Position Fixing
Budget Activity: 5 - Intelligence and Communication

H. (U) WORK PERFORMED BY: This work is accomplished in-house at the US Army Engineer Topographic Laboratories (USAETL), Fort Belvoir, VA, with assistance from other Army elements, and by contractors under USAETL direction. The contractors are: The American Development Corp., Charleston, SC; Bausch and Lomb, Rochester, NY; Litton Systems, Inc., Woodland Hills, CA; Decilog Inc., Melville, NY; and Xerox Corp, Electro-Optical Systems Division, Pasadena, CA; Sperry Flight Systems, Phoenix, AZ; and the Command, Control, Communications Corporation (C^4), Torrance, CA.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: In FY72, the Lightweight Gyro Azimuth Surveying Instrument was tested and type classified for troop use. This instrument automatically determines true north by sensing the earth's rotation. It replaces an instrument of 1955 vintage and is more accurate, less costly, lighter, more reliable, and easier to maintain than its predecessor. Development of an Analytical Photogrammetric Positioning System (APPS) was initiated in FY72, and was type classified Standard B in April 1973. Tests of the APPS have demonstrated that this hardware provides point positioning accuracy comparable to conventional ground survey. Both the US Air Force and Navy have procured APPS units to aid in the determination of the location of the targets. The US Army will include Product-Improved APP (PIAPPS) units in the Topographic Support System (TSS) for the same task. All APPS now in the Army's inventory are being converted to PIAPPS in a retrofit program. The TSS was initiated in FY74, and selection of off-the-shelf components for the system was completed in FY78. First Article Tests on TSS modules will be completed in 1QFY82. The TSS FY81 option to buy an additional 55 modules was exercised by US Army MERADCOM in March 1980. Fabrication of the Position and Azimuth Determining System (PADS) was completed, and DT II/OT II was started in FY77. First Article Tests on PADS production systems began in October 1980, and three tests were completed in April 1981. PADS first-production units were delivered to the Field Artillery School at Ft. Sill, OK, and the Engineer School at Ft. Belvoir, VA, in June 1981. Recent operational performances at these installations have resulted in outstanding accuracies to tenths of a meter. Surveys that normally take a conventional eight-man survey party several days can now be accomplished in hours by a two-man PADS party. Engineering development of a FIREFINDER Digital Elevation Data Dubbing (DEDD) facility began in FY80. A contract for engineering the development (ED) of the FIREFINDER DEDD facility was awarded to the Command, Control, and Communications Corporation in FY81.

2. (U) FY 1982 Program: Complete ED effort of the FIREFINDER DEDD facility. Scheduled for delivery in 4Q82, the DEDD Facility will extract digital elevation data provided by the Defense Mapping Agency on 9-track tapes and reformat the data on militarized cassettes for the computer-controlled FIREFINDER weapon-locating radar systems. Deploy the FIREFINDER DEDD to an active Army Engineering Topographic Unit.

Program Element: #6.47.16.A Title: Mapping and Geodesy
DOD Mission Area: #361 - Navigation and Position Fixing Budget Activity: #5 - Intelligence and Communication

3. (U) FY 1983 Planned Program: Develop an outline Development Plan for the ED phase of the Quick Response Multicolor Printer (QRMP). Prepare solicitation material for use in FY84.

4. (U) FY 1984 Planned Program: Begin engineering development of the Quick Response Multicolor Printer (QRMP). Award contract for development of an engineering development prototype for of the QRMP.

5. (U) Program to Completion: This is a continuing program. Development of the Quick Response Multicolor Printer will be completed in FY 1987. An Azimuth Determining Device will be developed in the years beyond FY 1984. A digital Topographic Support System that will draw on the Defense Mapping Agency's Land Combat Data Base will be developed and deployed in this decade.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.78.A
DOD Mission Area: #361 - Navigation and Position Fixing

Title: NAVSTAR Global Positioning Systems (GPS) User Equipment
Budget Activity: #5 - Intelligence and Communications

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	17849	0	11911	4773	Continuing	Not Applicable
D168	NAVSTAR GPS EQUIPMENT	17849	0	11911	4773	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: *Traditionally, precise positioning* and navigation (POS/NAV) needs 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 sytems 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 the present systems. GPS will consist of at least 18 satellites, a satellite control segment, and user equipment sets in vehicles, ships, airplanes, and manpacks. The system will provide global, highly accurate information which will satisfy a significant portion of the Army navigation and positioning missions.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Funds are required to continue the full-scale development contracts for a family of manpack, vehicular, and aircraft sets. In addition, funds are required for internal Army support, test planning, operational test vehicle modification, and logistics planning. A production decision for user equipment is scheduled for 1984.

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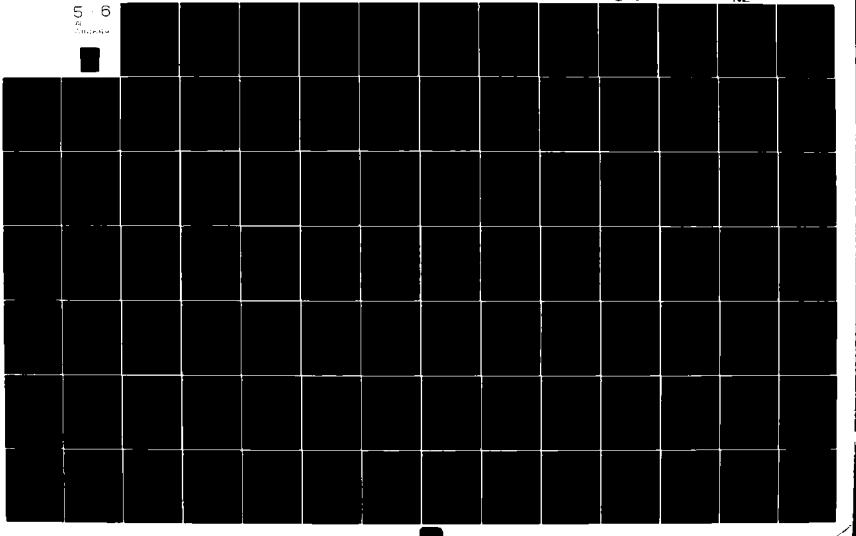

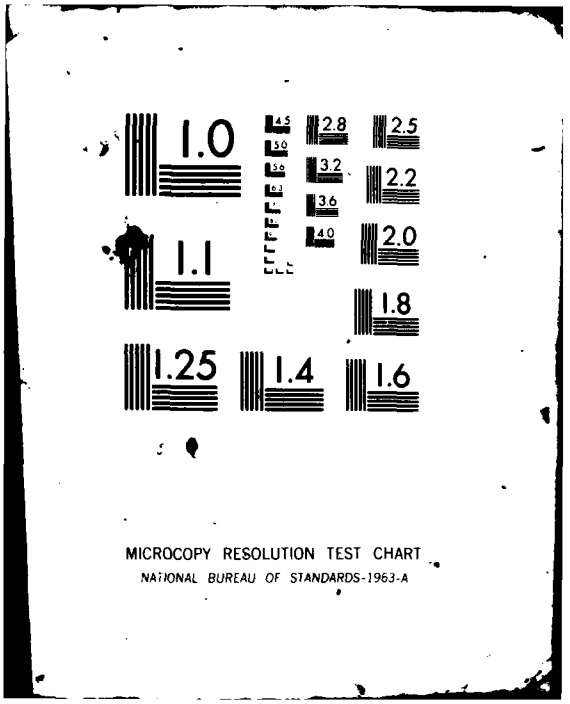
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Program Element: #6.47.78.A Title: NAVSTAR Global Positioning Systems (GPS) User Equipment
DOD Mission Area: #361 - Navigation and Position Fixing Budget Activity: #5 - Intelligence and Communications

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	17849	0	11911	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	18839	21002	14206	Continuing	Not Applicable

Decrease in FY81 is the result of a DARCOM reprograming. *Decrease in FY82* reflects authorization conference action which terminated FY 1982 Army RDTE funds. Decrease in FY 83 reflects transfer of funds to higher priority program.

E. (U) OTHER APPROPRIATION FUNDS:

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
OTHER PROCUREMENT, ARMY II						
Funds (current requirements)	0	0	0	3800	67600	71500
Funds (as shown in FY 1982 submission)	Not Shown					
Quantities (current requirements)	0	0	0	57	2283	2340
Quantities (as shown in FY 1982 submission)	Not Shown					

Program Element: #6.47.78.A Title: NAVSTAR Global Positioning Systems (GPS) User Equipment
DOD Mission Area: #361 - Navigation and Position Fixing Budget Activity: #5 - Intelligence and Communications

AVIATION PROCUREMENT, ARMY	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Funds (current requirements)	0	0	0	2300	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	Not Shown					
Quantities (current requirements)	0	0	0	25	Continuing	Not Applicable
Quantities (as shown in FY 1982 submission)	Not Shown					

Program Element: #6.47.78.A Title: NAVSTAR Global Positioning Systems (GPS) User Equipment
DOD Mission Area: #361 - Navigation and Position Fixing Budget Activity: #5 - Intelligence and Communications

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Fundamental to the successful accomplishment of military functions is the ability to precisely position friendly forces relative to each other and with respect to enemy forces. Over the years, the Services have developed numerous positioning and navigation aids to satisfy specific requirements and to increase the effectiveness of their weapons systems. This has resulted in a proliferation of POS/NAV systems with varying degrees of accuracy and capabilities. The operations and maintenance costs for these systems represent a large expenditure of funds each year. Extensive studies, analyses, and tests by all the Services have confirmed the feasibility of a single, highly precise, satellite-based positioning system capable of satisfying a broad spectrum of positioning requirements which will reduce the total annual expenditure for these requirements. The objective of the system is to provide the precision required for accurate weapons delivery, in all weather conditions, day or night, anywhere. The NAVSTAR Global Positioning System will provide unprecedented accuracies of position and velocity in three dimensions; i.e., position within 16 meters and velocity within 0.1 meters per second. The satellites will be in 20,183-kilometer orbits. GPS will greatly enhance military capabilities for navigation and position fixing. The NAVSTAR program was approved for concept validation at DSARC 1 in December 1973 and for full-scale development in August 1979 (Phase II).

G. (U) RELATED ACTIVITIES: This is a joint program with all Services participating. The Air Force is the executive Service. Funding for Phase I, Concept Validation, was derived from program elements 6.34.03.A, 6.34.21.F, and 6.34.01.N NAVSTAR Global Positioning System (GPS). Phase II efforts for user equipment are in program elements 6.47.78.A, 6.47.78.N, 6.47.78.F, and 6.47.19.M, NAVSTAR-GPS User Equipment. The Phase II NAVSTAR space and control segments are funded by program element 6.44.78.F, NAVSTAR-GPS Space and Control Segments. The Program Manager for the Joint-Service Program coordinates the supporting activities of the Army, Navy, Air Force, Marine Corps, Defense Mapping Agency, and NATO through his Service and NATO deputies to provide cohesive and complementary development, test, and evaluation of the NAVSTAR Global Positioning System.

H. (U) WORK PERFORMED BY: Contracts for this program were awarded to Magnavox, Torrance, CA, and Rockwell Collins, Cedar Rapids, IA. Internal Army effort is provided by the US Army Communications Electronics Command (CECOM) at Ft Monmouth, NJ.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The Joint Program Office awarded a cor[illegible] 23 October 1974 to General Dynamics Corporation for study and fabrication of ground control systems and joint r[illegible]orne, vehicle, and manportable user system equipment. Advanced development contracts were initiated for competit[illegible]ment of manpack equipment

Program Element: #6.47.78.A
DOD Mission Area: #361 - Navigation and Position Fixing

Title: NAVSTAR Global Positioning Systems (GPS) User Equipment
Budget Activity: #5 - Intelligence and Communications

by Texas Instruments and Magnavox. Flight tests, vehiclar tests, and manpack tests were conducted at the Army's Yuma Proving Ground, using both a ground-based simulation facility and four operational satellites, with excellent results. Both the Magnavox and Texas Instruments Manpacks successfully determined position to an accuracy of better than 10 meters. All of these efforts were funded by the Phase I program elements. A Required Operational Capability (ROC) was prepared and approved in February 1979, and Defense System Acquisition Review Council (DSARC) II was conducted in June 1979. Following the DSARC, full-scale development contracts were awarded for a full family of manpack, vehicular, and aircraft equipment. Contractor development of user equipment software, and design of retrofit kits for vehicles and aircraft, has continued. The logistics concept, including maintenance, training, and supportability, was completed in 1980. Detailed development of training materials was initiated. Development of test equipment for user sets maintenance has continued.

2. (U) FY 1982 Program: Following the joint Authorization Conference Committee action which eliminated the Army's 1982 RDTE funds, the Army began a reprograming action. The joint committee indicated that the Army could reprogram if GPS were of sufficient priority to warrant such an action. $10.6 million is required to continue joint service user terminal development, and continue integration of the terminals into Army vehicles and aircraft.

3. (U) FY 1983 Planned Program: Continue with the Joint Program Office Full-Scale Development (FSD) contract initiated in FY79. The hardware development contractors will deliver the first prototype sets and continue to support Government Development/Operational (DT/OT) tests. Software development will continue and include technical publication preparation, verification, and validation. Logistic support and maintainability concepts will be completed and demonstrated. Integration studies will be completed for follow-on vehicles. Joint Service Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) (OT II) initiated. The Army will begin preparation for the Army Systems Acquisition Review Council and DSARC production approvals and initiate a Request for Proposal for Phase III.

4. (U) FY 1984 Planned Program: Full-scale development and DT II will be completed. DSARC III will be held in May 1984. Source selection leading to production in late 1984 will be conducted.

5. (U) Program to Completion: Plans call for continued support of the NAVSTAR Program. Operational testing of user sets, test equipment, logistics concepts, and training materials will be completed. Production of the NAVSTAR family of user equipment will be initiated. Global Positioning System equipment will also be made available to NATO and selected allied nations so that they may achieve similar objectives and benefits.

Program Element: #6.47.78.A
DOD Mission Area: #361 - Navigation and Position Fixing

Title: NAVSTAR Global Positioning Systems (GPS) User Equipment
Budget Activity: #5 - Intelligence and Communications

J. (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. Parameters verified include system accuracy, propeller rotor blade modulation, foliage attenuation, multipath rejection, ionospheric/tropospheric correction, satellite clock and ephemeris accuracy, acquisition and reacquisition time, time transfer, signal levels and signal structure, and effects of dynamics. Types of operation during testing included: precision weapon delivery, landing approach, rendezvous, photomapping, nap-of-earth, static positioning, cross-country, shipboard and combined operations. Except for reliability problems, no major deficiencies were noted.

b. During Phase II, Full-Scale Development, the following User Segment Joint Service DT&E will be conducted (with test completion dates as indicated):

(1) (U) In-plant testing will verify design of User Equipment (UE) (Dec 82).

(2) (U) A vehicle test (accomplished at Lakehurst, NJ, on UH-60 and at Yuma Proving Ground on M-60) will verify host vehicle/UE compatibility (May 82).

(3) (U) Field DT&E will verify systems performance. Individual service test objectives will be combined as joint service DT&E requirements.

(4) (U) Army Independent DT II will verify suitability of design for Army deployment. Testing will be integrated with Joint Service DT&E. (2 QCY 82 - 2 QCY 83).

c. (U) GPS manpack, vehicular, and aircraft user equipment tested during Phase II DT/OT II will be prototypes of production equipment.

d. (U) All test items and support equipment are expected to be available during the test period.

Program Element: #6.47.78.A
DOD Mission Area: #361 - Navigation and Position Fixing

Title: NAVSTAR Global Positioning Systems (GPS) User Equipment
Budget Activity: #5 - Intelligence and Communications

e. (U) User segment development contractors - Rockwell Collins Division, Cedar Rapids, IA; Magnavox Advanced Products Divison, Torrance, CA. Technical Support Contractor - Aerospace Corporation, El Segundo, CA. Joint Service Program Manager - Col J. Reynolds (USAF). Test Agencies include US Army Test and Evaluation Center (USATECOM), US Air Force Test and Evaluation Command (USAFTEC), US Army Operational Test and Evaluation Agency (USAOTEA), US Navy Operational Test and Evaluation Force (OPTEVFOR), and US Marine Corps Operational Test and Evaluation Agency (USMCOTEA).

f. (U) DT&E test sites include Yuma Proving Ground, AZ; China Lake NAF, CA; Carswell AFB, TX; Ocean Test Ranges; Nellis AFB, NV; White Sands Army Missile Range, NM, and US Army Electronics Proving Ground, AZ; Dugway Proving Ground, UT; Cold Regions Test Center, AK; Tropic Test Center, Panama.

g. (U) User Segment Schedule

Contract Award..... Jul 79
Start Vehicle Integration..... Jan 83
First Set Delivery..... Feb 83
Start Field DT&E..... Apr 83
Start IOT&E..... Sep 83
DSARC III..... May 84

h. (U) A total of 54 User Equipment sets with associated Support Equipment from each contractor will be tested in Phase II.

i. (U) Logistics supportability will be tested during Phase II DT&E and IOT&E. The Reliability, Availability, and Maintainability (RAM) requirements vary depending on the type of User Equipment (UE) set. Mature Mean Time Between Maintenance (MTBM) is expected to be 1000 hours minimum for all sets. Goal is to demonstrate 500 hours MTBM during Phase II. Contractors will provide depot-level support during Field DT&E and IOT&E. Government military personnel will maintain equipment during Field DT&E and IOT&E.

j. (U) User equipment tested during Phase II DT/OT will be prototypes of Phase III production equipment.

k. (U) Environmental qualification test of user equipment will begin in March 1982. Environmental tests identified in MIL STD 810C will be conducted for a broad range of user applications.

Program Element: #6.47.78.A
DOD Mission Area: #361 - Navigation and Position Fixing

Title: NAVSTAR Global Positioning Systems (GPS) User Equipment
Budget Activity: #5 - Intelligence and Communications

2. (U) Operational Test and Evaluation:

a. (U) The Army is the only service that conducted operational testing during Phase I. The Phase I weight goal of 25 lbs for the manpack was not achieved in order to keep cost down, but the ultimate design goal of 10-14 lbs for the manpack is expected to be achieved. AD has demonstrated that the NAVSTAR UE will develop into a system which will meet or exceed requirements. The US Army Operational Test and Evaluation Agency (USAOTEA) judged the GPS UE suitable for continuation into the full-scale development phase. During Phase II, improvements will be accomplished.

b. (U) During Phase II, Full-Scale Development, NAVSTAR GPS Joint Service IOT&E will be conducted.

(1) (U) User equipment Joint Service 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 test on service vehicles. IOT&E objectives are related to:

(a) (U) Operational effectiveness

(b) (U) Operational suitability

(c) (U) Military utility

(d) (U) Mission performance

(e) (U) Supportability

(f) (U) Doctrine, training, and organization

(g) (U) Vulnerability

(h) (U) Human factors

(2) (U) Milestones OT II Sep-Dec 83

Program Element: #6.47.78.A Title: NAVSTAR Global Positioning Systems (GPS) User Equipment
DOD Mission Area: #361 - Navigation and Position Fixing Budget Activity: #5 - Intelligence and Communications

c. (U) User equipment tested during Phase II IOT&E will be prototypes of production equipment. OT II during Phase II will include testing UE from two competing contractors on UH60 helicopter, M60 tank, and the infantryman.

d. (U) All test items and support equipment are expected to be available during the test period.

e. (U) Sets allocated for OT II from each contractor are as follows:

(1) (U) UH60 2 sets
(2) (U) M-60 2 sets
(3) (U) Manpack 5 sets

f. Operational tests of user equipment will be conducted prior to major production contract.

g. (U) OT I was conducted January-February 1979. No major deficiencies were noted, and the system was judged to be suitable for operational use with planned improvements.

h. (U) RAM requirements will be verified by OT II test personnel in accordance with OT II test design plan.

3. (U) System Characteristics:

Operational/Technical Characteristics	*Objectives	**Demonstrated Performance
Manpack weight	10-14 lbs	***28.5 lb (DT-I)
System Accuracy	10 M 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.

Program Element: #6.47.78.A
DOD Mission Area: #361 - Navigation and Position Fixing

Title: NAVSTAR Global Positioning Systems (GPS) User Equipment
Budget Activity: #5 - Intelligence and Communications

*** Manpack not designed to fulfill weight requirement in order to save cost.

**** Size of OT I RAM data sample did not permit precise analysis. Phase II OT will produce a Full-Scale Development RAM assessment.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.37.38.A
Title: Non-Systems Training Devices (NSTD) Development
DOD Mission Area: #430 - Non-Systems Training Devices
Budget Activity: #6 - Defensewide M ssion Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimate Costs
	TOTAL FOR PROGRAM ELEMENT	1	1380	0	6343	Continuing	Not Applicable
A115	NSTD Infantry	0	0	0	0	Continuing	Not Applicable
A224	*NSTD Armor/Antiarmor*	1	1380	0	3245	Continuing	Not Applicable
A225	NSTD Artillery/Air Defense Engineer	0	0	0	1525	Continuing	Not Applicable
A226	NSTD Combined Arms	0	0	0	1573	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEEDED: 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) EXPLANATION OF CANCELLATION OR DEFERRAL: The advanced development effort on the Eye-Safe Simulated Laser Rangefinder (ESSLR) being conducted under Project A224 will be completed in FY 1982. Development of the Armor Remoted Target System (ARETS) has been integrated into the Infantry Remoted Target System (IRETS) program under Program Element 6.47.15.A, Non-Systems Training Devices Engineering. This completes all advanced development efforts currently funded under

Program Element: #6.37.38.A
DOD Mission Area: #430 - Non-Systems Training Devices

Title: Non-Systems Training Devices (NSTD) Development
Budget Activity: #6 - Defensewide Mission Support

Program Element 6.37.38.A. New Non-Systems Training Device advanced development efforts previously planned for initiation in FY 1983 have been deferred until FY 1984 to allow funding of higher priority Army requirements.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.15.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	12211	11253	8645	16054	Continuing	Not Applicable
	QUANTITIES						Not Applicable
D237	NSTD Artillery/Air Defense/ Engineer	6298	2043	295	1152	Continuing	Not Applicable
D239	NSTD Infantry	255	520	1958	3470	Continuing	Not Applicable
D241	NSTD Combined Arms	3180	5663	2489	4576	Continuing	Not Applicable
D572	NSTD Armor/Antiarmor	99	0	494	3055	Continuing	Not Applicable
D573	PM-Trade (Project Manager for Training Devices) and Naval Training Equipment Center (NTEC) Support	2379	3027	3409	3801	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 1980's. 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.

Program Element: #6.47.15.A
DOD Mission Area: #430 - Non-System Training Devices
Title: Non-System Training Devices (NSTD) Engineering
Budget Activity: #6 - Defensewide Mission Support

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) BASIS FOR FY 1983 RDTE REQUEST: Requested funds will provide for completion of the Army Training Battle Simulation System (ARTBASS), the Infantry Remoted Target System (IRETS), and the Automatic Weapons Effects Signature Simulator (AWESS). Engineering Development will be continued on the Mine/Countermine Casualty-Producing Simulation (MICAPS) and the Scaled-Range Target System (SRTS). Engineering Development will be initiated on the Eye-Safe Simulation Laser Rangefinder (ESSLR). Requested funds support the personnel cost of the Office of the Project Manager for Training Devices (PM TRADE), the agency responsible for executing the Army Non-System Training Devices (NSTD) program, and continues funding of a joint Army/Navy agreement which makes available for Army use the resources of the Naval Training Equipment Center (NTEC).

D. (U) COMPARISON WITh FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	12211	11253	8645	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	10981	12863	8493	Continuing	Not Applicable

(U) The increase of $1,230 thousand in the FY 1981 funding level is a result of reprograming to fund additional effort in Project D237 on the Air Ground Engagement System/Air Defense System (AGES/ADS) in time to meet scheduled fielding date and to complete engineering development on the Blank Firing Adapter, Project D572.

(U) The decrease of $1610 thousand in FY 1982 funding is a result of the amended budget request and the application of revised inflation indices.

(U) The increase of $152 thousand in FY 1983 reflects realignment of the program as a result of changes in prior year funding and the application of revised inflation indices.

Program Element: #6.47.15.A
DOD Mission Area: #430 - Non-System Training Devices

Title: Non-System Training Devices (NSTD) Engineering
Budget Activity: #6 - Defensewide Mission Support

E. (U) OTHER APPROPRIATION FUNDS:

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement, Army:						
Funds (current requirements)	43000	40400	76000	93900	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	42900	41700	73700	-	Continuing	Not Applicable

(U) It is not feasible to list the quantities and Military Construction Costs because of the type and quantity of the different training devices. The increase in FY 1981 funding is a result of the application of actual pricing data.

(U) The decrease in FY 1982 funding is a result of the amended budget request.

(U) The increase in FY 1983 funding resulted from addition of the Multiple Integrated Laser Engagement System (MILES) for the M1 tank and M2 and M3 Fighting Vehicle System and the application of revised inflation indices.

Program Element: #6.47.15.A Title: Non-System Training Devices (NSTD) Engineering
DOD Mission Area: #430 - Non-System Training Devices Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: This program provides for the Engineering Development (ED) of training devices which are developed to support general military training and training on more than one item/system. The Program Element is divided into five projects, three of which support engineering development of training devices in the functional areas of infantry, armor/antiarmor, and combined arms. The fourth project supports engineering development of training devices encompassing the functional areas of artillery, air defense, and engineer items. The other project provides funds to support the personnel costs of the Office of the Project Manager for Training Devices (PM TRADE) and to continue funding a joint Army/ Navy agreement which makes available for Army use the resources of the Naval Training Equipment Center (NTEC). The purpose of the program is to improve the effectiveness and efficiency of Army training by developing training devices and simulators which facilitate the transfer to trainees of the knowledge, ability, and experience required to fight outnumbered and win on the modern battlefield. Modern technology is utilized to create training environments which realistically portray the environments expected on future battlefields.

G. (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 fr m related Non-System Training Devices Advanced Development (Program Element (PE) 6.37.38.A) and/or Non-System Training Devices Exploratory Development (PE 6.27.27.A). This Program also funds a Service 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).

H. (U) WORK PERFORMED BY: Primary contractors are Xerox Electro-Optical Systems, Inc., Pasadena, CA, and Singer Company (Link Division) Binghampton, NY. In-house activities are performed by the PM TRADE, Orlando, FL; the Army Armament Research and Development Command, Picatinny Arsenal, Dover, NJ; and the Naval Training Equipment Center, Orlando, FL.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Engineering, fabrication, and operational/developmental testing were completed and production was begun on the Multiple Integrated Laser Engagement System (MILES) and the Antitank Weapons Signature Simulator (ATWESS). Engineering, fabrication, and operational/developmental testing were completed for the

Program Element: #6.47.15.A
DOD Mission Area: #430 - Non-System Training Devices

Title: Non-System Training Devices (NSTD) Engineering
Budget Activity: #6 - Defensewide Mission Support

Observed Fire Trainer (OFT). Development was completed and production was begun on the Blank Firing Adopter (BFA), which will permit firing of linked blank .50 caliber ammunition in the M2 and M85 machine guns.

2. (U) FY 1982 Program: Engineering Development (ED) of infantry Remoted Target System (IRETS) will be continued. 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. Engineering Development (ED) on the Automatic Weapons Effects Signature Simulator (AWESS) will be continued. The AWESS is a training device to simulate the firing signature of the Army's full family of machine guns (caliber .50 and 7.62mm machine gun), the 20mm machine cannon, and the M16 rifle. The devices will be used in lieu of blank ammunition to simulate the visual and aural effects of weapons firing during both conventional and engagement simulation field exercises. Engineering Development (ED) of the Air-Ground Engagement System (AGES) will be completed. The development of this system allows the introduction of air weapons into tactical engagement simulation exercises and provides a realistic means of simulating helicopter and ground support aircraft operations during the course of tactical training by the inclusion of realtime casualty assessment in combat arms exercises. The air-to-ground weapons simulated include TOW, HELLFIRE, 20/30mm machine cannons and other air-delivered munitions. Engineering Development (ED) of Air Defense Simulators (ADS) will be completed. This system provides lasers to simulate the firing characteristics of the CHAPARRAL, VULCAN, and STINGER Air defense weapons to provide a realistic means of simulating air defense measures against helicopters and ground support aircraft and allow the inclusion of realtime casualty assessment in combat arms exercises. Engineering Development (ED) of the Army Training Battle Simulation System (ARTBASS) will be continued. This device 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. Engineering Development (ED) will be completed on the Alpha Radiac Training Device for the AN/PDR-56 Radiacmeter. This device 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. Engineering Development (ED) of the Mine/Countermine Casualty-Producting Simulation (MICAPS) will be continued. This program provides the capability to accurately simulate the casualty-producing effects of mines during engagement simulation exercises.

Program Element: #6.47.15.A Title: Non-System Training Devices (NSTD) Engineering
DOD Mission Area: #430 - Non-System Training Devices Budget Activity: #6 - Defensewide Mission Support

3. (U) FY 1983 Planned Program: Engineering Development (ED) of the Infantry Remoted Target System (IRETS), Automatic Weapons Effect Signature Simulator (AWESS), and the Army Training Battle Simulations System (ARTBASS) will be completed. Engineering Development (ED) of the Eye-Safe Simulated Laser Rangefinder will be initiated. The Eye-Safe Simulated Laser Rangefinder will be an attachment for the tank laser rangefinder to provide eye-safe laser training. It will be eye-safe at all ranges when viewed through 13X sighting optics, activated by the crew, and will provide exactly the same system input and scaled-range accuracy as the operational laser rangfinder. Engineering Development (ED) of the Mine/Countermine Casualty-Producing Simulation (MICAPS) will be continued. All necessary experimental work will be performed and the proposed systems will be ready for full-scale development.

4. (U) FY 1984 Planned Program: Engineering Development (ED) of the Mine/Countermine Casualty-Producing Simulation (MICAPS) and the Eye-Safe Simulated laser Rangefinder (ESSLR) will be completed. Engineering Development (ED) on the Army Maintenance Training and Evaluation Simulation System (AMTESS) will be initiated. The system will provide the capability to train and evaluate maintenance procedures and tasks for all major maintenance functional areas (i.e., automative, missile, electronics, aircraft, etc.). Initial emphasis will be placed on the automative and missile areas to demonstrate the concept. Engineering Development will be initiated on the 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 the complex computer-based SIGINT/EW systems. Engineering Development will be initiated on the Ground Laser Locator Designator (GLLD). The GLLD system is required for fire support teams to employ Copperhead rounds on armor and other land targets during Multiple Integrated Laser Engagement System (MILES) exercises. All necessary experimental work will be performed, and the proposed systems will be ready for full-scale development.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D241 Title: Non-System Training Devices Combined Arms
Program Element: #6.47.15.A Title: Non-System Training Devices Engineering (NSTD)
DOD Mission Area: #430 - Non-System Training Devices Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: This continuing project provides for the Engineering Development (ED) for Combined Arms-related training devices that are developed to support general military training and training on more than one item/system. The first item to be discussed is the Army Training Battle Simulation System (ARTBASS). Current analysis of the threat battle scenarios indicates that the future battlefield will be characterized by extraordinary lethality and high casualty rates in short periods of time. Extremely rapid combat action requiring immediate decisions, and the requirement for maneuver commanders to control and coordinate combat, combat support, and combat service support assets against a numerically superior force necessitate a new approach to exercising decisionmaking skills. A training system is required that will allow a battalion commander and his staff to properly manage resources and consider time-space relationships under the pressures of a realtime simulated combat environment. This high-fidelity, computer-driven battle simulator will train maneuver battalion commanders and their staffs. The Army Training Battle Simulation System (ARTBASS) will create an unclassified training environment in which existing and future friendly/threat organizations, flexible force ratios, tactics, command and control, and weapon effects will be realistically simulated. This system will be a part of the command group training support system. The second system to be discussed is the Automatic Weapons Effects Signature Simulator (AWESS). Both current conventional training and the Multiple Integrated Laser Engagement System (MILES) use blank ammunition to provide weapons firing signatures. The Automatic Weapons Effects Signature Simulator will be a training device to simulate the firing signatures of the Army's full family of machine guns (cal .50 and 7.62mm) and the 20mm machine cannon. The devices will be used in lieu of blank ammunition to simulate the visual and aural effects of weapons firing during both conventional and engagement simulation field training exercises. Key design criteria are a credible signature, troop safety, and reduced life cycle costs.

B. (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, 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 unnecessary duplication of effort. The devices contained in this project have normally progressed from efforts in Non-Systems Training Devices Exploratory Development (PE 6.27.27.A), and Non-Systems Training Devices Advanced Development (PE 6.37.38.A).

Project: #D241 Title: Non-System Training Devices Combined Arms
Program Element: #6.47.15.A Title: Non-System Training Devices Engineering (NSTD)
DOD Mission Area: #430 - Non-System Training Devices Budget Activity: #6 - Defensewide Mission Support

C. (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. Primary Contractor for the engineering development effort on the Army Training Battle Simulation System (ARTBASS) is Singer Company, Silver Spring, MD. The engineering development contractor for the Alpha Radiac Training Device is AAI Corporation, Orlando, FL.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: An Engineering Development (ED) contract for the Army Training Battle Simulation System (ARTBASS) was awarded in FY 1980. An Engineering Development (ED) contract for the Alpha Radiac Training Device was awarded in FY 1981.

2. (U) FY 1982 PROGRAM: Engineering Development (ED) of the Army Training Battle Simulation System (ARTBASS) will be continued. This device will allow the training of leaders and staffs to cope with the complex and sophisticated environments they will face on future battlefields. The Army Training Battle Simulation System (ARTBASS) will provide a two-sided, free play, highly realistic, realtime environment. 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. Engineering Development (ED) will be initiated on the Automatic Weapons Effects Signature Simulator (AWESS). The AWESS will be a training device to simulate the firing signatures of the Army's full family of machine guns (cal .50 and 7.62mm) and the 20mm machine cannon. The devices will be used in lieu of blank ammunition to simulate the visual and aural effects of weapons firing during both conventional and engagement simulation field exercises. Engineering Development (ED) will be completed on the Alpha Radiac Training Device for the AN/PDR-56 Radiac Set. This device will allow Alpha and EOD teams to practice Alpha radiation monitoring and survey techniques without being exposed to hazardous radiataion. The trainer will consist of two hot-spot simulators, four minitransmitters, and four simulated AN/PDR-56(F) Radiac Sets. The simulated Radiac Sets will exactly represent the operational equipment in appearance, operating controls, and meter readings.

3. (U) FY 1983 Planned Program: Engineering Development (ED) on the Army Training Battle Simulation System and ED on the Automatic Weapons Effects Signature Simulator will be completed.

Project: #D241 Title: Non-System Training Devices Combined Arms
Program Element: #6.47.15.A Title: Non-System Training Devices Engineering (NSTD)
DOD Mission Area: #430 - Non-System Training Devices Budget Activity: #6 - Defensewide Mission Support

4. (U) FY 1984 Planned Program: Engineering Development (ED) will be initiated on the Army Maintenance Training and Evaluation Simulation System (AMTESS). The system will provide the capability to train and evaluate maintenance procedures and tasks for all major maintenance functional areas (i.e., automotive, missile, electronics, aircraft, etc.). Initial emphasis will be placed on the automotive and missile areas to demonstrate the concept. Engineering Development will be initiated on the 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 the complex computer-based SIGINT/EW systems. All necessary experimental work will be performed, and the proposed systems will be ready for full-scale development.

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

6. (U) Major Milestones: Not applicable.

7. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	3180	5663	2489	4576	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	4808	5680	1036	-	Continuing	Not Applicable

(U) Decrease of $1,628 thousand in FY 1981 funding is a result of reprograming to higher priority Army program (project D237).
(U) Decrease of $17 thousand in FY 1982 funding is a result of the application of revised inflation indices.
(U) Increase of $1,453 thousand in FY 1983 results from realignment of the program based on the FY 1981 reduction and the application of revised inflation and civilian pay pricing indices.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.47.26.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT QUANTITIES	4656	2099	2172	1776	Continuing	Not Applicable 3
D511	Meteorological Data System (AN/TMQ-31)	4656	2099	2172	1776	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 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 is 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: #6.47.26.A
Title: Meteorological Equipment and Systems
DOD Mission Area: #420 - Global Military Environmental Support
Budget Activity: #6 - Defense Wide Mission Support

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Development Test II reports will be completed and Operational Test II conducted and completed. Independent evaluation reports will be completed. The Development Acceptance In-Process Review (DEVA-IPR) to consider Type Classification Standard will be conducted.

Major Milestones	Current Milestone Dates	Milestone Dates Shown in FY 1982 Submission
Complete Development Test (DT) II:	4Q FY 1982	2Q FY 1982
Contract Award for Limited Production		4Q FY 1982
Complete Operational Test (OT) II:	2Q FY 1983	3Q FY 1982
Complete Type Classification Standard:	3Q FY 1983	4Q FY 1982
Contract Award for Full-Scale Production:	4Q FY 1983	1Q FY 1985
Complete Engineering Development	1Q FY 1985	1Q FY 1982
Initial Operational Capability (IOC):	4Q FY 1985	1Q FY 1984

As a result of cost growth due to contractor underestimation of the work required to complete the software and hardware integration, the number of developmental models was reduced from 5 to 3. This caused the schedule to be revised, and delayed the completion of DT/OT II, Type Classification Standard, and IOC. Limited Production is no longer anticipated; instead, Full-Scale Production was moved forward. The program cost growth also caused the development of training devices to be delayed, thus slipping the completion of engineering development.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	4656	2099	2172	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	2657	2104	2223	Continuing	Not Applicable

Program Element: #6.47.26.A
DOD Mission Area: #420 - Global Military Environmental Support

Title: Meteorological Equipment and Systems
Budget Activity: #6 - Defense Wide Mission Support

(U) Additional funds were reprogramed in FY81 to cover the cost growth associated with the contractor underestimation of development work required. Funds for a reprograming in FY82 have been identified to continue the program at the same rate. The FY 1982 and 1983 reductions were the result of inflation adjustments.

E. (U) OTHER APPROPRIATION FUNDS: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Other Procurement Army:						
Funds (current requirements)	0	9300	4100	10000	151700	175100
Funds (as shown in FY 1982 submission)	0	24300	0	-	61560	85860
Quantities (current requirements)	0	12	6	14	98	130
Quantities (as shown in FY 1982 submission)	0	30	0	-	76	106
Military Construction, Army:						
Funds (current requirements)	0	0	0	0	0	0
Funds (as shown in FY 1982 submission)	0	0	0	0	0	0

(U) Due to the restructure of the program, the FY82 funds are excess to the program and are being reprogramed by the Army for other high-priority requirements. The 12 sets will need to be rescheduled for procurement in later years.

(U) Funds were added in FY83 and FY84 to initiate production and to maintain a minimum production rate.

(U) Last year's submission incorrectly listed 106 under "Additional to Completion." The correct quantity should be 76, with 106 listed under the "Total Estimated Cost" column.

(U) The total quantity required was increased from 106 to 130 to include some war reserve systems.

Program Element: #6.47.26.A
DOD Mission Area: #420 - Global Military Environmental Support

Title: Meteorological Equipment and Systems
Budget Activity: #6 - Defense Wide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The US Army Field Artillery urgently requires a highly mobile, lightweight, automated data processing and meteorological (MET) data acquisition system with nonradiating ground-based components, to assure maximum combat effectiveness of the field artillery on the modern-day battlefield. Existing atmospheric sounding equipment, the AN/GMD-1, type classified Standard A in 1949, is not suitable for fulfilling artillery MET requirements in the areas of mobility, timeliness of data, reliability, manpower utilization, and accuracy. The components were individually developed over a period of a decade, resulting in a system that does not lend itself to significant technical advances through product improvement. Manual data reduction significantly degrades the accuracy of the final product and consumes a disproportionate share of available manpower and time. Presently, the Army requirement is to replace the AN/GMD-1 with the new Meteorological Data System (MDS). The MDS combines mobility, computer technology, and operational flexibility to produce the timely, accurate MET data essential for maximizing field artillery effectiveness. The MDS can provide battlefield MET conditions hourly. The nonradiating computer-controlled ground station acquires MET data from a balloon-borne radiosonde, prepares Standardization in Agreement (STANAG) formatted messages, and distributes information in near-realtime to users via integral communications devices. Atmospheric conditions from surface to 30 km altitude are available for correcting artillery fires, weather forecasting, nuclear, biological, and chemical (NBC) operations, and tactical decisionmaking. Designed to operate in the vicinity of the front lines, the MDS has mobility equal to the weapons systems it supports. Short-setup and march order times allow the MDS to deploy quickly and as often as battlefield conditions dictate. The ability to collect MET data while on the move adds a new dimension to tactical MET support. The MDS equipment standardization centers around the fully militarized AN/UYK-19 System Processing Unit. System software converts telemetered MET information to real values of pressure, temperature, humidity, wind direction, and speed. Requests for MET messages are serviced immediately, and available data is formatted and transferred to the selected communication device. Multiple finding techniques virtually assure MDS operational availability under all weather and terrain conditions. A 403-MHz radiosonde equipped with a Navigational Aid (NAVAID) receiver furnishes winds in any area where LORAN C, D, VLF, or OMEGA signals are available. A 1680-MHz sonde tracked by the trailer-mounted radio direction-finding (RDF) subsystem may be employed in areas where NAVAID signals are absent. The 1680-MHz sonde may also be configured to simultaneously provide both NAVAID and RDF winds. This mixed mode of operation promises accurate wind data at all altitudes. Visual balloon tracking via a synchro-equipped theodolite adds another option. Theodolite data is automatically read into the computer and may be used independently or in conjunction with radiosonde-based height data. Modularity in construction allows the system to be updated as needed to retain maximum flexibility.

Program Element: #6.47.26.A
DOD Mission Area: #420 - Global Military Environmental Support

Title: Meteorological Equipment and Systems
Budget Activity: #6 - Defense Wide Mission Support

G. (U) RELATED ACTIVITIES: Program Element #6.11.02, Defense Research Sciences, Project #B53A, Atmospheric Sciences; Program Element #6.21.11, Atmospheric Investigations; Program Element #6.37.41, 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 Armaments 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.

H. (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.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Meteorological Balloon, ML-537; Balloon Inflation and Launching Device, JL-595; and the Meter Volume, Hydrogen-Helium, were developed and type classified as standard equipment. Service testing of the Mobile Weather Radar, AN/TPS-41, was successfully completed, and a Development Acceptance In-Process Review Package was prepared. Meteorological Balloon, ML-635, was developed for low-altitude soundings of the atmosphere. A contract was awarded to Bendix Corporation, Baltimore, MD, for fabrication of five ED prototype models of the AN/TMQ-31. A cost overrun was declared by Bendix Corporation. Program options were developed which were within reprograming authority. HQ ERADCOM elected to reduce the scope of the program by deleting two systems and stretching out the work effort. No essential work efforts were deleted. Fabrication of three engineering development (ED) prototype models continued. Draft manuals were prepared.

Program Element: #6.47.26.A
DOD Mission Area: #420 - Global Military Environmental Support

Title: Meteorological Equipment and Systems
Budget Activity: #6 - Defense Wide Mission Support

2. (U) FY 1982 Program: Technical manuals for the AN/TMQ-31 will be completed and validated. Key Instructor training will be conducted, and then Operational Test (OT) II players will be trained. System 1 will undergo contractor accuracy verification at Wallops Island, VA, followed by a physical teardown demonstration. The system will be refurbished and used for OT II. Fabrication of systems 2 and 3 will continue. These systems will be utilized for mobility tests, a maintenance demonstration, reliability tests, human factor tests, electromagnetic interference tests, and the initiation of Development Test II and nuclear testing. A decision for early procurement of Long-Lead Items and Production Special Test Equipment will be made.

3. (U) FY 1983 Planned Program: Operational Training (OT) II will be conducted at Fort Sill, Oklahoma. Technical manual and system design revisions will be made as required after OT II. Development of training devices will be initiated for institutional operator and maintenance training. Extension Training Materials for use at field locations will also be developed. Software for use in checking and repairing the printed circuit cards on automated test equipment will be developed. Engineering Development models of the Surface Acoustical Wave (SAW) oscillator will be built and tested. The SAW oscillator will be used to decrease the frequency drift of the radiosondes used with the AN/TMQ-31. The Development Acceptance In-Process Review to consider Type Classification Standard will be conducted.

4. (U) FY 1984 Planned Program: The AN/TMQ-31 fielding plan will be completed. Initial production will be monitored. The software programing necessary for fault isolation and repair on the automated test equipment will be completed. Training device development and construction will be continued.

5. (U) Program to Completion: Training devices will be completed. Initial Operational Capability (IOC) will be achieved in FY 1985. Procurement is planned to extend through FY 1989. An improved radiosonde capable of using the Global Positioning System as a known source will begin development in FY 1985. Development will continue through FY 1988 with IOC projected for FY 1990. The Remote Automatic Meteorological Station, AN/TMQ-30, is funded to begin engineering development in FY 1986. Type classification is expected to occur in FY 1988 with IOC projected for FY 1990.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.51.02.A

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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	1400	1543	3287	3429	Continuing	Not Applicable
M980	TRADOC Studies and Analyses	1400	1543	1958	2380	Continuing	Not Applicable
M981	Army Model Improvement Program	-	-	425	422	Continuing	Not Applicable
M982	Army Model Improvement Program - DARCOM	-	-	904	627	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the conduct of 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 funds studies and analyses that address high-priority problems requiring capabilities not available in-house and not duplicative of other DOD efforts. TRADOC is the lead activity for the Department of the Army for the Army Model Improvement Program (AMIP) and has primary responsibility for overseeing AMIP activities. It has established an AMIP Management Office. The AMIP will improve the efficiency and consistency of Army models used for studies and analyses. The AMIP will be independent new projects (M981 and M982) for FY 1983.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Project M980 provides for individual contract efforts that will focus on force structuring, missions, requirements, assessment of doctrine, Cost and Operational Effectiveness Analyses, and Cost and Training Effectiveness Analyses for developmental systems. These efforts will provide both new and updated analyses and

Program Element: #6.51.02.A 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

assessments to enable decisionmakers to make sound and rational decisions regarding matters related to materiel systems, such as resource allocations, doctrine, training, and force designs. Projects M981 and M982 are new and provide for developing, modifying, documenting, implementing, and managing a hierarchical family of computerized combat models (theater force, corps/division, combined arms and support task force) to support Army studies, analyses, research, and training; to treat functional areas in an adequate, valid, and consistent manner; and to be supported by specially developed data bases.

D. (U) COMPARISON WITH FY 1982 REQUEST ($ in thousands):

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1400	1543	3287	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	1400	1547	2008	Continuing	Not Applicable

The slight decrease in the FY 1982 estimate is the result of the application of revised inflation pricing indices. The increase in the FY 1983 estimate is for the initiation of new efforts in the Army Model Improvement Program.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.51.02.A

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

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The objective of this program is to provide for the conduct of contract studies and analyses for the US Army Training and Doctrine Command (TRADOC). Sophisticated analytical techniques are used to integrate and analyze a variety of factors. These techniques lead to conclusions and recommendations which make substantive contributions to Army and TRADOC planning, programing, and decisionmaking. Study contributions include assistance in improving the understanding of materiel systems in the areas of: alternative organizations, tactics, doctrine, policies, and procedures; cost effectiveness of existing and proposed systems or programs; and allocation of resources. The studies organize and evaluate data and information already available or which can be inferred or extrapolated from existing data.

G. (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. Interservice 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 which 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.

H. (U) WORK PERFORMED BY: All work is done under contract. Primary contractors are: Decisions and Design, Inc., McLean, VA; Science Applications, Inc., McLean, VA; BDM Corporation, McLean, VA; Martin Marietta Aerospace, Orlando, FL; Systems Development Corporation, Huntsville, AL; and Vector Research, Inc., Ann Arbor, MI. The TRADOC integrating centers (i.e., Combined Arms Combat Developments Activity, Soldier Support Center, and Logistics Center) assist Headquarters (HQ), TRADOC, in formulating the TRADOC study and analyses program. The TRADOC Service Schools, Integrating Centers and HQ, TRADOC monitor the execution of the program by the contractors.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The intelligence/electronic warfare mission area analyses level I defined shortfalls in this mission area and identified proposed solutions relative to organization, operations, personnel, and materiel requirements. The air defense mission area analysis level I accomplished similar analyses for the Army's air defense mission and proposed solutions. The Army Model Improvement Program continued to develop more responsive models for the analyses of systems capabilities in response to threats. It continued to improve the Integrated Corps engineer model

Program Element: #6.51.02.A

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

and chemical module and performed data base management. The combat support nuclear, biological, and chemical mission area analyses level I defined shortfalls in the Army's defensive nuclear posture and in chemical/biological arenas, and proposed solutions. The capability of enemy emitters to attack friendly command, control, and communications systems was analyzed to determine the preferred method(s) to neutralize enemy emitters. Preliminary design and organization of an artillery target integration center identified sources and types of intelligence information available to artillery systems and developed an approach for integrating artillery target information for efficient and effective use. Efforts in this area will continue in FY 1982. An intelligence Systems parameter review was performed that provided a new approach for analyzing/processing massive amounts of data to provide rapid identification of high-value targets and a better, faster, and more efficient indication and warning means for the commander and his staff. Phase I of the VECTOR II model was performed to analyze force-on-force effects. Phase II of the VECTOR II model was initiated. The parameter analysis of potential critical nodes was performed to analyze adversary's organization and operation patterns for its critical points so that we could more adequately predict and take advantage of future events. New methods for creating communication electronic operator instructions were investigated in a communication electronic instructor study. The Cramer Obscuration Model analyzed the effects of smoke and other battlefield debris.

2. (U) FY 1982-FY 1984 Planned Program: Project M980. The intelligence/electronic warfare level II mission area analysis will be performed to investigate shortfalls and identify proposed solutions to problems found last year during the level I mission area analysis in this area. The results of this effort will improve intelligence/electronic warfare relative to organization, operations, personnel, and materiel requirements. An air defense level II (echelons above division) mission area analysis will be performed that will provide concepts for effective use of air defense assets, protection of friendly aircraft from engagement by friendly forces, and satisfaction of corps/theater area air defense requirements. A study in forward area directed energy weapons will be conducted to identify their utility on the battlefield. Analysis will be performed to ascertain infantry close combat advanced antiarmor requirements. A radiological defense analysis will be performed. A prioritization methodology will be developed to enable the Army to more effectively and efficiently integrate its requirements among all of the Army mission areas. The antistandoff jammer cost and training effectiveness analysis will identify the preferred training alternative for that system. An antitactical ballistic missile cost and operational effectiveness analysis (COEA) will define the cost effective measures for countering the tactical ballistic missile threat. A high-energy laser system COEA will assess alternative high-energy laser systems capable of air defense application. The air defense and the battlefield nuclear warfare mission area analyses will define doctrinal, organizational, or materiel

Program Element: #6.51.02.A 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

shortfalls within those mission areas and identify preferred solutions to problems identified. Analyses will be performed relative to the roles and missions of special forces; airmobility operations; air defense structure, systems, and training; reconnaissance/surveillance and target acquisition; command, control, and communications; mobility and countermobility requirements; and electronic warfare systems. The purpose of the analyses is to provide user recommendations relative to preferred equipment within Army resource constraints. The Division Air Defense (DIVAD) gun subcaliber device training development requirements study will be performed. The Initial All-Source Analysis System (IASAS) cost and operational effectiveness analysis (COEA) will be performed to provide a basis to determine cost effective solutions for operation and training to IASAS requirements at division, corps, and echelons above corps. The IASAS COEA will support a special system acquisition review. Definition of improved HAWK software requirements and DIVAD gun tactical software requirements will provide a basis for any necessary redesign of these system elements to meet combat requirements based upon threat implications. The human side of the combat equation study will be directed toward the development of a means to quantify the impact of human aspects on combat performance and providing a basis for future in-house efforts to incorporate such quantitative factors in combat models to determine human factors impacts on man/system performance and battle outcome. Project M981. The program will address the following areas for further analysis: The development of joint doctrine and tactics; integrated battlefield issues; Army training; command, control, communications and intelligence (C3I); logistics; materiel systems; force design and mission area analysis; human aspects in battle; reconstitution of the force in combat; validation of Army program requirements; and Intelligence/Electronic Warfare Analysis. The Army Model Improvement Program will proceed to develop a hierarchical family of computerized combat models at three levels (theater, corps/division, and combined arms and support task force). These models will have a common data base which will provide for consistency in data used to evaluate the aspects included in a variety of combat development studies, promote consistency in scenario evaluations, and promote compatible study results. Individual contract services will be required for software and to develop the computer models. This will encompass the battlefield functional areas of command, control, communications, artificial intelligence, logistics, electronics, and chemical and nuclear warfare. Efforts will continue in development and improvement of computerized training simulation models as they relate to combat functional areas and training requirements. The modeling effort will provide an improved capability to analyze Army combat problems by providing an improved representation of Army capabilities and alternate systems/organizations and anticipated threat. This is a continuing project in view of changing technologies, threat, and Army requirements. Project M982. This project is oriented towards the US Army Materiel Readiness and Development 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 (friend and enemy) item system performance data required

Program Element: #6.51.02.A

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

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.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.52.01.A 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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4365	5432	5791	6714	Continuing	Not Applicable
D066	Aviation Engineering Flight	4365	5432	5791	6714	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides the 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. 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 equiment used in flight test data reduction. AEFA is collocated with the Air Force Flight Test Facility and provides the Army capability to perform its own aircraft engineering flight tests.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: FY 1983 funds are required to sustain the engineering flight test activity which supports the planned development and product improvement programs for Army aircraft to include: airworthiness and flight characteristics tests for CH-47D, AH-64 (APACHE) composite blade evaluation, Advanced Helicopter Improvement Program (AHIP) engineering evaluations, and other directed programs required to support new development and preplanned product improvement programs.

Program Element: #6.52.01.A Title: Aviation Engineering Flight Activity
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	4365	5432	5791	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	4381	5443	6052	Continuing	Not Applicable

The FY 1981 and FY 1982 decreased funding reflects minor reprograming to higher priority Army programs. The FY 1983 decreased funding reflects a realignment of planned projects during this fiscal year.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable

Program Element: #6.52.01.A Title: Aviation Engineering Flight Activity
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The mission of the Activity which this program supports is to conduct engineering flight testing of Army aircraft being developed, procured, or modified. This includes New Aircraft Program Development Testing I and II, flight tests to evaluate air vehicles incorporating advanced concepts with potential military application, and tests to determine airworthiness of proposed engineering change proposals or modifications to existing aircraft systems. Engineering flight testing consists of precision flight to collect airborne data 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 for each aircraft. Data from the flight testing are used as a basis for the US Army Aviation Research and Development Command (AVRADCOM) Statement of Airworthiness qualification which assures compliance with pertinent design standards and production guarantees. Approximately 30 test projects are normally accomplished in each fiscal year. This program element also provides for the development and maintenance of an in-flight Helicopter Icing Spray System (HISS), which is used to simulate icing conditions for aircraft qualification tests. The Aviation Engineering Flight Activity also conducts an orientation course which reviews aeronautical academic fundamentals and flight test techniques for potential Army Aviator Test Pilots who are preparing for entry into the US Naval Test Pilot School at Patuxent River Naval Air Station, MD.

G. (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 on projects such as development of the XV-15 tilt rotor research aircraft and conduct of external acoustical noise measurements utilizing the YO-3A research aircraft for developing techniques to reduce aircraft detection by reducing ambient noise.

H. (U) WORK PERFORMED BY: United States Army Aviation Engineering Flight Activity, Edwards Air Force Base, CA.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: During FY 1977 and FY 1978, major programs conducted by the US Army Aviation Engineering Flight Activity (AEFA) included the Utility Tactical Aircraft System (UTTAS), later designated the UH-60 (BLACKHAWK), and the Advanced Attack Helicopter (AAH), now designated the AH-64 (APACHE). During FY 1979, AEFA worked on ongoing projects and completed several test programs including: Advanced Attack Helicopter (AH-64) Engineer Design Test (EDT) II, Kaman AH-1S Rotor Blade Airworthiness and Flight Characteristics (A&FC) tests, and various OH-58 helicopter product improvement and modernization evaluations. At the close of FY 1979 there were 38 assigned projects in either the planning, instrumentation, flying, or reporting stages. Major helicopter test programs for FY 1980 included UH-60A

Program Element: #6.52.01.A Title: Aviation Engineering Flight Activity
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

(BLACKHAWK) and CH-47D Preliminary Airworthiness Evaluations (PAE); artificial and natural icing tests in the UH-60A and the CH-47D; icing tests of various ice phobic coatings; and calibration of the Helicopter Icing Spray System (HISS) using an instrumented UH-1H. Major helicopter test programs for FY 1981 included: UH-60A artificial and natural icing reevaluation; OV-1 MOHAWK limited artificial and natural icing evaluation; limited artificial icing evaluation of a civilian commercial helicopter (Bell 412); various OH-58C modernized product improvement evaluations; YAH-64 airworthiness and flight characteristics evaluations; and fuel conservation evaluations of the OH-58, AH-1, and UH-1 helicopters.

2. (U) FY 1982-FY 1984 Program: Major test programs for FY 1982 will include: AH-64 (APACHE) airworthiness and flight characteristics, climatic, and artificial/natural icing evaluations; UH-60A (BLACK HAWK) flight evaluation of alternate testing techniques to determine stability derivatives; additional civilian commercial helicopter icing tests for Sikorsky S-76, Bell 214 and 412; XV-15 Tilt Rotor Research Aircraft evaluations; continued tests of various rapid deployment (RD) and strike force modifications to OH-6A, UH-60A and OH-58C helicopters; and evaluation of helicopter icing spray system (HISS) with improved bleed air source for increased cloud size and particle distribution. Engineering flight tests for FY 1983 are expected to include airworthiness and flight characteristics for CH-47D; AH-64 composite blade evaluation; Advanced Helicopter Improvement Program (AHIP) engineering evaluations; additional civilian commercial helicopter icing tests; and other programs required to support new development and preplanned product improvement programs. FY 1984 major test programs are expected to include continuation of the Airworthiness and Flight Characteristics Evaluation on the AHIP and other programs required to support new development and product improvement programs. Also anticipated are continued tests of rapid deployment and strike force modifications to various fielded aircraft.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.53.01.A Title: Kwajalein Missile Range
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	125475	139351	152140	151601	Continuing	Not Applicable
D614	Kwajalein Missile Range	125475	139351	152140	151601	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Kwajalein Missile Range (KMR) is a national range whose principal missions are to support Intercontinental Ballistic Missile (ICBM) and Sea-Launched Ballistic Missile (SLBM) development and operational testing, Ballistic Missile Defense (BMD) development and testing, and intelligence data collection. KMR is the only range in the free world where the ICBM/SLBM can be fired to full range in a tactical configuration and collect sophisticated technical data during the terminal portion of the trajectory. These trajectory data are required by the Army's BMD program to support BMD systems development, test, and validation. Locating BMD experiments on KMR has a synergistic effect since both the strategic offensive and defensive programs benefit. In addition to the support of weapons system development programs, KMR collects data on foreign satellites for the intelligence community.

C. (U) BASIS FOR FY 1983 REQUEST: The FY 1983 funds are required for the continued operation of KMR in suppport of all Services. During FY83, 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.

Program Element: #6.53.01.A Title: Kwajalein Missile Range
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	125475	139351	152140	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	127474	140985	153916	Continuing	Not Applicable

In FY80, $1999 was reprogramed to this project to cover the increase in payments for KMR to the Government of the Marshall Islands under the Interim Use Agreement. The difference in FY81 represents the "payback" of the previous year's reprogramming action. The reduction in FY82 and FY83 results from a repricing of inflation increases and POL price changes.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable

Program Element: #6.53.01.A Title: Kwajalein Missile Range
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: KMR is a national range managed and operated by the Army primarily for strategic offensive missile development and operational testing, ballistic missile defense (BMD) research and development testing, and intelligence data collection on foreign space launches. Major range users are the Air Force Intercontinental Ballistic Missile (ICBM) program, the Navy Sea-Launched Ballistic Missile (SLBM) program, and the BMD program. The range, located about 8000 km southwest of Vandenberg Air Force Base, provides the terminal area for Air Force and Navy ballistic missile tests. KMR is the sole range in the free world offering this capability. It is equipped with instrumentation having unique capability to measure performance and accuracy of ballistic missile payloads as they reenter the earth's atmosphere. These offensive missile payloads also provide targets for validating technology and testing hardware developed by the Army's BMD program. Principal Army range user programs which have equipment and personnel located on KMR are the BMD Systems Technology Program and the BMD Advanced Technology Program. Data essential to the success of both these programs are dependent upon the availability of ICBMs/SLBMs targeted to impact in the general vicinity of KMR data collection sensors. These data collection sensors include the sophisticated KMR sensors as well as those of the range user programs. Air Force programs include the Advanced Strategic Missile Systems program (ASMS) (formerly Advanced Ballistic Reentry Systems (ABRES)) and the Strategic Air Command (SAC) Minuteman Operational and Training test firings. In addition, plans are being made to support the MX program. The Navy SLBM programs have included development firings for the Poseidon and Trident. In addition to its established role of intelligence data collection on orbiting satellites, KMR will participate in the Air Force Space Detection and Tracking System (SPADATS) to provide early track of new foreign launches.

G. (U) RELATED ACTIVITIES: There are no related activities. No other DOD facility duplicates capabilities available at KMR.

H. (U) WORK PERFORMED BY: KMR is managed by the Ballistic Missile Defense Systems Command, Huntsville, AL. 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 small contractors (totaling $4,959,000).

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: KMR was established as a national range on 1 July 1964 under the management of the Army. During this period, the Nike-Zeus and Safeguard BMD programs, with full system interceptor firings, were completed at KMR. Over the years KMR has supported Air Force ABRES experimental and developmental firing programs, SAC

Program Element: #6.53.01.A Title: Kwajalein Missile Range
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

Minuteman Operational and Training tests, Defense Nuclear Agency (DNA) special test missile firings, and Navy SLBM programs. Other Army programs supported during this period were the Signature of Fragmented Tanks (SOFT), the Designating Optical Tracker (DOT), and the Systems Technology Reentry Experiment Program (STREP). Support has also been provided to the NASA Orbital Flight Test and SAC Space Object Identification programs. After an extensive modification program, the ALTAIR radar will become a contributing sensor to the Air Force Space Detection and Tracking System (SPADATS). SPADATS consists of detecting, tracking, identifying, and cataloging all manmade objects in space and providing data to the intelligence community. The C-7A Sonobuoy Missile Impact Location System (SMILS) and Terminal Area Support Aircraft (TASA) development programs have been initiated to extend the data-gathering capability at KMR into the Broad Ocean Area (BOA) to support the MX test program.

2. (U) FY 1982-FY 1984 Planned Program: In FY82 BMD has fifteen major missions forecast. The Air Force Advanced Strategic Missile Systems workload decreases by seven missions while the SAC tests increase by five missions. The BMD Systems Technology Program's Homing Overlay Experiment (HOE) is a new test program on the range. The ALTAIR radar will operate 24 hours a day, 7 days a week as a contributing sensor to SPADATS. FY82 Improvement and Modernization (I&M) projects include replacement of instrumentation controllers, procurement of three Meteorological Sounding Systems, replacement of the Splash Detection Radars, telemetry upgrades, and completion of the SMILS and TASA efforts. Base maintenance and repair projects include completion of the electrical feeder cable replacement, initiation of a phase replacement of water supply systems and sewers, and repairs to housing, streets, and aircraft taxiways. In FY83 KMR has eighteen major missions forecast. SAC Minuteman II and III as well as HOE continue at the FY82 level; MX testing will begin with 4 missions targeted at KMR North. ALTAIR will continue to detect, track, identify, and catalog all manmade objects in space and provide data to the intelligence community. Major I&M projects include the replacement of the ALTAIR UHF transmitter and the TRADEX computer, upgrades to the Telemetry Data Recorders, and procurement of a Mobile Optical Tracker. Efforts will continue in order to reduce the backlog of major base maintenance and repair projects. The FY83 program contains funding for payment to the Government of the Marshall Islands (GOMI) for continued land use. In FY84 KMR has fourteen major missions forecast. SAC Minuteman II and III continue at five and seven missions, respectively while the MX test program decreases to two missions. The major I&M acquisition is a $3.2M Multiple-Target Instrumentation Radar (MIR). Future program support requirements for multiple reentry vehicles continue to stress more stringent accuracy and precision for radar tracking and velocity measurements. Procurement of this sensor will provide high tracking rates required by high-performance vehicles. The present administration is not expected to terminate the trusteeship of the Trust Territory of the Pacific Islands before the end of FY83. Future relations with the GOMI will be subject to a negotiated Compact of Free Association, Base Operating Rights Agreement, and Status of Forces Agreement.

Program Element: #6.53.01.A Title: Kwajalein Missile Range
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.57.02.A Title: Support of Development 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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	30523	36635	43180	56377	Continuing	Not Applicable
DE95	Cold Regions Test Center	4961	5869	6255	6889	Continuing	Not Applicable
DE96	Tropic Test Center	2758	3308	3588	3930	Continuing	Not Applicable
D026	Test Design and Evaluation	3511	4271	4525	5921	Continuing	Not Applicable
D127	Meteorological Support to RDTE Activities	5474	6676	10743	17385	Continuing	Not Applicable
D204	Field Smoke Assessment	3086	2330	2211	2243	Continuing	Not Applicable
D575	R&D Field Support Activity	60	122	220	218	Continuing	Not Applicable
D618	Aviation Development Test Activity	6380	7740	8352	10190	Continuing	Not Applicable
D621	United States Army Test Facilities Register	115	326	284	299	Continuing	Not Applicable
D623	United States Army Test and Evaluation Command (TECOM) Instrumentation Development	2890	4010	4389	6176	Continuing	Not Applicable
D625	TECOM Test Methodology	1288	1983	2613	3126	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Provides funding to subordinate activities of the US Army Materiel Development and Readiness Command (DARCOM) for indirect support of development test and evaluation other than test and evaluation conducted at DARCOM facilities included in the Major Range and Test Facility Base. Indirect test support at such DARCOM facilities is funded by Program Element (PE) 6.58.04.A, DARCOM Ranges/Test Facilities. The indirect support funded by this program consists of salaries, supplies, travel expenses, equipment, host/tenant costs, and services not directly associated with any particular test project.

Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Provides for continuation of projects to support Army development test and evaluation.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	30523	36635	43180	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	30253	36728	42670	Continuing	Not Applicable

FY 1981 funding for Field Smoke Assessment was increased $1.8 million to support major tests of Advanced Attack Helicopter, HELLFIRE Fire-and-Forget Missile System, and Target Acquisition Designation Sight in an obscured battlefield environment. Nearly all of this increase was obtained by reprograming from other projects within this program element. The FY 1982 funding estimate is decreased slightly as a result of a small reduction in the September 1981 amended budget (inflation repricing) and a small contribution to the RDTE, A reduction for modernization of National Guard/Army Reserve equipment. FY 1983 funding for Meteorological Support to RDTE Activities is increased $2.1 million to provide for civilianization of meteorological support teams which begins in FY 1983, with $1.6 million being transferred from other projects within this program element (approximately $1 million from project D623, TECOM Instrumentation Development).

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable

Program Element: 06.57.02.A Title: Support of Development Testing
DOD Mission Area: 0454 - Other Test and Evaluation Support Budget Activity: 06 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Ten projects are funded under this program element. The first two projects provide funding for the US Army Cold Regions Test Center, Fort Greely, AK (DE95), and the US Army Tropic Test Center, Fort Clayton, CZ (DE96), on a nonreimbursable basis (i.e., both direct and indirect test costs). These environmental test centers provide data on effects to DOD materiel systems and equipment in diverse natural environments. The third 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 with respect to 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 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. Project D127 provides for Meteorological Support services at White Sands Missile Range, 12 other permanent test sites, and various temporary sites. Complete weather services and the highly specialized meteorological data collection are provided before, during, and after tests to range users, including the Defense Nuclear agency and the National Aeronautics and Space Administration. Army participation in the Meteorological Rocket Network is provided by the operation of rocket launching sites at three locations: White Sands Missile Range, NM; Poker Flat, AK; and Fort Sherman, CZ. Project D204 provides for the conduct of Smoke Weeks during which the vulnerabilities of electro-optical (EO) items to smoke/obscurant countermeasures are determined under realistic, analytically characterized battlefield obscurant environment scenarios. It also provides for the development of test technology, methodology, and instrumentation to determine the effectiveness of EO items in such environments. Project D575 provides direct liaison to resolve materiel problems related to test activities conducted at the National Training Center, Fort Irwin, CA. The seventh project, D618, finances the Aviation Development Test Activity (AVNDTA), Fort Rucker, AL, which conducts test of aircraft and components and gathers data to aid in determining component service life, repair parts consumption, and required inspection cycles. AVNDTA funding provides for an aircraft maintenance contract, salaries of civilian test personnel, host support, instrumentation, and supplies. Project D621 provides for the publication and distribution of the US Army Test Facilities Register to include gathering the necessary data and keeping it current. 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 operation of test facilities control procedures. Project D623 provides for development of instrumentation that is unique to

Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

the testing of complex weapon systems, that is commensurate with technological advances in materiel developments, and that applies modern technology to cost- and labor-intensive areas to enable more efficient testing at lower manning levels. Development of instrumentation is undertaken when a required test capability cannot be obtained using "off-the-shelf" equipment. Efforts undertaken may include studies, planning, design, prototype fabrication, integration of available equipment into a new configuration, or testing of developed items. Many instrumentation developments have resulted in advances in materiel testing technology or in reduced cost or duration of required testing. Project D625 provides for the development and improvement of test methodology for all TECOM test activities, to include improving test procedures and/or developing new test techniques to enable effective testing of the advanced technology systems to be developed and to reduce test manpower, costs, and duration. Methodology efforts are extremely important as a prerequisite in determining what instrumentation needs to be developed.

G. (U) RELATED ACTIVITIES: This program with its emphasis on testing is closely related to: the varied Army materiel developing activities; development testing activities of the ranges and test facilities funded by Program Element (PE) 6.58.04.A, *US Army Materiel Development and Readiness Command* (DARCOM) Ranges/Test Facilities; testing activities of the US Army Operational Test and Evaluation Agency (OTEA) and the US Army Training and Doctrine Command (TRADOC) funded by PE 6.57.12.A, Support of Operational Testing. Instrumentation and test methodology are developed under PE 6.57.02.A for the ranges and test facilities funded by PE 6.58.04.A. The Army Staff directs 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 greatest possible effectiveness of Army testing activities and to avoid duplication of instrumentation development efforts. PE 6.57.02.A. is now structured to support only development testing. Since the test boards now primarily support operational testing, they have been transferred to TRADOC. 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 of capabilities, 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 Test Center, and DE96, Tropic Test Center, were transferred from PE 6.58.04.A, DARCOM Ranges/Test Facilities, to this PE, 6.57.02.A, starting in FY 1982. These are two of the three Army installations/activities responsible for natural environmental testing. The third is the desert climatic test center located at Yuma Proving Ground (YPG). Projects DE95 and DE96 provide test services to users on a nonreimbursable basis, while YPG is funded only for indirect test cost (project DE90 in PE 6.58.04.A).

Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

H. (U) WORK PERFORMED BY: Approximately 80 percent of the effort is performed in-house by civilian and military personnel assigned to DARCOM; the rest is performed by a large number of contractors.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The Cold Regions and Tropic Test Centers (projects DE95 and DE96) provided the test capability necessary for subjecting developmental Army materiel to natural environmental conditions. The US Army Materiel Systems Analysis Activity (AMSAA) provided (project DO26) appropriate evaluations regarding the adequacy of materiel systems at significant milestone points during the development cycle. AMSAA also used such cost saving techniques as modeling, simulation, statistical design of experiments, system analysis, engineering and operations analysis, and appropriate data bases. AMSAA test design and evaluation efforts were expanded to include about 60 systems. Specific materiel items included Stinger air defense missile system, Single-Channel Ground and Airborne Radio System, Lightweight Company Mortar System and Remotely Piloted Vehicles. Meteorological support services were provided (project D127) to high-priority programs. Meteorological rocket and balloonsonde data impact prediction ballistic support continued at White Sands Missile Range. The systematic Army Meteorological Rocket Network sounding schedule also continued. In addition, special event sounding was made to support programs such as Defense Nuclear Agency programs and the US/USSR meridional network data exchange agreement. Acquisition of labor- and cost-reducing automated upper air sounding systems for installation at Meteorological team permanent sites was initiated. The annual Smoke Week was conducted (project D204) to provide a smoke/battlefield debris environment, and results of Smoke Week tests were provided to developers of smoke and electro-optic (EO) hardware for use in their programs. Improved instrumentation and methodology were developed and acquired for characterization of smoke/dust/battlefield debris. Major tests of Advanced Attack Helicopter (AAH), HELLFIRE Fire-and-Forget Missile System and Target Acquisition Designation Sight (TADS) were conducted under obscured (battlefield) conditions. US Army Aviation Development Test Activity (AVNDTA) (project D618) conducted development and production acceptance tests of aircraft systems and components such as UH-1H Main Rotor Assembly and Missile Detector System. Project D621, US Army Test Facilities Register, provided for salaries and administrative operations of personnel in the US Army Test Facilities Management office who carry out the registration of new or modified test facilities/equipment. Project D623, US Army Test and Evaluation Command (TECOM) Instrumentation Development, efforts included: initiation of development of a doppler radar for tracking artillery and mortar projectiles with greater accuracy and more complete data feedback than the antiquated HAWK illuminators that it replaces; development of a target simulation facility to reduce the need for costly live tests of such systems as M1 Tank and Division Air Defense Gun System; development of on-board instrumentation for missiles and vehicles; a multitarget modification to instrumentation radars; and a cooperative project with the US Army Training and Doctrine Command

Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

(TRADOC) for an indirect fire artillery and mortar scoring system. Test methodology (project D625) efforts were conducted in high-priority areas such as communications in a countermeasure environment, determining environmental pollution effects of testing, assessment of human factors, nuclear effects, environmental quality control and software simulation (e.g., for testing computer-controlled systems).

2. (U) FY 1982-FY 1984 Planned Program: The Cold Regions and Tropic Test Centers (projects DE95 and DE96) will continue to subject Army materiel to the natural environmental conditions of the arctic and tropic areas of the world. Independent test design and evaluation efforts (project D026) will be extended to address 70 systems including new major systems that are programed for testing. Critical customer-oriented environmental measurements and meteorological services (project D127) will be provided in support of programs such as Ground-Launched Cruise Missile, Pershing, high-energy laser, electro-optics, and precision-guided munitions. Initial steps will be taken (e.g., preparation of job descriptions and training plans) in FY 1982 so that civilianization of Meteorological Support teams can be accomplished in FY 1983 and FY 1984. A total of 200 civilians will be hired and 302 military spaces will be released to the field Army. Meteorological instrumentation will be modernized so that highly sophisticated weapons programs can be supported with fewer personnel. The annual Smoke Week will be conducted (project D204) for the developers of smoke and electro-optical (EO) devices. Emphasis will be upon improving prediction capability of validated mathematical models and use of models in lieu of costly field tests. Support will also be provided for comparative trials of anti-infrared smokes under NATO Project Group 16. The Aviation Development Test Activity will continue to conduct development and production acceptance tests (project D618) of aircraft, aircraft components, subsystems, and ancillary equipment; major instrumentation procurements will include space positioning equipment, data vans, and nondestructive laboratory equipment. Under project D621, the DARCOM Test Facilities Management Office will continue to control equipment for the test facilities with emphasis on avoiding duplication and pursuing standardization and joint efforts, whenever possible. The Test Facilities Register will be continually updated. Project D623 efforts will include major developments of chemical agent instrumentation, a live-fire simulated evasive target, direct fire weapon instrumentation, a new doppler velocimeter, equipment/software to provide a realistic electromagnetic environment, dedicated miss-distance and close-in tracking radars, fiber optics technology, and advanced video techniques. A major portion of test methodology (project D625) efforts will be devoted to development of test procedures for binary munitions and the interoperability and performance of complex electromagnetic systems under realistic conditions. Simulation techniques will be stressed. Automation of data acquisition, integration, and reduction will be accomplished. Shock, vibration, and climatic test procedures will be improved.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: DE95 Title: USA Cold Regions Test Center
Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: This project provides for the operation and maintenance of the US Army Cold Regions Test Center (CRTC), Ft Greely, Alaska (formerly, the US Army Arctic Test Center), a subordinate cold weather environmental test facility of the US Army Test and Evaluation Command (TECOM). Missions include planning, conducting, and reporting on cold region, mountain and northern environmental phases of development tests and other types of tests. Also provides support to the Department of Defense, Department of the Army, and the US Army Materiel Development and Readiness Command (DARCOM) for cold region environmental test and evaluation services. The CRTC maintains and provides 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 existing instrumentation that has become obsolete or uneconomical to repair (e.g., based on electronic vacuum tube technology). Funding encompasses all fixed and variable expenses, commonly known as a level of effort concept, including base operations support costs and direct and indirect test costs.

B. (U) RELATED ACTIVITIES: Close and continuous coordination exists with other test and evaluation activities, materiel developers, and other elements of the armed services to insure optimum effectiveness of materiel testing while avoiding unnecessary duplication of capabilities. This project was financed under P.E. 6.58.04.A, DARCOM Ranges/Test Facilities through FY 1981.

C. (U) WORK PERFORMED BY: Testing is performed primarily by in-house military personnel and a small number of DA civilians. Many tests require military troops on temporary duty during the peak testing season. Contractor support is used in areas where no in-house capability exists.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Major items tested for effects of cold environment on the man-materiel interface included: Blackhawk Helicopter, M1 Abrams tank, Plastic Fuel Tanks for Trucks, Stinger Guided Missile System, AN/TPQ-37 Artillery Locating Radar, Smoke Projectiles, M43E1 Chemical Agent Alarm, 81mm UK Mortar, NASA solar cells, and Demolition Kit. Feasibility studies and surveillance tests were also conducted. Procurements of instrumentation included: Portable Instrumentation Shelters, Rapid Collection and Analysis of Data hardware, Electro-Optical Data Acquisition System, Data Communications Equipment and Vehicle/Weapons Performance Evaluation Equipment.

Project: DE95 Title: USA Cold Regions Test Center
Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget #6 - Defensewide Mission Support

2. (U) FY 1982-FY 1984 Program: Testing of major items of materiel will continue to be conducted to determine effects of cold environment on the man/materiel interface. Some of the items and systems scheduled for testing are as follows: Norwegian Lightweight Decontamination System; XM19 biological agent alarm; new protective mask, XM30; 155mm improved smoke projectile, XM825; chemical protective gloves; Arctic Fuel Dispensing Equipment; Modular Pack Mine System; Silent Generating System; various items of military clothing; Antitank Guided Missile System Shelter; High Performance Aircraft Respirator System; and Manportable Smoke/Obscurant Generator. Instrumentation procurements will include items to establish a capability for testing new weapon systems and to provide for replacement of the obsolete or uneconomical-to-repair portion of the instrumentation inventory, such as the manual data collection system. Automated measurements of critical evaluation parameters will be emphasized. Prior year procurements will be completed, and additional items (e.g., electro-optical data acquisition system) will be procured.

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

4. (U) Major Milestones: Not applicable.

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	4961	5869	6255	6889	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	4961	5886	6380	Not Shown	Continuing	Not Applicable

FY 1982 and FY 1983 requirements decreased as a result of revised inflation pricing indices.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D127 Title: Meteorological Support to RDTE Activities
Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND 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. Services provided consist of: personnel, equipment, and supplies for data collection, analysis, and dissemination; weather forecasts, warnings, and advisory services; professional and technical meteorological consultation; post-test analysis assistance; and impact prediction at 12 permanent sites and numerous temporary test locations, as required, in and out of the continental United States (CONUS/OCONUS). Support provided is critical to adequate assessment of atmospheric effects on high-priority Army materiel systems (*e.g., high-energy laser, electro-optics, smart weapons*) as well as on-range/off-range rocket-firing impact predictions. Project also provides for procurement of modern and efficient equipment to replace 1950-vintage observation devices.

B. (U) RELATED ACTIVITIES: 6.11.02.A, Research in Atmospheric Sciences; 6.21.11.A, Atmospheric Investigations; 6.37.41.A, Meteorological Systems-Advanced Development; and 6.47.26.A, Meteorological Equipment Systems. The Army-operated White Sands Missile Range is part of the National Range System, which includes the Air Force-operated Eastern Test Range and the Navy-operated Pacific Missile Range. Meteorological support requirements are coordinated by the Inter-Range Instrumentation Group.

C. (U) WORK PERFORMED BY: Approximately 93% of the work is performed in-house by the Atmospheric Sciences Laboratory (ASL), US Army Electronics Research and Development Command, White Sands Missile Range (WSMR), NM. Approximately 70% of the work force consists of military personnel; however, current plans call for civilianization of the entire work force in the FY 1983-FY 1984 timeframe. There are six contracts: (1) New Mexico State University, Las Cruces, NM; (2) Dynalectron Corporation, WSMR, NM; (3) Geo Atmospheric Corporation, Lincoln, MA; (4) Lockheed, WSMR, NM; (5) Raytheon Corporation, Sudbury, MA; and (6) Battelle, Columbus Laboratory, Durham, NC.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Standard and mission-unique atmospheric measurements and meteorological services (advisory/consultation; data collection, reduction, analysis, and formatting; forecasts; and impact prediction) were provided to an average of 50 Army RDTE activities in support of 600 projects at 12 permanent and numerous temporary sites in CONUS and OCONUS, as required. Projects supported include high-energy laser, Multiple Launch Rocket System,

Project: #D127 Title: Meteorological Support to RDTE Activities
Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

ssault Breaker, Advanced Attack Helicopter, Copperhead, electro-optics, smoke aerosols and near millimeter wave with pecial support to Meppen 80 test, Meppen, Germany; Snow One, Camp Ethan Allan, VT; and Startle, Fort AP Hill, VA. lodernization program continued on schedule with emphasis on software development and complete modernization of all sites cheduled for FY 1983, with an associated reduction in required manpower. Prepared plan for civilianization of the work orce in FY 1983 and FY 1984. The plan addresses the release of 302 military spaces to the field Army and hiring 200 civilan personnel with an orderly mission posture phase-in, and includes costs for salaries, overtime, personnel relocation, and raining. The plan provides for cost effective maximum utilization/minimum redundancy of civilian/military personnel. ight of the twelve permanent sites will be civilianized in FY83 at a cost of about $5 million. Civilianization will be ompleted by the second quarter of FY84.

2. (U) FY 1982-FY 1984 Program: Continue to provide atmospheric/meteorological parametric measurements and advi- ory/consultation services in support of Army RDTE activities and the national range. High-priority programs supported ill include: high-energy laser, electro-optics, near millimeter wave (Startle), smoke aerosols and obscurants technology, ultiple Launch Rocket System, Stinger, Chapparal, Ground-Launched Cruise Missile, Pershing, remotely piloted vehicles, and recision-guided and conventional munitions. In FY 1982, draft job descriptions, training plans, and operating procedures or civilianization of the meteorological support teams will be prepared, and a cadre of key civilian personnel will be elected. The civilianization program will be completed by the second quarter of FY 1984, to include recruiting, hiring, nd training 200 civilian personnel and releasing 302 military spaces. Obsolete and inefficient equipment will be replaced y modern, automated equipment. Examples are: a laser doppler velocimeter and multitrack radiosonde system required for ealtime support to surface-launched missiles and high-energy lasers, and realtime collection, analysis, and dissemination ystems required for direct support of field test of high-priority field Army-related systems requiring precise atmospheric easurements.

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

4. (U) Major Milestones: Not applicable.

Project: #D127 Title: Meteorological Support to RDTE Activities
Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	5474	6676	10743	17385	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	5734	6691	8667	Not Shown	Continuing	Not Applicable

The decrease in FY 1981 funding is a result of reprograming to the Field Smoke Assessment effort in this same program element. The slight decrease in the FY 1982 funding estimate is a result of repricing of inflation indices. The FY 1983 funding increase is a result of a decision to civilianize much of the work force in FY 1983 at a cost of about $5 million, an increase of $2.1 million over the prior plan.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D618 Title: Aviation Development Test Activity
Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: This project provides for the fixed and recurring costs of the US Army Aviation Development Test Activity (AVNDTA) (formerly part of the Aviation Test Board), Ft Rucker, AL, a field element of the US Army Test and Evaluation Command (TECOM), during the conduct of development testing (DT) and production acceptance testing of Army aircraft. The project also provides for the improvement and modernization of test instrumentation. Fixed and recurring costs include an aircraft maintenance contract, salaries of civilian test personnel, host support, instrumentation and supplies. DT is conducted to demonstrate that design risks have been minimized, that the engineering development process is complete, and that the system will meet specifications. The technical performance, safety, reliability, and maintainability characteristics of the system are measured during DT. AVNDTA also gathers data to aid in determining component service life, repair parts consumption, and required inspection cycles, and in developing quick-change kits and modifications. Prior to FY 1976, Project D618 funded the six Army test boards which were then under TECOM. Five of the boards were transferred to the US Army Training and Doctrine Command (TRADOC), 1 July 1975, and were financed by project DV02, Test Boards. Effective 1 July 1976, the operational testing (OT) activities of the sixth board, the Aviation Test Board, were transferred to TRADOC, also under Project DV02. Most of the effort of the old Aviation Test Board consisted of DT activities. Responsibility for these activities was assigned to the new Aviation Development Test Activity, which remained under TECOM and continued to be financed by Project D618.

B. (U) RELATED ACTIVITIES: Close and continuous coordination exists with other test and evaluation activities, TRADOC, materiel developers, and the US Army Operational Test and Evaluation Agency (OTEA) to insure optimum effectiveness of DT/OT. The Office of the Secretary of Defense reviews the operation of all Department of Defense test facilities to avoid unnecessary duplication of effort among the Services.

C. (U) WORK PERFORMED BY: Testing is performed by in-house military and civilian personnel. A major portion of project funding is for aircraft (fixed and rotary) maintenance, which is performed on a contractual basis.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Equipment tested included Synthetic Flight Training System, AH-1S Improved Main Rotor Blade, Aviator's Night Vision Imaging System, YAH-64 Advanced Attack Helicopter, CH-47 Chinook, UH-60A Blackhawk, UH-1H Main Rotor Assembly and Gearbox, AN/ALQ-156 Missile Detector System, and AN/ALQ-144 Countermeasures Set. Instrumentation was modernized to enhance airborne data acquisition and analysis capabilities.

Project: #D618 Title: Aviation Development Test Activity
Program Element: #6.57.02.A Title: Support of Development Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

2. (U) FY 1982-1984 Program: Scheduled tests will include development and production acceptance testing of aircraft components and subsystems, such as: 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 Blackhawk, Aviation Ground Power Unit, Laser Warning Receiver, Infrared Suppressors, tail rotor hub and blade installation on the AH-1S, tail rotor shaft hanger bearings for the UH-1H, Special Electronic Mission Aircraft survivability systems, transportable helicopter enclosures, AH-64 simulator and automatic test equipment, CH-47C improved engine and improved OH-58C helicopter. Major instrumentation procurements include: space positioning equipment, mobile data reduction system, photo/video equipment, simulation equipment, and replacement of special-purpose equipment that has become obsolete and expensive to maintain. A substantial increase in improvement and modernization is programed in FY 1984 to procure instrumentation for testing turbo-shaft engines and other aircraft drive-train components in an Aircraft Component Test Facility.

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

4. (U) Major Milestones: Not applicable.

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	6380	7740	8352	10190	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	6909	7760	8388	Not Shown	Continuing	Not Applicable

FY 1981 funding was decreased as a result of reprograming to the Field Smoke Assessment effort in this same program element. The small reductions in the FY 1982 and FY 1983 funding estimates result from the application of revised inflation pricing indices.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.57.06.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	9874	12435	13166	14216	Continuing	Not Applicable
M541	Materiel Systems Analysis	9874	12435	13166	14216	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: US Army Materiel Systems Analysis Activity (AMSAA) executes this program to provide the central independent technical capability in US Army Materiel Development and Readiness Command (DARCOM) for the conduct of major materiel systems performance effectiveness analyses and cost effectiveness evaluations. AMSAA is the DARCOM lead activity for the Army Model Improvement Program and survivability of all Army materiel as well as the center for reliability, availability, and maintainability methodology, and it conducts analyses of these aspects of materiel systems. AMSAA maintains direct contact with Army materiel users in the field to ascertain requirements for improvements. AMSAA, the only analytic organization whose capability spans the entire range of Army systems, provides support to US Army Operational Test and Evaulation Agency, Headquarters, Department of the Army, and the Office of the Secretary of Defense.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Complete the analyses and evaluations started in prior years. Initiate new analyses and evaluations in support of taskings from DARCOM and other commands/activities noted in paragraph B. Emphasis will be on review of major systems alternatives and trade-offs that might be considered in order to reduce cost of procurement and systems operations and support.

Program Element: #6.57.06.A
DOD Mission Area: #430 - Non-System Training Devices

Title: Materiel Systems Analysis
Budget Activity: #6 - Defensewide Mission Support

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	9874	12435	13166	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	9889	14458	15143	Continuing	Not Applicable

The small decrease in FY 1981 funding reflects a reduction in the amount of travel. The decrease in the FY 1982 and FY 1983 estimates result from planned charges to customers for analytic services rendered.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.57.06.A
DOD Mission Area: #430 - Non-System Training Devices

Title: Materiel Systems Analysis
Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: US Army Materiel Systems Analysis Activity (AMSAA) is a subactivity of the US Army Materiel Development and Readiness Command (DARCOM). Its primary mission is to conduct independent systems analyses and effectiveness evaluations of major materiel systems under development. This encompasses assessing the performance, supportability, effectiveness, and military utility of existing, developmental, and proposed systems to provide a basis for major decisions concerning their design, development, acquisition, employment, and deployment. AMSAA provides estimates of Army materiel performance for the total spectrum of combat environments to Army agencies as a basis for cost and operational effectiveness analyses, force development studies, and analyses of military materiel requirements. The Advanced Attack Helicopter, M1 Abrams Tank, PATRIOT surface-to-air missile system, Division Air Defense Gun System, Family of Scatterable Mines (FASCAM), Position Navigation Systems Integration, Battery Computer System, and BLACKHAWK Utility Tactical Transport Aircraft are examples of specific projects worked on by AMSAA. AMSAA serves as the DARCOM center for reliability, availability, and maintainability (RAM) methodology development and conducts analyses of the RAM aspects of materiel systems. AMSAA serves as the DARCOM lead activity for the enhancement of materiel survivability and battlefield integration analyses of materiel systems. AMSAA also maintains direct contact with Army materiel users in the field to determine requirements for materiel improvements, to evaluate these requirements, and to seek timely solutions through application of current and emerging technology. AMSAA is located at Aberdeen Proving Ground, MD.

G. (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 for the Steering Committee in coordination with HQ, DARCOM and the military services. 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 6.58.05.A, DOD Munitions Effectiveness and Explosive Safety Standards, Project D620, DOD Munitions Effectiveness. AMSAA also 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 system. AMSAA is currently tasked with approximately 70 such systems. Test design and evaluation is financed by project D026, Test Design and Evaluation, Program Element 6.57.02.A, Support of Development Testing.

H. (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.

Program Element: #6.57.06.A
DOD Mission Area: #430 - Non-System Training Devices

Title: Materiel Systems Analysis
Budget Activity: #6 - Defensewide Mission Support

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Developed weapon systems performance data base for Army and threat air defense, armor-antiarmor weapons, artillery weapons, small arms, helicopters, and mine systems in support of the Army Model Improvement Program to provide a consistent basis for major analyses by the US Army Training and Doctrine Command (TRADOC) and other DA agencies. Performed effectiveness and survivability analyses of Advanced Attack Helicopter (AAH) weaponization and analyzed various sensor candidates for the near-term Scout Helicopter to determine optimum sensor package, survivability and target acquisition effectiveness. Based on new methodology developed by AMSAA, evaluated the operational performance of the HELLFIRE antitank missile in the battlefield environment in support of Army cost and operational effectiveness analyses. Evaluated the effectiveness of the Division Air Defense Gun in engaging threat helicopters in the heavy clutter environment typical of threat helicopters employing antitank guided missiles. Performed studies of biological warfare defensive posture to determine deficient areas and recommend approaches to improve biological defense capabilities. Initiated study of logistical support posture for chemical defense and planned to recommend improvements to chemical defense support (this study will continue into FY 1982). Initiated infantry antiarmor studies to define future weapon system requirements (will continue into FY 1982). Evaluate lethality and survivability of armored combat vehicle technology alternatives. Assessed concepts for enhanced artillery firepower to include enhanced self propelled artillery, Multiple Launch Rocket System, and Artillery Antiradiation Projectile. Assessed US/Korean minefield and barrier effectiveness. Completed joint analysis of US/German Mine Study. Development of reliability assessment methodology continued. Continued support of Army special studies and international panels relative to weapon effectiveness and requirements for interoperability. Participated in the development of the Army Model Improvement Program to develop a hierarchy of standard models for Army analyses. Other technical accomplishments included tests and evaluations of the Battery Computer System, Software Reliability Model, Division Support Weapon Systems, Lethal Attack of Emitters, Patriot, Roland, Stinger/Stinger Post, New Equipment Revolution, Battlefield Auto Systems Test Facility, Position Navigation Systems Integration, Firefinder Transporter Mobility, Commercial Utility Cargo Vehicle, XM795 improved artillery projectile, Remote Antiarmor Mine System, Area Denial Artillery Munition, Combat Vehicle Crewman Uniform (facemask), Improved Light Antitank Assault Weapon (VIPER), Black Hawk helicopter, Light Weight Company Mortar System, Modular Universal Laser Equipment, Cavalry Fighting Vehicle/Infantry Fighting Vehicle, and Squad Automatic Weapon.

2. (U) FY 1982-FY 1984 Planned Program: Continued analyses and evaluation will be required for the general families of weapon systems such as helicopters, air defense, small arms, tank-antitank weapons, artillery, missiles, and communications. Many of these will be carried over from the previous fiscal year in support of the Army Model Improvement Program

Program Element: #6.57.06.A
DOD Mission Area: #430 - Non-System Training Devices

Title: Materiel Systems Analysis
Budget Activity: #6 - Defensewide Mission Support

data base development and due to the continuing nature of many weapon system developments. A major effort in this timeframe will include analyses associated with the integration of battlefield sensors such as the Battlefield Data System, Remotely Monitored Battlefield Sensor System, and Remotely Piloted Vehicles to assess battlefield intelligence capabilities. Continue to define logistical support requirements for chemical defense. Conduct studies to define nuclear defense posture of the Army and recommend approaches to improve deficient areas. Study biological defense posture. Perform evaluation of Division Air Defense Gun survivability against antiarmor missiles and antiradiation missile attack. Evaluate concepts for command and control of forward area air defenses. Evaluate command and control concepts for employment of Advanced Attack Helicopter and Scout Helicopter to include interface with advanced target acquisition systems. Continue the assessment of enhanced artillery concepts to include Division Support Weapon Systems, Antiradiation Projectile, and the Corps Support Weapon System. Perform studies of light infantry antiarmor concepts with emphasis on the tank breaker concept and others evolving from close combat mission area analysis. More definitive effectiveness analysis of armored combat vehicle technology candidates will be undertaken. Analyses of both low-energy and high-energy lasers as potential ground combat systems will be conducted. Result of these analyses will be provided to US Army Training and Doctrine Command for their Forward Area Directed Energy Weapons System Study. Target acquisition concepts for improved artillery systems and munitions will be explored. Improved methodologies for assessing Army weapons system in the battlefield environment will continue. Development of methodologies to predict reliability of developmental systems will continue. An analysis will be performed to project soviet capabilities through the 1990's. Tests and evaluation will be performed on Stinger (Post), Tank Breaker, Remotely Monitored Battlefield Sensor System, Multiple Launch Rocket System. Tests and evaluations will be performed on the Fire Support Team Vehicle, M1E1 model of the ABRAMS Tank, Modular Pack Mine System, Field Artillery Delivery Anti Radiation Missile, Remotely Piloted Vehicle, and the XM 785 nuclear projectile. Other areas of analyses will include avionics systems, performance evaluations associated with reliability as a function of charge fired guided projectile systems, the evaluation and tracking of reliability growth, directed energy systems, breaker ignition evaluation, and evaluation of aircraft systems, and air defense weapons.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.57.09.A
Title: Exploitation of Foreign Items
DOD Mission Area: #460 - International Cooperative RDTE
Budget Activity: #6 - Defensewide Mission Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1480	1953	2021	2737	Continuing	Not Applicable
D650	Exploitation of Foreign Items	1480	1953	2021	2737	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 the Army Research and Development community. 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. BASIS FOR FY 1983 RDTE REQUEST : FY 1983 funds will support new start candidates and US K&D tasks. New start candidates include

Supported US R&D

Tasks: Fixed Installation Filters, Chemical Protection Technology, Concepts for NBC Sampling, Detecting, and Marking During Reconnaissance Missions and Detection and Identification Technology.

Program Element: 6.57.09.A Title: Exploitation of Foreign Items
DOD Mission Area: #460 - International Cooperative RDTE Budget Activity: #6 - Defensewide Mission Support

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1480	1953	2021	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	1527	1957	2095	Continuing	Not Applicable

Program funding reductions in FY82 and FY83 reflect internal Army adjustments based on overall budget affordability.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: 6.57.09.A Title: Exploitation of Foreign Items
DOD Mission Area: #460 - International Cooperative RDTE Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: 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 objective is 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 Proposals (VEP), Product Improvement Programs (PIP), and incorporation into US engineering designs. Resultant reports are distributed to interested DOD agencies.

G. (U) RELATED ACTIVITIES: Exploitation/evaluation is coordiated with Defense Intelligence Agency, all Services, and other interested agencies. Program Element 6.51.11.D, Foreign Weapons Evaluation, insures that foreign military materiel which appears to satisfy US Army needs, is adequately evaluated as a viable acquisition alternative to a US development program and to enhance North Atlantic Treaty Organization (NATO) standardization through the acquisition of NATO common materiel. Program Element 3.13.07.A, Scientific/Technology Intelligence, is used for acquisition of threat items for evaluation exploitation in support of intelligence activities and long-range threat analyses.

H. (U) WORK PERFORMED BY: The commodity command or separate laboratory within the US Army Materiel Development and Readiness Command having developmental responsibility for counterpart US materiel. 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. The US Army Foreign Science and Technology Center, Charlottesville, VA, has overall management responsibility for Project D650, Exploitation of Foreign Items.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1981 and Prior Accomplishments: In FY75 exploitation included the
FY76 initiated exploitation of the

In FY77

Recent examples of technology gains and cost avoidance are: (1)
which advanced US entry in the thin-film technology area by 2-5 years, avoided expenditure of $500K in US R&D

funds and incorporated this technology in 7 US R&D projects. (2) demonstrated the value of incorporation of Central Tire Inflation System (CTIS) and manual locking differentials in US designs and the evaluation of NBC protection system avoided hundreds of man-years in false starts. Supported 4 US R&D Projects. (3) resulted in a Value Engineering Proposal (VEP) to adapt features to US projects and provide BLACKHAWK, CHINOOK, and CRANE with a previously nonexistent aerial recovery capability, allowed initial procurement savings of $278,000, a weight savings of 370 pounds per system, and eliminated various design and safety shortcomings, (4) The saddle lug technology, as demonstrated by the was chosen as the design concept for future attack helicopter weapons racks. (5) This round demonstrated a lethality 1.5 to 2 times the lethality of the US round. (6) Evaluation of this lightweight decontamination unit defined the critical parameters of temperature, pressure, and discharge velocity for effective removal of Chemical/Biological (CB) surface contaminants within the practical field constraints of water supply. The design features of this system have potential for such field uses as personnel bathing, equipment cleaning, aircraft de-icing and support of field hospitals, messes, and maintenance elements. (7) US inventory has no comparable item. Evaluation results generated a user requirement. Item will be reverse-engineered for adoption of features (almost exact copy) to US needs. Cost avoidance for the is 1.5 man-years and $1 million.

2. FY 1982-FY 1984 Planned Program: New candidates include

Foreign Ammunition (World), Armor and Antiarmor Materials (World),

Battledress

(World), CB Overgarments (World), Night Vision Devices (World),

Exploitation of

will continue. Anticipate completion of the following projects during FY82:

Reports of technology gains and cost avoidance estimates will be furnished as received. Testing and evaluation of foreign materiel will continue. The FY 1984 program will be flexible so that, as foreign materiel becomes available, it will be exploited, tested, and evaluated in a timely manner. The program offers a high payoff for the resources invested.

Program Element: 6.57.09.A
Title: Exploitation of Foreign Items
DOD Mission Area: #460 - International Cooperative RDTE
Budget Activity: #6 - Defensewide Mission Support

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.57.12.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	36119	42584	50106	60283	Continuing	Not Applicable
DN01	US Army Operational Test and Evaluation Agency (OTEA) Support Equipment	0	0	326	2501	Continuing	Not Applicable
DV02	Test Boards	14159	16098	17682	20604	Continuing	Not Applicable
DV03	US Army Training and Doctrine Command (TRADOC) Initial Operational Test and Evaluation (IOTE)	4890	5421	6340	7027	Continuing	Not Applicable
D001	US Army OTEA IOTE	9986	11651	13442	15068	Continuing	Not Applicable
D918	Communications-Electronics User Testing	100	368	441	487	Continuing	Not Applicable
D976	Development and Acquisition of Threat Simulators	0	0	1462	3844	Continuing	Not Applicable
D985	Concepts Evaluation of Materiel	1550	1954	2417	3237	Continuing	Not Applicable
D986	TRADOC Support Equipment	5319	7092	6716	7028	Continuing	Not Applicable
D992	National Training Center Support	115	0	1280	487	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The objective of this program is to conduct the operational testing of Army systems under development so as to support decisionmaking related to materiel acquisition programs. The program consists of nine projects that provide for the recurring costs of operating the TRADOC Test Boards; for the direct costs of

Program Element: #6.57.12.A Title: Support of Operational Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

operational tests of developmental materiel prior to production; for an economical test vehicle via 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 the tests scheduled for that year. The funds for these projects are not proportional to the number of tests as 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 that provide an effective test capability).

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Requested funds provide for operational testing on developmental systems, for operation and maintenance of the Test Boards, and for the development of instrumentation, targets, and simulators to enable timely efficient and effective testing.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	36119	42584	50106	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	38512	43691	52921	Continuing	Not Applicable

FY 1981 funding decreased due to: the application of general FY 1981 Congressional reductions, actual testing falling short of amount planned, inflation repricing, and reduction in travel. The FY 1982 and FY 1983 estimates decreased due to: refinement of estimated test costs, inflation repricing and reduction in planned travel. Decreases in the FY 1983 estimates were partially offset by the October 1981 civilian pay raise.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.57.12.A Title: Support of Operational Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Project DN01, US Army Operational Test and Evaluation Agency (OTEA) Support Equipment, provides for the development of instrumentation and targets used to support operational testing of major systems such as tanks and missile systems. Emphasis is placed on more efficient collection of data on the more sophisticated systems under development with particular attention to overcoming recognized inadequacies in the existing instrumentation inventory. Objectives include reduced cost, enhanced realism, and improved test effectiveness. To the greatest extent possible, these objectives have been met by exploiting the results of project D986, US Army Training and Doctrine Command (TRADOC) Support Equipment, so that no funds were required for project DN01 from FY 1977 through FY 1982. Funds will be required in FY 1983 for the improved remote controlled ground target vehicle and the realistic obscured battlefield instrumentation programs. Project DV02, Test Boards, provides for the fixed and recurring costs of the TRADOC Test Boards which conduct operational testing (OT) and force development testing and experimentation (FDTE) in support of TRADOC, OTEA, and other agencies, to include Office of the Secretary of Defense (OSD)-sponsored joint tests. The direct costs of FDTE are funded under the Operations and Maintenance, Army Appropriation. Organization of the boards under TRADOC was begun in FY 1976 and was completed in FY 1979, with FY 1980 being the first year of operation with fully staffed test boards. Project DV03, TRADOC Initial Operational Test and Evaluation (IOTE), provides for the direct costs of operational test of non-major developmental materiel systems, prior to production. Project D918, Communications-Electronics User Testing, provides for the direct costs of US Army Communications Command equipment. Such testing is conducted primarily on-site. Project D976 Development/Acquisition of Threat Simulators is funded as part of D986 through FY 1982. It funds for foreign threat simulators to provide a realistic threat environment for testing and training. Project D985, Concepts Evaluation of Materiel provides 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 has proven far more cost effective than resolving such issues later in the materiel development cycle. Project D986, TRADOC Support Equipment, provides for the development of instrumentation in support of user testing by TRADOC. This project also provides, through FY 1982, for targets used to establish a realistic environment for user testing. User testing is conducted primarily at the Test Boards, TRADOC Combined Arms Test Activity(TCATA), and the Combat Developments Experimentation Command (CDEC). Project D992 provides for development of an instrumentation system for the National Training Center, 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."

G. (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

Program Element: #6.57.12.A Title: Support of Operational Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

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). Operational tests of the acceptability of nonmajor developmental materiel items were conducted by US Army Training and Doctrine Command (TRADOC) under Program Element (PE) 6.57.07.A, TRADOC Operational Testing, in FY 1980 and prior years. All projects in PE 6.57.07.A were transferred into PE 6.57.12.A, starting in FY 1981, to consolidate all RDTE, Army-funded operational testing activities into one PE. Operational testing activities formerly conducted by the US Army Security Agency, using part of the funding in PE 6.57.01.A, Communications-Electronics Testing Activities, were transferred into PE 6.57.12.A, starting in FY 1979 (under projects DV02 and DV03).

H. (U) WORK PERFORMED BY: IOTE is primarily conducted at Army troop installations 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 military and civilian personnel.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: A major effort was begun in FY 1973 to upgrade user test instrumentation including central test data processing, automatic data collection, (moving) target location and weapons engagement scoring. Development was also begun on targets for a live firing range and on a family of threat weapon simulators. The mission of the Test Boards was revised, and the Boards were transferred from US Army Test and Evaluation Command (TECOM) to TRADOC

Program Element: #6.57.12.A Title: Support of Operational Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

starting in FY 1976 in order to provide the operational tester with unqualified independence of the developing agency. Since FY 1977, instrumentation has been developed under project D986, Support Equipment, for the Test Boards with the aim of rebuilding and reorienting their instrumentation toward efficient and effective conduct of operational testing of developmental systems. RDTE funding was initiated in FY 1976 for conduct of IOTE by US Army Operational Test and Evaluation Agency (OTEA) and in FY 1977 for conduct of Initial Operational Test and Evaluation (IOTE) by the US Army Training and Doctrine Command (TRADOC). Examples of tests and evaluations conducted during FY 1981 and earlier include: parachute inflation assistance device, high-frequency experimentation radio, FM communications radio, closed-cycle cooler for Thermal Night Sight, DRAGON tripod, integrated night vision goggles, recovery vehicle, joint service intrusion detection system, M1 turret organizational maintenance trainer, heliborne fire-and-forget missile system, PATRIOT air defense guided missile system, Squad Automatic Weapons system and automatic communications central office. Development of a Mobile Automated Field Instrumentation System (MAFIS) was initiated in FY 1979 under Project D986. This system will provide TRADOC with the capability to conduct fully instrumented tests at remote sites where troops and suitable terrain are available, thus reducing the impact of testing on readiness, reducing transportation and travel costs, and increasing realism. MAFIS will provide for realtime casualty assessment during force-on-force engagements involving ground-to-ground, ground-to-air, air-to-ground, and air-to-air scenarios. Under Project D992, a Phase I instrumentation system was developed for the National Training Center (NTC). This system is compatible with the Multiple Integrated Laser Engagement System and other training systems. It provides a capability for data collection down to individual fighting vehicles and key weapon systems with the information transmitted to a central computer for processing and analysis. During FY 1981, Project D992 completed a study to determine how to integrate the results of the National Training Center Live Fire Exercise into the Phase I instrumentation system.

2. (U) FY 1982-FY 1984 Planned Program: OTEA and TRADOC will conduct operational tests in FY 1982 that include: Multiple Launch Rocket Sytem, high mobility multipurpose wheeled vehicle, improved 81mm mortar system, defense satellite communications system, AN/AVR-2 laser detection system, high-altitude airdrop resupply system, off-route antitank mine system, and portable UHF-AM transceiver (AN/PRC-113). Concepts evaluations will include: tactics and techniques for combat service support equipment in the area of light antitank assualt weapons, trainer for antiarmor gunner, and teaching systems. Instrumentation, targets, and simulators essential to effective operational testing of systems in a realistic environment, to include threat, will be developed. MAFIS will absorb approximately 75% of Project D986 funding in FY 1982, 95% in FY 1983, and 70% in FY 1984, the objective being to provide an operational MAFIS in FY 1985 that will accommodate 200 players and have an add-on capability. Scheduled FY 1983 and FY 1984 tests include: TRI-TAC family of joint tactical communications equipment, Pershing II, fire support team vehicle systems, Army training battlefield simulation system, eye-safe

Program Element: #6.57.12.A Title: Support of Operational Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

simulated laser rangefinger, aviation ground power unit, meteorological data system (MDS) (AN/TMQ-3), heavy-barrel machine gun for rear area combat operations, Black Hawk helicopter flight and weapons simulator, Single Channel Ground and Airborne Radio System, and Army Helicopter Improvement Program. Project DN01 will provide for development of improved remote-controlled ground target vehicles, realistic obscured battlefield instrumentation, a scoring system for electro-optical equipment (e.g., laser target designators), and a data collection system for computer-based systems. Project D992 will evaluate the potential of MAFIS and the Global Positioning System for integration into the National Training Center (NTC) Phase II instrumentation. Indirect fire simulation and scoring systems will be tested for compatibility with the NTC instrumentation system. After these evaluations and necessary development are completed, NTC will have a fully integrated system that provides position location, laser engagement and realtime feedback for individual soldiers, land vehicles, and aircraft in a dirty battlefield environment.

3. (U) Program to Completion: This is a continuing program. A second phase of MAFIS development will be accomplished aimed at providing enhanced capabilities in FY 1989. This will exploit advanced technology such as millimeter wave radiation to penetrate smoke, fog, haze, rain, and other obscurants on the dirty battlefield. Research will be conducted in techniques for measuring miss distances to more accurately evaluate damage probabilities. More accurate position location and altitude measuring systems will be developed. Expanded memory techniques will be developed for distributed storage at player positions where telemetry data cannot be transmitted to a central data processing position.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #DV02 Title: Test Boards
Program Element: #6.57.12.A Title: Support of Operational Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: Prior to FY 1976 the fixed and recurring costs incurred by six test activities of the US Army Test and Evaluation Command (TECOM) were financed by project D618, now Aviation Development Test Activity (formerly titled Test Boards), under Program Element (PE) 6.57.02.A, Support of Development Testing. These six development test activities, or test boards, performed engineering and service tests of developmental Army materiel prior to commitment to production with emphasis on service tests (i.e., on the soldier-materiel interface). Increased emphasis on independent operational testing led to a decision by the Army to transfer the boards to the US Army Training and Doctrine Command (TRADOC). The transfer was intended to provide the test agency with unqualified independence from the Army materiel developing agency. The transfer also provided clearer separation of development testing and operational testing. The term "operational testing" is used to distinguish those tests of materiel conducted under conditions as close as possible to those encountered in actual field use with troops representative of those trained to employ the materiel. The term "development testing" is used to distinguish tests of the acceptability of developmental materiel other than operational tests, prior to commitment to production. Development tests support decisionmaking by demonstrating that design risks have been minimized, that the system will meet its specifications, and that the engineering development process is complete. Starting in FY 1976, the operational tests of developmental materiel by five TRADOC test boards were financed by this project, DV02. The five boards were: Air Defense Board, Ft. Bliss, TX; Armor and Engineer Board, Ft. Knox, KY; Airborne - Communications - Electronics Board, Ft. Bragg, NC; Field Artillery Board, Ft. Sill, OK; and Infantry Board, Ft. Benning, GA. In FY 1977, a sixth board, the Aviation Board, Ft. Rucker, AL, was formed by TRADOC to conduct operational tests of aviation systems (formerly conducted by TECOM). In FY 1978, a seventh testing element was added, the Intelligence and Security Board, Ft. Huachuca, AZ, to perform operational testing of signal intelligence and electronic warfare equipment, formerly performed by the US Army Security Agency Test and Evaluation Center. In FY 1978 and prior years, this type of testing was supported under PE 6.57.01.A, Communications-Electronics Testing Activities. An eighth test board, the Communications - Electronics Board was activated October 1978 at Ft. Gordon, GA, with the nucleus obtained from reorganization of the Airborne-Communications-Electronics Board, which was redesignated as the Airborne Board. Each board relies upon local troop support personnel during the conduct of tests. The collocated center and school is the principal source of this troop support. Approximately 80% of the test boards' workload is devoted to research and development (R&D)-type test and evaluation activities; 60% of this R&D Test and Evaluation activity is Initial Operational Test and Evaluation and the other 40% is support of R&D customers and concepts evaluations. The remaining 20% of the boards' workload is devoted primarily to Force

Project: #DV02 Title: Test Boards
Program Element: #6.57.12.A Title: Support of Operational Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

Development Testing and Experimentation (FDTE); a small fraction is devoted to support of other non-R&D customers, such as Follow-On Evaluations.

B. (U) RELATED ACTIVITIES: Close and continuous coordination exists between the test boards, TRADOC agencies responsible for use of materiel items, TECOM, materiel developing agencies, and the US Army Operational Test and Evaluation Agency (OTEA) to insure optimum effectiveness of Army testing activities. High-level centralized management of resources for user testing is provided by the Test Schedule and Review Committee, whose principal product is the Army Five-Year Test Program, the Army's plan for operational testing of all materiel items and for testing in support of force development for the following five years. OTEA supervises execution of the Five-Year Test Program, which includes most of the test boards' programs. The Director of Defense Test and Evaluation reviews management, operation, and maintenance of all Department of Defense test facilities and planned testing to avoid unnecessary duplication of efforts/facilities, to insure that highest priority capabilities are established expeditiously and suitably maintained, and to insure integration of testing by the Services. In addition to operational testing activities, the test boards also conduct force development testing and experimentation (FDTE) funded by the Operations and Maintenance, Army appropriation and conduct other tests in support of elements of the US Army Training and Doctrine Command (TRADOC) and other Army commands that are financed by the customer. FDTE is conducted to permit evaluation of new concepts of tactics, doctrine, organization, and training. Two other activities also support user testing, the TRADOC Combined Army Test Activity (TCATA) and the Combat Developments Experimentation Command (CDEC). Operational tests of the acceptability of major developmental materiel systems are conducted by the US Army Operational Test and Evaluation Agency (OTEA) under project D001, OTEA IOTE, in this same program element (PE). In those instances when the test boards support OTEA operational tests, costs directly attributable to conduct of the tests are reimbursed by OTEA. Similarly, the direct costs of tests in support of TRADOC operational tests are reimbursed from project DV03, Initial Operational Test and Evaluation, also in this PE.

C. (U) WORK PERFORMED BY: The salaries of civilian personnel assigned to the test boards are paid primarily from this project. A portion of project funds are spent for numerous small contracts for services such as machine rentals and maintenance, and for equipment and supplies attributable to support of operational tests of developmental materiel, but not identifiable with an individual test.

Project: #DV02 Title: Test Boards
Program Element: #6.57.12.A Title: Support of Operational Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Organization of the Test Boards under TRADOC was initiated in FY 1976 and completed in FY 1979. The eight boards conducted most operational test and evaluations described under project DV03, Initial Operational Test and Evaluation (IOTE). The boards also conducted tests of US Army Communications Command equipment, concept evaluations of materiel, force development testing and experimentation (FDTE) funded by the Operations and Maintenance, Army appropriation, and other tests financed by customers. Additional details are provided above under "Detailed Background and Description."

2. (U) FY 1982-FY 1984 Program: This project continues to provide for the fixed and recurring costs of the eight test boards. The boards continue to conduct operational testing (OT) and force development testing and experimentation (FDTE) in support of the US Army Training and Doctrine Command (TRADOC), US Army Operational Test and Evaluation Agency (OTEA), and other agencies, to include Office of the Secretary of Defense (OSD)-sponsored joint tests.

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

4. (U) Major Milestones: Not Applicable.

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	14159	16098	17682	20604	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	14178	16128	17447	Not Shown	Continuing	Not Applicable

(U) The FY 1983 estimate has increased as a result of the October 1981 civilian pay raise, partially offset by decreases resulting from inflation repricing and planned travel reductions. The slight FY 1982 reduction is due to inflation repricing. The FY 1981 decrease is due to lower than anticipated program execution costs.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #DV03 Title: US Army Training and Doctrine Command (TRADOC) Initial Operational Test and Evaluation (IOTE)

Program Element: #6.57.12.A Title: Support of Operational Testing

DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: The objective of this project is to provide for the direct costs of conducting operational testing of Army nonmajor materiel systems. All TRADOC operational tests are programed through the Test Schedule and Review Committee (TSARC), whose principal function is to schedule and manage the Army Five-Year Test Program. The TSARC meets semiannually to update user testing for the Army. TRADOC test organizations conduct programed tests which address specific materiel system acquisition programs, assessing military utility, operational effectiveness, and suitability, including compatibility, interoperability, reliability, maintainability, and logistic and training requirements. 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. Test organizations rely on the US Army Forces Command (FORSCOM) to provide representative user troops for the conduct of these tests. Each test organization has a distinct area of expertise as indicated by its name. The following test organizations conduct nearly all TRADOC operational tests:

US Army Airborne Board, Ft Bragg, NC
US Army Air Defense Board, Ft Bliss, TX
US Army Armor and Engineer Board, Ft Knox, KY
US Army Field Artillery Board, Ft Sill, OK
US Army Communications-Electronics Board, Ft Gordon, GA
US Army Infantry Board, Ft Benning, GA
US Army Aviation Board, Ft Rucker, AL
US Army Intelligence and Security Board, Ft Huachuca, AZ
US Army TRADOC Combined Arms Test Activity, Ft Hood, TX

B. (U) RELATED ACTIVITIES: Close and continuous coordination exists between the various TRADOC proponents and test organizations, the US Army Test and Evaluation Command (TECOM) development test activities, materiel developing agencies, and the US Army Operational Test and Evaluation Agency (OTEA) to ensure greatest possible effectiveness of Army testing activities and to avoid duplicative instrumentation development efforts. The Director of Defense Test and Evaluation reviews planned testing to ensure integration of testing by the Services. OTEA supervises the Army's Five-Year Test Program, which includes Initial Operational Test and Evaluation (IOTE), Follow-On Evaluation, and Force Development Testing and Experimentation (FDTE) programs. IOTE of major developmental materiel items are conducted by OTEA with funding provided under project D001, OTEA IOTE. The fixed and recurring costs incurred in connection with IOTE by the test boards are financed by project DV02, Test Boards. Both D001 and DV02 are in this same Program Element, PE 6.57.12.A.

Project: #DV03 Title: US Army Training and Doctrine Command (TRADOC) Initial Operational Test and Evaluation (IOTE)

Program Element: #6.57.12.A Title: Support of Operational Testing

DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

C. (U) WORK PERFORMED BY: Work is performed by in-house personnel (civilian and military) assigned to the US Army Training and Doctrine Command (TRADOC) to the various Army installations where tests are conducted. By definition, operational tests use regular Army troops as players. No contractor personnel or development command technicians are used.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY1981 and Prior Accomplishments: Examples of items tested are: Ground-Emplaced Mine Scattering System, Lightweight Doppler Navigation Subsystem, AN/TSQ-109 Automated Ground Transportable Emitter Location Identification System, Combat Vehicle Technology Program, AH-1S Fire Control Subsystem, Mortar Fire Control Calculator, Telephone Signaling Interface Unit, Combat Vehicle Heading Reference System, Combat Vehicle Crewman's Clothing Countermeasures System, Special Purpose AN/ARQ-33 Quick Fix without direction finding, Joint Services Intrusion Detection System, Container Lift Adapter for helicopters, M1 Turret Organizational Maintenance trainer.

2. (U) FY 1982-FY 1984 Program: Examples of tests scheduled include: AN/TSQ-114 TRAILBLAZER, Megabit Digital Troposcatter Subsystem, AN/AVR-2 Laser Detection System, High-Altitude Airdrop Resupply System, Off-Route Antitank Mine System, Army Training Battlefield Simulation System, Eye-Safe Simulated Laser Rangefinder, Aviation Ground Power Unit, Meteorological Data System (MDS) AN/TMQ-31, Tank Weapons Gunnery Simulation System, Facility Intrusion Detection System, Heavy Barrel Machine Gun for Rear Area Combat Operations, AH-64 Flight and Weapons Simulator, Armor Remoted Target System, Personal Equipment Decontamination System, and Close Air Support Electronic Countermeasures.

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

4. (U) Major Milestones: Not Applicable.

Project: #DV03 Title: US Army Training and Doctrine Command (TRADOC) Initial Operational Test and Evaluation (IOTE)

Program Element: #6.57.12.A Title: Support of Operational Testing

DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	4890	5421	6340	7027	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	4982	5437	7011	Not Shown	Continuing	Not Applicable

FY 1981 funding and the FY 1982 and FY 1983 estimates have been decreased as a result of inflation repricing and reductions in planned travel.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: D001 Title: US Army Operational Test and Evaluation Agency (OTEA) Initial Operational Test and Evaluation (IOTE)

Program Element: #6.57.12.A Title: Support of Operational Testing

DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: Provides for the conduct of 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 troops representative of those trained to employ the materiel, 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 military utility, 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. Prior to FY 1976, IOTE was funded by the Operations and Maintenance, Army (OMA) appropriation, Program 2 (208015). Funds were transferred from OMA to this program in accordance with Congressional and OSD decisions to fund IOTE from the RDTE appropriation.

B. (U) RELATED ACTIVITIES: Close and continuous coordination exists between OTEA and development test activities, materiel developing agencies, and US Army Training and Doctrine Command (TRADOC) agencies to ensure greatest possible effectiveness of Army testing activities and avoid duplication. The Office of the Under Secretary of Defense for Research and Engineering reviews planned testing and development of support equipment to ensure integration of testing by the Services and to avoid duplication. Full-time liaison personnel are assigned by each of the Services to appropriate test activity headquarters of the other Services. OTEA manages the execution of the Army's Five-Year Test Program which includes IOTE and Force Development Testing and Experimentation (FDTE) programs. IOTE of most nonmajor developmental materiel items are conducted by TRADOC with funding provided under project DV03, TRADOC IOTE. The fixed and recurring costs incurred in connection with IOTE by the TRADOC Test Boards are financed by project DV02, Test Boards. Both DV01 and DV03 are in this same Program Element 6.57.12.A. When the test boards or other test agencies support OTEA in the conduct of IOTE, direct test costs are reimbursed by OTEA with project D001 funds.

C. (U) WORK PERFORMED BY: The work is performed by in-house personnel (civilian and military) assigned to OTEA and by personnel (civilian and military) assigned to the various Army installations where tests are conducted. By definition, operational tests use regular Army troops as players and not contractor personnel or development technicians.

Project: D001 Title: US Army Operational Test and Evaluation Agency (OTEA) Initial Operational Test and Evaluation (IOTE)

Program Element: #6.57.12.A Title: Support of Operational Testing
DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defenswide Mission Support

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Operational tests have been conducted on such systems as the new Army Abrams tank, lightweight artillery and company mortar systems, BLACK HAWK utility tactical transport aircraft system, advanced attack helicopter, artillery and mortar locating radars, air defense command and control system, heliborne fire-and-forget missile system, improved TOW vehicle, family of military engineer construction equipment, vehicle rapid fire weapon system, infrared Maverick (AGM)-(5D), infantry fighting vehicle system, squad automatic weapon system, Patriot air defense guided missile system, automatic communications central office and message switch, improved armored personnel carrier, and all-weather missile system. RDTE funding for this purpose (i.e., the conduct of IOTE) was initiated in FY 1976. The 19 tests performed in FY 1975 *and* prior years were funded by the Operations and Maintenance, Army appropriation in accordance with Department of Defense funding practice at that time.

2. (U) FY 1982-FY 1984 Program: OTEA will direct and participate in operational tests on such systems as: Stinger manportable air defense system, defense satellite communications system, division air defense gun system, Single Channel Ground and Airborne Radio System, Multiple Launch Rocket System, and high mobility multipurpose wheeled vehicle, TRI-TAC family of joint tactical communications equipment, Pershing II, Patriot air defense missile system, and Army helicopter improvement program.

3. (U) Program to Completion: Not applicable. This is a continuing program.

4. (U) Major Milestones: Not applicable.

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	9986	11651	13442	15068	Continuing	Not Applicable

Project: D001

Title: US Army Operational Test and Evaluation Agency (OTEA) Initial Operational Test and Evaluation (IOTE)

Program Element: #6.57.12.A

Title: Support of Operational Testing

DOD Mission Area: #454 - Other Test and Evaluation Support

Budget Activity: #6 - Defensewide Mission Support

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Funds (as shown in FY 1982 submission)	10819	12686	15821	Not Shown	Continuing	Not Applicable

FY 1981 funding decreased because planned testing was deferred due to slippages in development programs. Examples of scheduled tests that were not conducted are operational tests of STINGER Manportable Air Defense Weapons Systems, Division Air Defense Gun, and Defense Satellite Communications System, all of which have been rescheduled for FY 1982. The FY 1982 estimate decreased as a result of refinement of estimated test costs, inflation repricing, and planned travel reductions. The FY 1983 estimate decreased primarily as a result of refinement of estimated costs.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #p986 Title: US Army Training and Doctrine Command (TRADOC) Support Equipment

Program Element: #6.57.12.A Title: Support of Operational Testing

DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: A major effort was begun in FY 1973 to upgrade instrumentation at the Combat Developments Experimentation Command (CDEC) and US Army Training and Doctrine Command (TRADOC) Combined Arms Test Activity (TCATA) (formerly Modern Army Selected Systems Test, Evaluation and Review (MASSTER)). Main emphasis was on development of integrated field instrumentation including central test data processing, automatic data collection, (moving) target position location, and weapons engagement scoring. Development was also begun on targets for a live firing range and for a family of threat weapon simulators. The Army Development and Acquisition of Threat Simulator (ADATS) program funded under D976 beginning in FY 1983 provides the Army with simulated threat equipment to support user testing by duplicating/simulating opposing force air defense threats to create a realistic test environment. At the beginning of FY 1976, the US Army Test and Evaluation Command (TECOM) transferred five Test Boards to TRADOC for conduct of operational testing (OT). Since then the test boards, including three boards established after FY 1976, have been developing, rebuilding, and reorienting instrumentation systems to support their revised test mission. TRADOC test activities use the equipment developed under this project in support of US Army Operational Test and Evaluation Agency (OTEA) tests and Office of the Secretary of Defense (OSD) sponsored joint tests as well as during conduct of TRADOC user tests.

B. (U) RELATED ACTIVITIES: The Army Staff monitors close and continuous coordination between TRADOC agencies responsible for test and use of materiel items, development test activities, materiel developing agencies, and OTEA to ensure greatest possible effectiveness of Army testing activities. The Director of Defense Test and Evaluation (DDT&E) reviews planned testing and development of support equipment to ensure integration of testing by the Services. The Army Staff and DDT&E also seek to avoid duplication of instrumentation development efforts. Threat simulator requirements are coordinated with the other Services through a USDRE-chartered tri-Service committee (CROSSBOW-S). Coordination is also maintained with training development activities with respect to targets required for testing and training.

Project: #D986 Title: US Army Training and Doctrine Command (TRADOC) Support Equipment

Program Element: #6.57.12.A Title: Support of Operational Testing

DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

C. (U) WORK PERFORMED BY: Work is performed primarily by numerous contractors; however, a portion is performed in-house. *In-house organizations* include: Harry Diamond Laboratories, Adelphi, MD; Naval Postgraduate School, Monterey, CA: US Army Missile Command, Redstone Arsenal, AL; US Army Tank-Automotive Command, Warren, MI; and Combat Developments Experimentation Command, Ft Ord, CA. Past contractors include: TRACOR, Austin, TX; General Dynamics Electronics, San Diego, CA; International Laser Systems, Orlando, FL; General Electric, Syracuse, NY; MILGO Inc., Miami, FL; and Jet Propulsion Laboratory, Pasadena, CA.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) *FY 1981 and Prior Accomplishments*: Combat Developments Experimentation Command (CDEC) and TRADOC Combined Arms Test Activity (TCATA) initiated and continued long-term integrated instrumentation development programs to enable simulation of a total tactical environment for conduct of operational testing and Force Development Testing and Experimentation (FDTE). Starting in FY 1976, this project also provided for development of instrumentation for the Test Boards. The instrumentation included sophisticated systems designed for particular test functions and provided for automatic collection of such data as system location and position, live fire hit/miss indication, simulated direct and indirect fire hit/miss, and range timing. Specific accomplishments include development of: Range Measuring System and Satellite Data Link at CDEC; Automatic Data Collection System and Weapons Engagement Scoring System at TCATA; threat simulator systems at the US Army Air Defense School (Army Development and Acquisition of Threat Simulator program); Range Control System, Target Spotting System, and Advanced Weapons Simulator at the Armor and Engineer Board; Range Control Instrumentation System at the Air Defense Board; data acquisition/reduction system at the Aviation Board; tracking system for the Airborne Board; Direct Fire Laser System at TCATA and CDEC for hit/kill simulation; noncommunications and communications threat environment equipment for testing electronic warfare systems at the Intelligence and Security Board; and projectile impact location system and remote control target system at the Infantry Board. During FY 1980, TRADOC, through TCATA, initiated development of subsystems for a Mobile Automated Field Instrumentation System (MAFIS), including navigation, communications, weapons engagement scoring, and data storage and retrieval subsystems. During FY 1981, emphasis was placed on improving the methodology for and accuracy of the collection of data for assessment of: equipment/systems mission performance, human factors, logistics, maintenance, and training. Examples of FY 1981 projects are: continuation of development of threat simulator systems and of threat communications and noncommunications emitters; Telemetry Acquisition System at the Airborne Board; Hit Sensing Telemetry System for Moving Targets at the Infantry Board; Smoke Environment Direct Fire Simulators at CDEC; equipment to

Project: #D986 Title: US Army Training and Doctrine Command (TRADOC) Support Equipment

Program Element: #6.57.12.A Title: Support of Operational Testing

DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

establish an adequate communications-electronics test capability at the Communications-Electronics Board; and continuing development of Mobile Automated Field Instrumentation System (MAFIS) at TCATA. MAFIS will utilize the latest technology for position location, communications and navigation, realtime casualty assessments, hit/kill probabilities, weapon simulation and scoring, data integration and analyses, and will interface efficiently with other modern test instrumentation. MAFIS will provide TRADOC with a highly mobile and self-contained capability to support force-on-force large-scale testing at any installation where troop resources are available. This will reduce the impact of testing on troop readiness, reduce travel costs, and increase realism.

2. (U) FY 1982-FY 1984 Planned Program: MAFIS will absorb approximately 75%, 95%, and 70% of programed funds in FY 1982, 1983, and 1984, respectively. The initial system, to be operational in FY 1985, will accommodate 200 players and will have an add-on capability. Other projects include: integration of the range instrumentation at the Air Defense Board; continued development of communications and noncommunications threat systems for testing electronic warfare systems at the Intelligence and Security Board as well as threat simulator systems at the US Army Air Defense School; development of a target system at the Armor and Engineer Board; automatic data collection system upgrade at TCATA; data communications monitoring system at the Field Artillery Board; methodology/instrumentation program at HQ, TRADOC; and live fire scoring, range tracking, and weapons engagement scoring systems.

3. (U) Program to Completion: This is a continuing program. A second phase of MAFIS development will be accomplished to provide enhanced capabilities in FY 1989. This will exploit technology such as millimeter wave radar to penetrate smoke, fog, haze, rain, and other obscurants on the dirty battlefield. Research will be conducted in techniques for measuring miss distances to more accurately evaluate damage probabilities. More accurate location and altitude-measuring systems will be developed. Expanded memory techniques will be developed for distributed storage at player positions where telemetry data cannot be transmitted to a central data processing position.

4. (U) Major Milestones: Not applicable.

Project: #D986 Title: US Army Training and Doctrine Command (TRADOC) Support Equipment

Program Element: #6.57.12.A Title: Support of Operational Testing

DOD Mission Area: #454 - Other Test and Evaluation Support Budget Activity: #6 - Defensewide Mission Support

5. (U) Resources in thousands:

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	5319	7092	6716	7028	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	5789	7113	8874	Not Shown	Continuing	Not Applicable

FY 1981 funding decreased as a result of the application of general FY 1981 Congressional reductions. The FY 1982 and FY 1983 estimates decreased as a result of inflation repricing and planned travel reductions. The FY 1983 estimate was further decreased as a result of separate funding of project D976, Development and Acquisition of Threat Simulators, formerly included in Project D986.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.57.15.A
DOD Mission Area: #471 - General Management Support

Title: Defense Systems Management College
Budget Activity: #6 - Defensewide Mission Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	1144	203	202	201	Continuing	Not Applicable
M199	Defense Systems Management College	1144	203	202	201	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 advanced 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 accomplish the educational mission and provide the student with a real-world scenario, the College implemented a program (System X II), which applies advanced computer learning technology in a real-world simulation of the System Acquisition Life Cycle. This laboratory 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 during the course of the total life cycle. System X II will be available to assist actual program managers to test and evaluate their acquisition strategies, develop new concepts, conduct life cycle trade-off analyses, and evaluate their program readiness for upcoming milestone decisions. DSMC also conducts acquisition management research in support of the Defense Acquisition Executive by anticipating future acquisition management problems and proposing concepts and new management approaches that will have significant impact on future acquisition policy. Such research will also have a dual application in the furtherance of the curricula within the College.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: The Acquisition Management research program is of a continuing nature and will focus on key policy issues, model development for a systems acquisition strategy initiative, and data base expansion for major systems procured by the Department of Defense. These research efforts will support the DSMC educational program, the Joint Logistic Commanders, and priority Office, Secretary of Defense (OSD) subjects.

Program Element: #6.57.15.A Title: Defense Systems Management College
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Mission Support

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	1144	203	202	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	1144	203	207	Continuing	Not Applicable

The FY 1983 decrease from the previous submission reflects the application of revised inflation indices. The current request for FY 1983 is required to continue efforts on selected research projects in direct support of the defense acquisition management mission.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.57.15.A
Title: Defense Systems Management College
DOD Mission Area: #471 - General Management Support
Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: In FY 1981, the Defense Systems Management College implemented a new educational simulation program (System X II) for teaching systems acquisition management to the next generation of defense program managers. This program is designed to simulate the acquisition life cycle of a major defense weapons system and includes a series of case studies and computerized decision exercises which address the major issues and actions involving defense systems acquisition program management on a real-world and realtime basis. System X II serves as a capstone management exercise to promote the development of acquisition strategy, analyze Mission Element Need Statements, conduct trade-off analyses relative to major programs, and conduct sensitivity analyses of various decisions and strategies. This program will also assist actual defense program managers in conducting milestone analyses of their ongoing programs with the objective of promoting more cost effective approaches and providing real-world alternatives through simulation. Other funded research projects within this program element are directed towards the development and application of advanced program management techniques to enhance the development and deployment of major systems and support Joint Logistic Commanders and Office, Secretary of Defense policy initiatives.

G. (U) RELATED ACTIVITIES: None

H. (U) WORK PERFORMED BY: Project and program offices, DSMC.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: The mission of the Defense Systems Management College is to conduct advanced 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 which funds research efforts in support of the Defense Systems Management College educational program; Office, Secretary of Defense initiatives; and Joint Logistic Commanders. In FY 1981, the College implemented a new educational simulation program, System X II, which is designed to simulate the acquisition life cycle of a major defense weapons system.

2. (U) FY 1982-FY 1984 Program: Continue selected research projects in direct support of the defense acquisition management mission.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.58.01.A Title: Programwide Activities
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	48446	60301	70101	72037	Continuing	Not Applicable
MM88-01	Command Headquarters Support	39463	43344	46525	48863	Continuing	Not Applicable
MM86-02	General Administrative Activities	2732	3293	3710	4105	Continuing	Not Applicable
MM68-03	Special Purpose and Automatic Data Processing Equipment	5506	13105	18905	17703	Continuing	Not Applicable
MM88-04	Minor Construction	745	559	961	1366	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program funds efforts directed toward support of Army RDTE installations, activities, and/or operations required to accomplish overall assigned general research and development missions (and which cannot be allocated to specific R&D projects). This is a continuing program which includes logistical and facility support to Army Management Headquarters Activities as established by Department of Defense Directive 5100.73 and Army RDTE programs at field command level; for operating costs of those RDTE headquarters type activities not classifed 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 and for those 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 for RDTE-funded Occupational Safety and Health Act and Environmental Protection Agency minor construction requirements.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: The requested program supports continuing requirements for the activities outlined above, at the FY 1982 level of operations. The FY 1983 request continues the requirement for a phased program to upgrade

Program Element: #6.58.01.A Title: Programwide Activities
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Support

the Army's R&D special purpose equipment inventory. Funding for the first increment of an equipment replacement program was programed for FY 1962. This program element is the only source of funds within the RDTE,A appropriation for the purchase and installation of scientific, engineering, and technical special-purpose equipment which is utilized in support of two or more research and development projects. The total value of the Army's laboratory general-purpose use scientific and technical equipment inventory is in excess of $450 million; most of this equipment was purchased in the era immediately following World War II. A phased plan for replacement and upgrading of this inventory is essential to the performance of the Army's research and development efforts.

D. (U) COMPARISON WITh FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	48446	60301	70101	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	51849	66815	65530	Continuing	Not Applicable

The current requirements, as reflected above, have been restructured, for comparability, to reflect the transfer of resources associated with US Army Medical R&D Command out of this program element. These resources have been transferred to Program Element 6.58.98.A, Army Management Headquarters Activities. This transfer is a result of a revision to Department of Defense Directive 5100.73, Department of Defense Management Headquarters and Headquarters Support, in which the US Army Medical R&D Command was designated as a Management Headquarters. The dollar resources which have been transferred are: FY 1981 - $3.2 million; FY 1962 - $3.3 million; FY 1983 - $3.5 million. Additional changes from previous submission are as follows: During the execution of the FY 1981 program, only minor reprograming out of the program element occurred. The Department of Defense FY 1982 Supplemental Budget Request reduced this program by $1.0 million to support higher priority defense requirements. Congressional action on the FY 1982 Defense appropriation reduced the program an additional $4.2 million. The requested program for FY 1983 continues to support the activities, as described, at the FY 1982 level. It provides for continuation of a phased program for replacement of the obsolete scientific, engineering, technical, and automatic data processing equipment in the R&D laboratories (+$7.6 million), and supports the transfer of functions into the program element from other elements within the RDTE,A appropriation (+$.5 million).

Program Element: #6.58.01.A
DOL Mission Area: #471 - General Management Support

Title: Programwide Activities
Budget Activity: #6 - Defensewide Support

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.58.01.A Title: Programwide Activities
DOL Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: This program includes four general categories: (1) Operation of those Research, Development, Test, and Evaluation Commands not designated as Army Management Headquarters Activities; (2) Logistical support activities at or associated with Research, Development, Test, and Evaluation Commands to include reimbursement to other appropriations or activities for operation and maintenance of facilities and real property occupied by R&D commands; (3) Procurement of special purpose equipment and automatic data processing equipment; and (4) Minor construction projects ($100,000 ceiling) which are not identifiable to single R&D projects. Category (1) supports operation of the US Army Test and Evaluation Command, Mobility Equipment Command, and Natick R&D Command; (2) includes logistical support at the US Army Materiel Development and Readiness Command and subordinate R&D command headquarters; support of Standardization Groups in Australia, Canada, the United Kingdom, and Germany; and reimbursement in support of utilities and maintenance provided to R&D commands by other appropriations or activities. Category (3) includes procurement and/or leasing of equipment. Category (4) provides payment for construction contracts required by laboratories in support of R&D efforts supporting more than one project.

G. (U) RELATED ACTIVITIES: Command headquarters perform staff management functions related to work performed by RDTE laboratories and test facilities.

H. (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.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Provided funds for operation of US Army Test and Evaluation Command, Natick R&D Command, Mobility Equipment R&D Command, Army Research Office, and Standardization Groups. Supported logistical and other support activities associated with operation of all R&D Commands to include reimbursement for base operations (facility) when RDTE headquarters are a tenant activity of another service or appropriation. Funds were also provided for procurement of special purpose and automatic data processing equipment needed by R&D laboratories for support of overall R&D projects (items not identifiable to specific projects). Minor construction projects (less than $100,000 associated with equipment installation, Environmental Protection Agency, and Occupational Safety and Health Act requirements) were also supported within this program.

Program Element: #6.58.01.A Title: Programwide Activities
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Support

2. (U) FY 1982-FY 1984 Program: Continue support of activities outlined in above paragraph (to include base operations/facility support for Commands).

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #MM88-01 Title: Command Headquarters Support
Program Element: #6.58.01.A Title: Programwide Activites
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: Resources programed in this project are required to fund logistic and other than Army Management Headquarters Activities for operation of or direct support to Research, Development, Test and Evaluation commands. These functions include both facility and administrative base operations support reimbursed to other agencies by R&D commands and support of RDTE headquarters civilian personnel not identified for Army Management Headquarters activities. These personnel perform operational and management functions at RDTE commands not identified as Army Management Headquarters, and base operations/logistic support functions at all RDTE commands.

B. (U) RELATED ACTIVITIES: Logistical functions funded in this project are in direct support of RDTE Army Management Headquarters Activities (see program element 6.58.98.A). Headquarters funded in this project perform staff management functions for work performed by RDTE laboratories and test facilities.

C. (U) WORK PERFORMED BY: Activities assigned to the US Army Materiel Development and Readiness Command, Headquarters and subordinate RDTE commands.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Provided support for logistical functions associated with US Army Materiel Development and Readiness Command Headquarters and subordinate R&D Army Management Headquarters, operation of and logistical support to 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 (e.g., travel, supplies and equipment), 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, and Communications R&D Command, and Electronics R&D Command.

2. (U) FY 1982-FY 1984 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

Project: #MM88-01 Title: Command Headquarters Support
Program Element: #6.58.01.A Title: Programwide Activites
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Mission Support

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) Program to Completion: This is a continuing program.

4. (U) Major Milestones: Not Applicable.

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	39463	43344	46525	48863	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	43022	46908	49492	-	Continuing	Not Applicable

The resources requested for FY 1983 will provide for the continuation of the operations as described above. The current requirements, as reflected, have been restructured for comparability, to reflect the transfer of resources associated with US Army Medical R&D Command out of this project. This transfer is a result of the revised Department of Defense Directive 5100.73, Department of Defense Management Headquarters and Headquarters Support. The revised directive designated the US Army Medical R&D Command as a Management Headquarters. The dollar resources which have been transferred to Program Element 6.58.98.A, Army Management Headquarters Activities are: FY 1981 - $3.2 million; FY 1982 - $3.3 million; FY 1983 - $3.5 million. The remainder of the changes from the FY 1982 submission are minor and represent reprograming within the program element in FY 1981; application of revised inflation indices in FY 1982; and transfer of functions from other elements within the RDTE,A appropriation in FY 1983.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #MM88-03 Title: Special Purpose and Automatic Data Processing Equipment
Program Element: #6.58.01.A Title: Programwide Activities
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: This program finances the procurement, installation, 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. Prior to programing, the requirements for new equipment are evaluated against such considerations as: (1) adequacy of existing equipment; (2) cost of modernization vs replacement; (3) availability of inventory in other laboratories; and (4) essentiality of equipment to mission. Foreign state-of-the-art capabilities and potential threats to present and future materiel or systems are also considered. This program is the only source for acquisition of multipurpose scientific and technical RDTE laboratory equipment which supports more than one R&D project. This project has repeatedly been reduced by unspecified Congressional action to a level of funding which has permitted only emergency replacement of inoperable equipment. The total value of the Army's laboratory general-purpose-use scientific and technical equipment inventory is in excess of $450 million; most of this equipment was purchased in the era immediately following World War II. A phased plan for replacement and upgrading of this inventory is essential to the performance of the Army's research and development efforts.

B. (U) RELATED ACTIVITIES: Not Applicable.

C. (U) WORK PERFORMED BY: RDTE Army laboratories and facilities of the US Army Materiel Development and Readiness Command, US Army Medical Research and Development Command, and the Corps of Engineers Research and Development Activities.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Provided funding for special-purpose and automatic data processing equipment as outlined in paragraph A above. Previous funding levels have basically supported continuing contracts (such as ongoing equipment rentals) and emergency repairs to aging equipment items.

2. (U) FY 1982-FY 1984 Program: A report by a recent Department of Defense Laboratory Management Task Force contained, as one of its findings and recommendations, the establishment of a laboratory equipment modernization policy to

Project: #MM88-03 Title: Special Purpose and Automatic Data Processing Equipment
Program Element: #6.58.01.A Title: Programwide Activities
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Mission Support

insure that general-purpose equipment is replaced or acquired in a timely manner. The program, as reflected, will support ongoing contractual efforts and a phased plan to replace and upgrade the scientific, engineering, technical, and automatic data processing equipment in the Army's Research and Development laboratories and research facilities. Planned purchases include such items as memory oscilloscopes, signal amplifiers, chromatographs, spectrophotometers, fluorometers, colorimeters, photo analyzers, calibration sensors, cameras, analyzing units, image display systems, environmental testing apparatus, and other specialized engineering, scientific, and medical equipment.

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

4. (U) Major Milestones: Not Applicable.

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	5506	13105	18905	17703	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	5065	18048	11268	-	Continuing	Not Applicable

The increase in FY 1981 represents reprograming, within the program element, to support ongoing contractual requirements. The September 1981 Department of Defense Supplemental FY 1982 Budget Request decreased this project ($-1.0 million) to support higher priority defense requirements. Final action by the Joint Appropriations Committee on the FY 1982 Defense Appropriation reduced this project by $3.9 million. The balance of the change in FY 1982 reflects the application of the revised inflation indices. The FY 1983 and FY 1984 programs reflect continuation of the phased plan to upgrade the automatic data processing and special-purpose equipment inventory throughout the Army's R&D facilities.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.58.02.A Title: International Cooperative Research and Development
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	645	980	1041	1093	Continuing	Not Applicable
M798	International Cooperative Research and Development	645	980	1041	1093	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Covers exchange of research and development technology with key US Allies to reduce duplication of effort and cost. This exchange is carried out through cooperative research and development programs, Data Exchange Agreements (DEA's), and multinational forums; for example, the North Atlantic Treaty Organization (NATO) Army Armaments Group (NAAG) and the American, British, Canadian, Australian (ABCA) Standardization Program.

C. (U) BASIS FOR FY 1983 RDTE REQUESTS: This program will support travel and expenses associated with participation in international forums, US share of the NATO Industrial Advisory Group (NIAG) activity, and other minor costs connected with international exchange of technology (e.g., negotiation of cooperative research and development projects). US cost share of implementing agreed cooperative projects is borne by applicable Research, Development, Test, and Evaluation program elements.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	645	980	1041	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	645	981	1049	Continuing	Not Applicable

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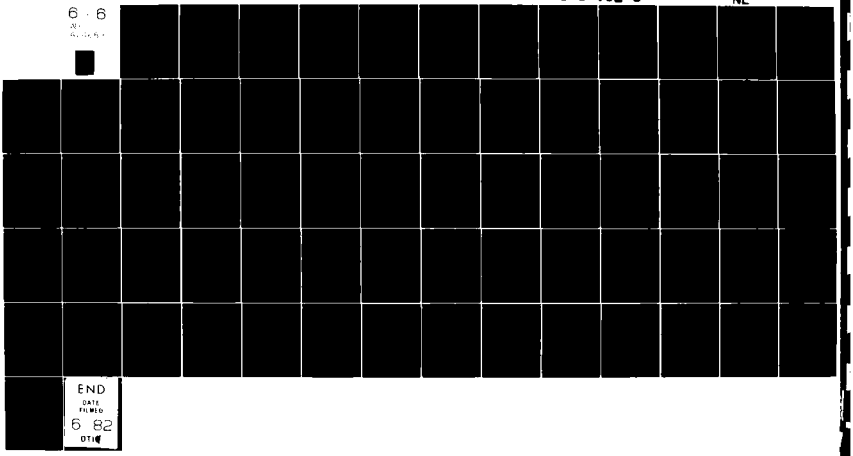

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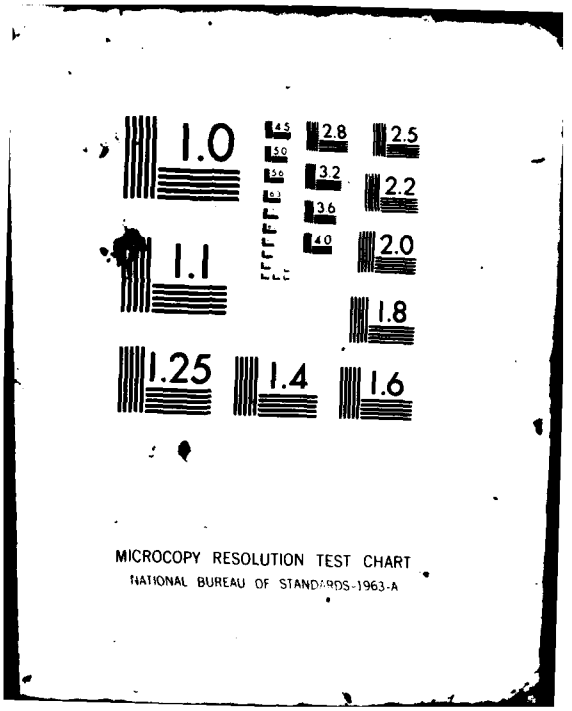
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Program Element: #6.58.02.A Title: International Cooperative Research and Development
DOD Mission Area: #460 - International Cooperative RDT&E Budget Activity: #5-Defensewide Mission Support

The funding decreases in FY 1982 and FY 1983 reflect revised inflation indexes.

E. (U) OTHER APPROPRIATION FUNDS: Not applicable.

Program Element: #6.58.02.A Title: International Cooperative Research and Development
DOD Mission Area: #460 - International Cooperative RDT&E Budget Activity: #6-Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Program provides for the exchange of research and development technology to reduce duplicative efforts, thereby lowering costs. Through these exchanges, cooperative research and development projects are identified, negotiated, begun, and completed. Besides reducing participant costs, cooperative projects promote equipment standardization or interoperability. Technology exchanges and cooperative project negotiations take place through bilateral data exchange agreements and multinational forums such as the North Atlantic Treaty Organization (NATO) and the American, British, Canadian, and Australian (ABCA) Standardization Program. This program also defrays the US share for the NATO Industrial Advisory Group (NIAG), which performs prefeasibility studies associated with NATO exploration of potential cooperative projects.

G. (U) RELATED ACTIVITIES: Most Army research and development programs incorporate investigation and evaluation of comparable non-US systems. Interservice coordination is carried out for each new program. Thus the Army, Navy, and Air Force can avoid duplication of effort. Accordingly, some programs become bi- or tri-service. In this way, standardization or interoperability is expanded, assuring maximum use of resources and dissemination of technology.

H. (U) WORK PERFORMED BY: Headquarters, Department of the Army, US Army Materiel Development and Readiness Command, Corps of Engineers, The Surgeon General, and the Army Training and Doctrine Command are principal agencies involved. Military and civilian personnel from these agencies, having specific research and development responsibilities, attend international meetings and forums to discuss ongoing and potential future cooperative research and development projects, and to negotiate nation-to-nation agreements.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: In FY 1979 the United States, the United Kingdom, France, and the Federal Republic of Germany signed a Memorandum of Understanding (MOU) for cooperative development for a free-flight, Multiple-Launch Rocket System (MLRS) to satisfy agreed tactical requirements of the four countries. The goals are common logistic and support concepts, coproduction, and future product improvements, e.g., the terminal guided warhead for destruction of enemy armor, to be jointly developed and produced. In FY 1980 the four governments agreed to a Combined Procurement Plan in furtherance of the MOU to specify the number of launchers and warheads that each country will buy. In FY81, the four countries completed the negotiating draft of the procurement phase supplement to the basic MLRS MOU to carry out joint production and sales of the MLRS system. The four governments set 30 March 1982 as a goal to conclude negotiations. In addition, they concluded a supplement to the basic MOU establishing policy for the concept definition phase of the terminal guided warhead. Such matters as the multinational industrial sharing arrangements and technology transfer will be covered. Formal MOU

Program Element: #6.58.02.A Title: International Cooperative Research and Development
DOD Mission Area: #460 - International Cooperative RDT&E Budget Activity: #6-Defensewide Mission Support

negotiations with the Federal Republic of Germany began on 1 November 1981. Negotiations are expected to be concluded in FY 1982. In August 1981, industry received the request for proposal (RFP) for the TGW concept definition study contracts. The US, France, Federal Republic of Germany, and United Kingdom also developed an agreed-upon description of the Soviet armor threat, target descriptions, and range targets for use by all services and NATO in antiarmor weapon developments. Other accomplishments were: coordination of British L16A1 mortar testing for possible Army purchase; an MOU with the Federal Republic of Germany for component standardization between XM1 and LEOPARD 2 Main Battle Tanks; the United States, the United Kingdom, France, the Federal Republic of Germany, Belgium, Canada, and the Netherlands began to examine the chief characteristics of future Main Battle Tank development for the year 2000; US participation in NATO tests resulting in selection of a second NATO standard small arms caliber (5.56mm); establishment of gap-crossing (bridging) requirements by the United States, the United Kingdom, and the Federal Republic of Germany; the United States, the United Kingdom, France, the Federal Republic of Germany, Italy, and the Netherlands prepared evaluation criteria for the Precision-Guided Munitions (PGM's) applicable to any future PGM development by these countries; the United States and the United Kingdom set up methods and criteria for Armored Fighting Vehicle (AFV) cooperation; the United States, the United Kingdom, France, and the Federal Republic of Germany signed an MOU to explore the feasibility of instituting a cooperative development program for the third generation of Antitank Guided Weapons (ATGW) under which the United States would develop a medium-range, manportable system and the Europeans, a long-range vehicular-mounted system; the ABCA Standardization Program formed a new Quadripartite Working Group (QWG) for collaborative training to identify combined exercises in which application of existing Quadripartite Standardization Agreements (QSTAG's) will be evaluated. Coordination of US Army involvement in NATO research and development activities continued.

2. (U) FY 1982-1984 Programs: US will chair the NATO Army Armaments Group (NAAG). US scientific and technical participation in NATO and in the American, British, Canadian, Australian Program will continue to stress defense equipment standardization or interoperability. The United States and European participants will pursue agreement on joint development of a terminal guidance warhead for MLRS. With the United [illegible] the United States will continue cooperative activities for Armored Fighting Vehicles and Advanced Armor Technolo[illegible] United States, Federal Republic of Germany, France, and United Kingdom will begin development of the Soviet Antiarmo[illegible]r threat, target description and targets for use in developing antihelicopter weapons. Working groups will c[illegible]e to meet as ATGW feasibility studies are developed. As opportunities arise, the United States will negotiate agreements for more efficient use of overall defense resources. Existing bi- and multi-lateral exchange programs will continue. The United States and its European partners will intensify efforts to reach a decision on whether the ATGW family of weapons program is feasible. If so, an MOU to govern the program will be negotiated. It is also expected that Belgium, Denmark, France, the Federal Republic of Germany, Greece, and the Netherlands will review proposals for acquisition of the PATRIOT air defense system. As identified, new cooperative undertakings will be pursued. Consistent with US policy toward cooperation with NATO in materiel production and standardization

or interoperability, the Army will respond appropriately. US representation in NAAG and ABCA panels and conferences will also continue. As Department of Defense, Congressional, and NATO policies on standardization or interoperability evolve, the program will be adjusted accordingly. Continued efforts to maximize NATO combat efficiency through prudent application of available resources will demonstrate requirements for expanded Army involvement in International Cooperative Research and Development.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.58.03.A 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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	3588	4628	5249	6179	Continuing	Not Applicable
MY11	Modernized Army Research & Development Information System (MARDIS) Support-DARCOM	622	644	575	572	Continuing	Not Applicable
MY14	MARDIS Proponent Support	-	-	89	94	Continuing	Not Applicable
MY29	Integrated Software	221	-	-	-	Continuing	Not Applicable
M720	Technical Information Functional Activities	758	937	967	1082	Continuing	Not Applicable
M728	Information Technology	837	926	796	1126	Continuing	Not Applicable
M729	Symposia-Conferences	494	609	661	694	Continuing	Not Applicable
M731	Government/Industry Data Exchange Program (GIDEP) and the Advisory Group on Electronic Devices (AGED)	-	-	535	580	Continuing	Not Applicable
M761	Technical Information Analysis Centers	613	912	948	1101	Continuing	Not Applicable
MS03	Signals Intelligence/ Electronic Warfare Technical Information	43	600	678	930	Continuing	Not Applicable

Program Element: #6.58.03.A
Title: Technical Information Activities
DOD Mission Area: #440 - Technical Integration/Studies and Analyses
Budget Activity: #6 - Defensewide Mission Support

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element supports projects to improve the Army's mission through continual upgrading of the accuracy, timeliness, availability, and accessibility of scientific, technical, and management information at all levels of Research and Development (R&D) and its management. All Army missions are heavily dependent upon information development, access, validation, and distribution. The Army has the leading Defense Research and Development program in information technology, but the Army capability in information technology still seriously lags behind the state of the art. Technological advances will make information science a dominating economic and technical influence in the decade of the 80's. Congress and the Executive Branch have demonstrated their recognition of the growing significance of information as a major resource and the need for this vital management support technology by enacting formal legislation and issuing related policy and executive orders. Cost avoidance and savings in terms of men, money, and time (minutes) can be directly related to enrichment of the information resources base. This program element supports initiatives to improve information derivation, storage, display, transmission, distribution, and interpretation. It is essential to the Army portion of the Defense Technical Information Center (DTIC) operation and is in no way duplicative of its mission or the mission of Army libraries. It provides the technology and 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. An underlying objective is to convert the concept of "Library operation" from "book access" to "information access" to provide the user with direct decisionmaking criteria.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Provide for support to projects to fulfill the provisions of Public Laws 94-282 and 96-480. Supports research and development of software and the exchange of software technical information through interagency and industry cooperative interaction. Integrates all Army inputs to the DTIC through five data bases that describe all Army R&D planned activity, ongoing activity, and completed activity using remote terminals for on-line input and access. Supports Army Science Conference to recognize Army scientists' and engineers' technical accomplishments; supports high-technology DOD-chartered information analysis centers, and supports the Army share of the two DOD triservice programs: the Government/Industry Data Exchange Program and the Advisory Group on Electronic Devices. Supports technological developments such as digital processing of analog information (drawings, X-rays, graphs, and pictures). Supports effort to improve health care delivery through direct on-line patient diagnostics using state-of-the-art information direct and remote access techniques, thus enhancing health care by significantly relieving physician time and availability constraints and by improving decisionmaking criteria. Provides support to develop technology transfer to fulfill provisions of Public Law 96-480.

Program Element: #6.58.03.A Title: Technical Information Activities
DOD Mission Area: #440 - Technical Integration/Studies and Analyses Budget Activity: #6 - Defensewide Mission Support

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	3588	4628	5249	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	4067	4632	5379	Continuing	Not Applicable

(U) The decrease in the FY81 funding is a result of reprogramming to higher priority Army requirements. The decrease in the FY82 and FY 83 estimates are a result of the application of revised inflation indices.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: #6.58.03.A
Title: Technical Information Activities
DOD Mission Area: #440 - Technical Integration/Studies and Analyses
Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Objective number one is to improve scientific, technical, and related management information activities required for the support of the Army research and development (R&D) Program, to provide information in support of technical decisionmaking, and to meet requirements imposed by public law (PL 94-282, PL 96-480). This program is not duplicated by any other project in the Army program and is supportive of DOD activities. It includes the derivation, acquisition, analysis, interpretation, storage, retrieval, processing, forwarding, dissemination, primary and secondary publishing, and use of all classes of technical and management information needed by all Army technical professional personnel. It improves the relevance, accuracy, timelines, and accessibility of technical information flowing to and from the Army. The program involves automatic data processing, microforms, graphic and analog information forms, information store and forward techniques, providing for and optimizing information access, economics of information stores, data banks and networks, and provides for active technology transfer. Objective number 2 is to provide requisite R&D support for the design, installation, and operations of a scientific and technical information system to support the Army Signals Warfare Requirements. The information system is designed to insure that necessary state-of-the-art and related data are available to Project Managers/Engineers, thus eliminating duplication of effort and obtaining the greatest possible output from R&D funds. Objective number 3 is to support the biennial Army Science Conference of Army scientists and engineers at Army Laboratories; the Junior Science and Humanities Symposia (JSHS); participation in Regional, State and International Science and Engineering Fairs (ISEF) to encourage high school students to seek careers in science; and US participation in the International Mathematics Olympiad held annually. Objective number 4 is to strengthen the activities of existing DOD Technical Information Analysis Centers (TIAC's) operated by the Army and support new TIAC's and other information centers in critical defense areas.

G. (U) RELATED ACTIVITIES: This program complements Integrated Software Research and Development (ISRAD) activities funded in PE 6.58.98.A, 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 Science. 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 relates also to the National Library of Medicine research program in automatic storage and retrieval of technical information.

H. (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; Through Association, Belleville, NJ;

Program Element: #6.58.03.A
DOD Mission Area: #440 - Technical Integration/Studies and Analyses

Title: Technical Information Activities
Budget Activity: #6 - Defensewide Mission Support

Tracor-Jitco, Rockville, MD; Library of Congress, Washington, DC; Harold Davidson, Inc., Fairfax, VA. The remainder of the work is performed primarily by civilian personnel assigned to the US Army Materiel Development and Readiness Command and the US Army Computer Systems Command.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Integrated Software Research and Development (ISRAD) activities have been moved to PE 6.58.98, Army Management Headquarters Activities, as an economy and efficiency move and will be effective in FY 1982. This places execution of the function in the same area where most of the actual work is done for the Army. Twenty-three users were put "on-line" (up from four experimental test sites) with the R&D work unit summary information system, and now 86% of all R&D work unit summaries are put in directly rather than with paper copy. Automated procedures were further developed for technical information analysis centers linking them to the Defense Technical Information Center (DTIC) via computer. The continued operations of seven technical information analysis centers were partially supported. Another new project sponsored was the development of a capability to enable test and evaluation data and reporting to be accomplished by computer telecommunications. Interagency agreements were made to test techniques developed to remotely provide medical diagnostic information, and initial sponsoring of medical technical information development began. Support was provided to the Government/Industry Data Exchange Program and the Advisory Group on Electron Devices.

2. (U) FY 1982-1984 Planned Program: Transfer and fully install the Army portion of the Department of Defense RDTE reporting system in Army laboratories and terminate contractor support by the end of FY 1982. Data base management will be moved from the contractor to the US Army Mobility Equipment R&D Command, Ft Belvoir, VA. Contractor support will be limited to routine servicing of noninteractive Army activities and processing of classified data. Army support to *DOD Atlas of Data Bases* will begin in FY 1983. Continue to improve the Army scientific and technical information (STINFO) program, integrating individual task efforts (e.g., converting dialogue and graphic and analog information into digital format) into total program needs. Continue conference and symposia program for support of youth science information activities. Continue support to the Government/Industry Data Exchange Program and the Advisory Group on Electronic Devices; in FY83 this will be funded as a separate project, M731. Continue development of and complete specialized bibliographies, glossaries, and techniques for computer handling of materials information. Continue operations of the R&D work unit summary information system to provide timely, accurate, computer-generated data for R&D program management. Evaluate extending automated information access between technical information analysis centers (TIAC) and DTIC. Continue support of Army TIAC's. Continue to

Program Element: #6.58.03.A
Title: Technical Information Activities
DOD Mission Area: #440 - Technical Integration/Studies and Analyses
Budget Activity: #6 - Defensewide Mission Support

develop technical information processes for the specialized needs of the Army intelligence community. Continue effort to establish a test facility and to develop techniques to improve Army health care through capability to access medical technical information. Continue development and implementation of an Army-wide Technical Information Management Plan to closely integrate the management of Scientific and Technical Information (STINFO) and tie the Army work in this field with other DOD and Government activities. Intralaboratory coordination to implement provisions of Public Law 96-480 (Stevenson-Wydler Technology Innovation Act) encouraging technology transfer will begin in FY83. program objectives. Emphasis will be directed to tasks which logically follow tasks previously completed (e.g., automating library operations via computers and telecommunications; the integration of R&D programs designed to make computer software cheaper, faster to develop, and more reliable and responsive). Efforts to convert information access to an active (vice passive) process will begin in FY84.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.58.04.A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451 - Major Ranges and Test Facilities

Budget Activity: #6 - Defensewide Mission Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	217751	278924	300671	337847	Continuing	Not Applicable
DE90	Yuma Proving Ground	24301	32837	37550	40612	Continuing	Not Applicable
DE91	Aberdeen Proving Ground	51459	72342	71578	90496	Continuing	Not Applicable
DE92	Dugway Proving Ground	19811	23857	29264	29231	Continuing	Not Applicable
DE93	White Sands Missile Range	109940	126593	146225	159434	Continuing	Not Applicable
DE94	Army Electronic Proving Ground	12240	23295	16054	18074	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Army modernization program calls for the development and fielding of many new weapon systems. The objective of this program element is to maintain a capability for development, production acceptance, and product improvement testing of materiel systems at five major US Army Test and Evaluation Command (TECOM) activities. These activities represent the lifeblood of an efficient Army research and development program. Each of the five test activities has established capabilities uniquely required to assure technical adequacy and quality of particular types of materiel under development or procurement, such as missiles and tactical vehicles. This program is designed to preclude proliferation and duplication of specialized testing facilities to meet individual program test and evaluation requirements. This program provides for the recurring installation operating costs and for all costs of conducting tests not identified with a particular weapon system project. This includes modernization of instrumentation to insure that test capabilities are commensurate with the state-of-the-art systems to be tested. Funding this program element is critical to the fielding of modern systems; it has a substantial impact on operational readiness.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Each facility will plan, conduct, and support development tests, engineering tests, check tests, and initial production tests. The types of materiel to be tested include aircraft, armament systems, tube artillery, artillery munitions, vehicles, chemical warfare and biological defense systems, missiles, communications equipment, high-energy lasers, and signal intelligence/electronic warfare equipment. The support provided will include

Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

improvement and modernization of instrumentation to provide a test capability compatible with new weapons technology, to shorten test time and reduce cost through automation, and to replace obsolete equipment which is uneconomical to operate and repair. An effort to reduce the test workload backlog at the test facilities will be accomplished through contract augmentation of in-house capabilities.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	217751	278924	300671	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	217397	297653	310215	Continuing	Not Applicable

The small increase in FY 1981 funding is a result of minor differences between actual program execution costs and the funding estimates made one year prior. The decrease in the FY 1982 funding estimate results from the following:

	$ Millions
September 1981 amended budget.	-5.6
FY 1982 Defense Appropriation Act programatic adjustment.	-11.1
Repricing of fuel costs	-1.6
Share of transfer of $5.3 million from RDTE, A appropriation for modernization of National Guard/Reserve equipment	-0.4
	-18.7

The decrease in the FY 1983 funding estimate is due to the transfer of $17.2 million from project DE94, Army Electronic Proving Ground, to a new program element, 6.58.07.A, Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE); provisions of several million dollars for reducing the backlog of maintenance and repair of real property; and a small reduction due to the application of revised inflation pricing indices.

. (U) OTHER APPROPRIATION FUNDS ($ in thousands)

Program Element: #6.58.04.A

Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451 - Major Ranges and Test Facilities

Budget Activity: #6 - Defensewide Mission Support

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army						
Funds (current requirements)	3950	4200	19850	28201	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	0	0	5000	Not Shown	Continuing	Not Applicable

FY 1981 funding was for a water system, multiuse instrumentation sites, and ceiling insulation at Yuma Proving Ground, White Sands Missile Range, and Aberdeen Proving Ground, respectively. FY 1982 funding is for a kinetic energy launch system, storm sashes on 64 buildings, and sprinkler systems (OSHA), all at Aberdeen Proving Ground. FY 1983 funding is for an M1 Abrams tank training facility, an addition to the Electromagnetic Environmental Test Facility, and a low-altitude air defense system launch complex at Aberdeen Proving Ground, Electronic Proving Ground (EPG), and White Sands Missile Range, respectively. FY 1984 funding is primarily for replacement of a gas filter system (OSHA), Division Air Defense Gun system training facility, and a chapel center, all at Aberdeen Proving Ground. All these projects, except for the FY 1983 project at EPG, were omitted last year from the RDTE Congressional Descriptive Summaries (CDS), because of program changes after submission of the RDTE-CDS.

Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: This program consists of five separate projects, each of which provides funding for a major test facility operated by the US Army Test and Evaluation Command (TECOM), a subordinate command of the US Army Materiel Development and Readiness Command (DARCOM). Development Testing (DT) is conducted to support decisionmaking related to materiel acquisition programs by demonstrating that design risks have been minimized, that the engineering development process is complete, and that the system will meet its specifications. DT includes measurement of technical performance, safety, reliability, and maintainability characteristics, which can only be accomplished with instrumentation commensurate with the capabilities of the materiel being tested. DT also includes determining that natural environmental performance requirements have been met. These test facilities also conduct production, product improvement, and other tests. The five projects provide funding to four proving grounds and White Sands Missile Range (WSMR), for three broad task areas: improvement and modernization of test capabilities, base operations, and other costs in support of testing not directly attributable to an individual test. These ranges operate under a uniform Department of Defense funding policy that requires each facility to pay for the indirect costs of testing and requires users of these facilities to pay for the direct costs of testing.

G. (U) RELATED ACTIVITIES: These five test facilities plus other designated Army, Navy, and Air Force test facilities make up the DOD Major Range and Test Facility Base. Two other Army facilities are included: Kwajalein Missile Range, financed by PE 6.53.01.A and Jefferson Proving Ground, Indiana, which is not financed by the RDTE appropriation. 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. Liaison personnel are assigned to assure that appropriate coordination takes place with these closely related activities. Further, the Office of the Director of Defense Test and Evaluation reviews management, operation, and maintenance of all DOD test facilities and planned testing activities 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. Projects DE95, Cold Regions Test Center; DE96, Tropic Test Center; and DE97, High Energy Laser System Test Facility (HELSTF) were all included in this program element, 6.58.04.A, until FY 1981. In FY 1982, the two test centers were transferred to PE 6.57.02.A, Support of Development Testing, and HELSTF was transferred to a separate PE 6.58.06.A. Starting in FY 1983, a significant Army effort to establish a capability to conduct systems performance and interoperability tests of large computer-based, advanced command, control, communications, and intelligence (C3I) systems is transferred from project DE94, Army Electronic Proving Ground, in this PE 6.58.04.A, to a new PE 6.58.07.A, Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE). MAINSITE will enable testing of C3I systems in an electromagnetic environment similar to that expected in a battlefield situation. The FY 1982 and FY 1983 restructuring actions limit PE 6.58.04.A to those DARCOM Major Ranges and Test Facilities that have been designated as part of the DOD Major Range and Test Facility Base, and also provide the HELSTF and MAINSITE programs with greater management visibility.

rogram Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

. (U) WORK PERFORMED BY: The work is primarily performed by in-house personnel (civilian and military) assigned to the S Army Test and Evaluation Command. Test support functions, such as data collection and reduction, are performed by contractor personnel. Housekeeping functions, such as custodial, ground maintenance, and repair of facilities, are also carried out by contractor personnel.

. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Testing was conducted to support the Army's materiel acquisition process on ajor developmental weapon systems such as: Improved Hawk, Patriot, Roland, Lance, Stinger, and Pershing Missile Systems; lack Hawk Helicopter; CH-47 Helicopter modernization; Advanced Attack Helicopter; M1 Abrams Tank; Infantry and Cavalry ighting Vehicles; signal and electronic equipment; engineer equipment; and munitions. In FY 1981, a major change made was hat PE 6.58.04.A finances base operations support to Army R&D agencies located at Aberdeen Proving Ground on a nonreimbursable basis. This change was related to decapitalization of the Army Industrial Fund and the Army's host/tenant policy, by hich the host installation provides base operations support to those tenant agencies financed by the same appropriation as he host. The backlog of deferred maintenance and repair of real property at the test facilities grew in FY 1981 and prior ears, such that it has become difficult to manage. A small fraction of the needed modernization of instrumentation was ccomplished.

2. (U) FY 1982-FY 1984 Planned Program: Testing will be conducted to support the Army's materiel acquisition process n major Army developmental systems such as: M1 Abrams Tank Systems (105 and 120mm), Infantry/Cavalry Fighting Vehicles, mproved TOW Vehicle, Armored Forward Area Vehicle, Division Air Defense Gun, Multiple Launch Rocket System, Single-Channel round and Airborne Radio System, Joint Tactical Microwave Landing System, Navy Tomahawk Cruise Missile, Air Force Cruise issile, Copperhead, Stinger and Patriot Air Defense Missile Systems, Air Force Remotely Piloted Vehicle, NASA Space Shuttle nd Landing Rockets, and HELLFIRE Fire and Forget Missile System. The program calls for significant improvement and moderization of test capability. The facilities will then be able to conduct tests of advanced weapon systems and equipment ffectively and efficiently. The program also calls for constraining plant deterioration and for making substantial reductions in the backlog of deferred maintenance and repair of real property.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #DE90 Title: Yuma Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: Yuma Proving Ground (YPG) is one of the ranges of the Department of Defense (DOD) Major Range and Test Facility Base. Its assigned mission is to plan, conduct, evaluate, report on, and support 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 artic environmental tests at the US Army Cold Regions Test Center, Fort Greely, AK, as directed by HQ, US Army Test and Evaluation Command (TECOM). Its land area comprises more than 1 million acres with restricted airspace ranging from the surface to 80,000 feet. Major facilities include a 420,000-acre artillery firing range with 21 firing positions and a maximum range capability to 74,000 meters and three fully instrumented impact areas; a 420,000-acre air-to-ground and ground-to-ground fully instrumented aircraft armament range; an instrumented air delivery test area of 1,000 acres containing separate drop zones for equipment, personnel, and hazardous items; and mobility test areas comprising 78,000 acres including gravel, hill, sand, and rock courses, test slopes of varying grades, swimming and fording facilities and a two-mile dynamometer course. This project finances the costs of operating and maintaining the proving ground and those indirect costs for testing not reimbursed by users. Indirect costs include three broad task areas: procurement of instrumentation, base operations, and test support.

B. (U) RELATED ACTIVITIES: Project DE90 is one of five projects comprising Program Element (PE) 6.58.04.A. These projects are managed by the US Army Test and Evaluation Command (TECOM). The other four projects finance costs at White Sands Missile Range, NM; Army Electronic Proving Ground, Ft Huachuca, AZ; Dugway Proving Ground, UT; and Aberdeen Proving Ground, MD. These five installations/activities and other DOD test and evaluation facilities operate under a uniform funding policy. Under this policy, the facilities finance all indirect testing costs, with the users or test proponents at these facilities paying all direct testing costs. YPG, the US Army's desert climatic test center, is one of the three Army installations/activities responsible for natural environmental testing. The other two, the US Army Cold Regions Test Center, Fort Greely, AK, and the US Army Tropic Test Center in the Panama Canal Zone, are funded in PE 6.57.02.A. and provide testing services to users on a nonreimbursable basis (i.e., including both direct and indirect costs). The Office of the Director of Defense Test and Evaluation reviews management, operation, and maintenance of all DOD test facilities and planned testing activities 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.

Project: #DE90 Title: Yuma Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

C. (U) WORK PERFORMED BY: Work is performed by Department of the Army civilian and military personnel with associated contractual support. Telecommunications services are provided by the US Army Communications Command, Ft Huachuca, AZ. Navajo Army Depot, Flagstaff, AZ, provides ammunition storage support.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Yuma Proving Ground (YPG) has developed a highly sophisticated range capability with realtime multitarget space position capability. Instrumentation includes precision laser trackers, Graphic Display Network, Multi-Target Trilateration Position Locating System, Telemetry Data Processing, Radar and Optical Tracking, High Frequency Data Recording and Video Scoring, all integrated into a computer-controlled network, which gives YPG a unique capability for testing Army aircraft armament and artillery weapons. During FY 1981, 125 tests were completed including 50 Army research and development tests, 34 Army production and post-production tests, 5 Army product improvement tests and malfunction investigations, and 36 other tests. Testing accomplished included: development testing of the Advanced Attack Helicopter (AAH); desert and environmental testing of M1 Abrams Tank; munitions for aircraft and antiaircraft weapons systems; a variety of conventional and nuclear artillery ammunition components (8 inch and 155mm) including the Selected Target Activated Fire and Forget (STAFF) weapon system; Long-Range Surveillance System (AN/USD-502); Global Positioning System (GPS) Sensor; Vehicle-Mounted Road Mine Detector System; and production acceptance and stockpile reliability testing of artillery ammunition, 105mm through 175mm.

2. (U) FY 1982-1984 Program: Based upon proven forecasting techniques, workload will be more than 40% above projected in-house capability. The testing backlog will be dealt with by means of overtime and significant contractor augmentation, onsite, in such critical functional areas as: range data acquisition, collation, and reduction; computer software development and interface; computer system maintenance and conversion; and environmental test facility operations and maintenance. These techniques for dealing with the test workload backlog will be used when necessary to preclude delays in development and fielding of weapons systems essential to defense readiness goals. Tests scheduled include: Elevated Kinetic Energy Weapon Test Bed Program, Fire Support Team Vehicle, Advanced Attack Helicopter, Multipurpose Submunition Warhead for 2.75-Inch Rocket System, 155mm Antitank Projectile, Enhanced COBRA Armament, High Mobility Multipurpose Wheeled Vehicle, Type V Airdrop Platform, Aircraft Controlled Exit System, AN/TPQ-36 Artillery Locating Radar, Selected Target Activated Fire and Forget (STAFF) weapon system, Sense and Destroy Armor Cannon munition, Random Time Delay Submunition Projectile, NATO field artillery ammunition, Indirect Fire Training Ammunition, Day-Night Mast-Mounted Sight, Interim

Project: #DE90 Title: Yuma Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

High-Altitude Resupply System, Automatic Actuator for Reserve Parachute, and production acceptance and stockpile reliability testing of artillery munitions of all calibers. Improvement and modernization of instrumentation includes: a surveillance radar system, expansion of the position-locating system and the laser tracker system, and automatic data processing equipment to link the major instrumentation (e.g., laser tracker, radar) to a distributed data net. This project also provides for constraining deterioration of the physical plant and reducing the backlog of maintenance and repair of real property (e.g., repair of range targets and firing bays in FY 1982, test tracks and road surfaces in FY 1983, and munition storage and handling facilities in FY 1984).

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

4. (U) Major Milestones: Not Applicable.

5. (U) Resources: ($ in thousands)

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	24301	32837	37550	40612	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	26831	35553	37449	Not Shown	Continuing	Not Applicable

The decrease in FY 1981 funding represents a reduction in funding by YPG for contractual services such as data reduction, due to funds being reallocated to high-priority maintenance and repair of real property and modernization of test facilities at other test activities funded by this program element, 6.58.04.A. The decrease in the FY 1982 funding level is a result of the September 1981 amended budget and Congressionally directed adjustments. The slight increase in the FY 1983 funding level is due to expansion of planned maintenance and repair of real property, partially offset by revised inflation pricing indices.

Project: #DE90
Program Element: #6.58.04.A

Title: Yuma Proving Ground
Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451 - Major Ranges and Test Facilities

Budget Activity: #6 - Defensewide Mission Support

Other Appropriations:

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
Military Construction, Army						
Funds (current requirements)	2650	0	0	1650	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	Not Shown	0	0	Not Shown	Continuing	Not Applicable

FY 1981 funding was provided for installation of a new water system. The FY 1984 requirement is for a "Quality of Life" project, construction of a gym at this remote location.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #DE91 Title: Aberdeen Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: Aberdeen Proving Ground (APG), MD, 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 (DARCOM). APG has the mission to conduct tests of weapon systems, rocket and missile systems, munitions and munition 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 it conducts nuclear radiation survivability evaluations. With its 75,000 acres, half of which are under water, instrumented firing of weapons up to ranges of 34,000 meters is possible. Approximately 100 firing positions are available for testing different types of weapons and equipment. The Munson Test Area contains facilities to test and evaluate wheeled and tracked vehicles and their component systems, and consists of dust, rock, hill, level, dynamometer, paved, Belgian block and gravel courses. Test slopes with grades from 10% to 60%, turning radii circles, and suspension and vibration test courses are also available. This project finances the costs of operating and maintaining the proving ground and those indirect costs for testing not reimbursed by users. Indirect costs include three broad task areas: procurement of instrumentation, base operations, and test support. Prior to FY 1981, this project funded base operations costs only for the Materiel Testing Directorate of APG. Starting in FY 1981, a major change was made; this project provided base operations support to Army R&D agencies located at APG on a non-reimbursable basis. This change was related to decapitalization of the Army Industrial Fund and the Army's host/tenant policy, by which the host installation provides base operations support to those tenant agencies financed by the same appropriation as the host. Included are such agencies as the Ballistic Research Laboratory, Chemical Systems Laboratory, Army Materiel Systems Analysis Activity, Human Engineering Laboratory, US Army Biomedical Laboratory, and Headquarters, US Army Test and Evaluation Command (TECOM).

B. (U) RELATED ACTIVITIES: Project DE91 is one of five projects that comprise Program Element (PE) 6.58.04.A. The other projects finance DE90, Yuma Proving Ground, AZ; DE92, Dugway Proving Ground, UT; DE93, White Sands Missile Range, NM; and DE94, US Army Electronic Proving Ground, Fort Huachuca, AZ. These five test facilities and other test and evaluation facilities of the Department of Defense (DOD) operate under a uniform funding policy for test and evaluation services within the overall DOD Major Range and Test Facility Base. The Office of the Director of Defense Test and Evaluation reviews management, operation, and maintenance of all DOD test facilities and planned testing activities 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.

Project: #DE91 Title: Aberdeen Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

C. (U) WORK PERFORMED BY: Work is performed by Department of the Army civilian and military personnel. Telecommunications services are provided by the US Army Communications Command, Fort Huachuca, AZ. Until FY 1980, only a small portion (about $400,000) of the APG Materiel Test Directorate's work was done by contractors; however, to cope with the test workload, which exceeds capability by more than 50%, the US Army Test and Evaluation Command (TECOM) initiated a contract augmentation plan in FY 1981 to augment (not replace) the in-house capability.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: During FY 1981, 352 tests were completed. Included were: Division Air Defense (DIVAD) Gun System; Infantry and Cavalry Fighting Vehicles (IFV/CFV); M1 and M60A3 Main Battle Tanks; highly instrumented ballistic testing of weapons, munitions, and armor plate, including research, development, and production tests of depleted uranium (DU) ammunition, improved field artillery, and 105mm and 120mm weapons sytems for the M1 tank; numerous improved conventional munitions; 155mm Howitzer, M198; British 81mm Mortar System; tests for the Navy under the Magazine Protection Enhancement Program; mobility and performance tests of tactical and support vehicles, such as semitrailers; and a bridge-erection boat. Construction of a complete range facility for depleted uranium (DU) munitions plate penetration and accuracy testing was completed in FY 1981. Test capability was improved with the successful completion of Phase I of the Automated Data Acquisition and Processing Techniques (ADAPT) system and initiation of Phase II to upgrade speed in data handling. During this period, test instrumentation was also acquired to replace obsolete equipment and improve capability for measuring projectile velocities, failure analysis, and other tests of materiel.

2. (U) FY 1982-FY 1984 Planned Program: To minimize delays in testing, efforts are underway to augment in-house capability with contracts for testing services. Some major areas that will involve contract augmentation are automotive operations, HAWK radar improvements, and machinery and welding shop support services. Test programs scheduled include: DIVAD Gun; Vehicle Rearm System; DU and conventional tank munitions, 90mm through 120mm; M1 Tank (105mm), M1E1 Tank (120mm), and tank gun integration; Combat Vehicle Technology Program; Battalion Mortar System; NATO field artillery ammunition; Armored Fighting Vehicle Large Caliber Armament System; Armored Forward Area Vehicle; Lightweight Company Mortar System; Petroleum Hoseline System; Infantry Fighting Vehicle (IFV); continued production acceptance testing of artillery weapons and armor plate; tactical and support vehicles; general equipment, including generator sets and fuel cell power units, 1.5 kW through 100 kW; bridging systems; 30-ton Lighter Air Cushion Vehicle (LACV-30); trailers, semitrailers, shelters, and mobilizers; High Mobility Multipurpose Wheeled Vehicles; and trucks, 1/2 ton through 5 ton. Instrumentation will be acquired to upgrade testing capability, to include: high-speed video instrumentation for evaluating projectile flight characteristics; test site terminals able to store more data and to process data quicker as part of ADAPT Phase II; dedicated instrumentation at the

Project: #DE91
Program Element: #6.58.04.A

Title: Aberdeen Proving Ground
Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451 - Major Ranges and Test Facilities

Budget Activity: #6 - Defensewide Mission Support

direct fire range able to support higher volume workload; improved data reduction and analysis ability at the main computer facility; and a better test capability in such areas as combat and commercial vehicles and shock/vibration. APG will constrain deterioration of the physical plant. In FY 1984, a substantial effort will be devoted to reducing the backlog of deferred maintenance. Examples of the latter are: repairs required by the environmental chamber for testing vehicles, special automotive test courses, and the ammunition handling facility. Army R&D agencies located on or satellited on the proving ground will continue to be furnished housekeeping services on a nonreimbursable basis.

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

4. (U) Major Milestones: Not Applicable.

Project: #DE91 Title: Aberdeen Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	51459	72342	71578	90496	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	51294	76827	73440	Not Shown	Continuing	Not Applicable

FY 1981 funding increased slightly as a result of minor differences between actual program execution costs and the funding estimate made one year earlier. The decrease in the FY 1982 funding level is a result of the September 1981 amended budget and Congressionally directed adjustments. The decrease in the FY 1983 funding estimate is due to the application of revised inflation pricing indices.

Other Appropriations:

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate
Military Construction-Army				
Funds (current requirements)	300	4200	9400	26231
Funds (as shown in FY 1982 submission)	Not Shown	Not Shown	Not Shown	Not Shown

FY 1981 funding is for installation of ceiling insulation (energy conservation). FY 1982 funding is for a kinetic energy launch system, for storm sashes on 64 buildings (energy conservation), and for a sprinkler system in Phillips Army Airfield hangar (OSHA). FY 1983 funding is for a training facility for the M1 tank. FY 1984 funding is for replacement of a gas filter system (OSHA), a DIVAD training facility, and a Chapel Center.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #DE92 Title: Dugway Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: Dugway Proving Ground (DPG), UT, 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 (DARCOM). DPG has a unique mission to plan, conduct, and report on research and development, production, and product improvement tests that assess the military value of chemical weapons and chemical/biological defense systems and to provide overall battlefield obscurant/smoke testing support for Department of Defense (DOD) flame, incendiary, and smoke munition systems and for other governmental agencies. Effective 1 July 1974, DPG was designated a major test facility within the DOD Major Range and Test Facility Base. It operates under a uniform DOD reimbursement policy for major ranges and test facilities wherein users of these facilities pay all direct test costs. This project finances indirect costs of testing and the costs of operating and maintaining the proving ground.

B. (U) RELATED ACTIVITIES: DPG is one of five TECOM installations/activities in this program element. The others, which also operate under the uniform DOD funding policy are: DE93, White Sands Missile Range, NM; DE90, Yuma Proving Ground, AZ; DE94, US Army Electronic Proving Ground, Ft Huachuca, AZ; and DE91, Aberdeen Proving Ground, MD. The Office of the Director of Defense Test and Evaluation reviews management, operation, and maintenance of all DOD test facilities and planned testing activities 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.

C. (U) WORK PERFORMED BY: Test and evaluation services are performed by assigned Department of the Army civilian and military personnel with associated contractual support. Contractors include: Hawthorne Aviation (Aircraft Maintenance), Charleston, SC; International Business Machines (IBM), Oswego, NY; and Tri-State Maintenance (Janitorial), Salt Lake City, UT.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) *FY 1981 and Prior Accomplishments:* Accomplishments include testing, analysis, and evaluation of a broad range of demilitarization equipment; onsite scientific and technical support to Smoke/Obscurant Candidate Baseline R&D (Smoke Weeks); Smoke Obscurant and 155mm/8-inch Binary Munitions; Chemical and Biological Defensive Systems and Equipment, including alarms and all classes of protective clothing and equipment; Navy and Air Force Cruise Missiles, Terrain Decontamination Evaluation; and a Man-Portable Smoke Generator. Investigations have included target vulnerability for US and allies;

Project: #DE92 Title: Dugway Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

Entomological Weapon Capabilities; Biological Defense; development of diffusion models and concepts; foreign biological threat and vulnerability assessments; US Navy Shipboard Decontamination; Outdoor Diffusion; Effectiveness of Decontaminants on Airstrip Materials; Helicopter Operations in Toxic Environments; and assessment of genetic engineering relative to bio-threat. Improvement and modernization efforts provided for refurbishing the instrumentation of a physical test chamber for testing chemical defensive equipment; modernizing the electronic circuitry of a Nike-Hercules tracker, an existing radar, at great savings in capital expense; and procuring a laser-based radar system to measure smoke and chemical gas intensities.

2. (U) FY 1982-FY 1984 Program: Test workload will exceed projected in-house capability by over 100%. Augmentation contracting with the private sector is planned to reduce the test workload backlog. Major tests scheduled include Chemical Agent-Resistant Paint, Infrared-Defeating Grenade System, the XM30 Protective Mask, a variety of smoke and obscurant munitions, support of Air Force/Navy Cruise Missile testing, 155mm and 8-inch Binary Munitions, Toxological Protective Outfit, Riot Control Convoy System, and the Jet Exhaust Powered Decontamination System. Planned investigations include target vulnerability assessments, technical assessment of foreign biological threat, development of an automatic chemical analyzer, tri-Service chemical/biological investigations, and obscurant environmental studies. Improvement and modernization will provide for: upgrading of field data acquisition systems, artillery range and optical instrumentation, and environmental/physical test chambers; and replacement of obsolete chemical, life sciences, photographic, and calibration equipment. The smoke test and evaluation capability will be enhanced with addition of a universal obscurant/smoke test grid. Maintenance and repair projects will include repair of safety hoods and vents at the chemical laboratory facility and replacement of sampling vials and wiring at the instrumented grids. Starting in FY 1984, an effort to reduce the backlog of essential maintenance and repair is programed, to include repair of chemical storage facilities, water systems and roads.

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

4. (U) Major Milestones: Not Applicable.

Project: #DE92 Title: Dugway Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	19811	23857	29264	29231	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	18887	26396	28708	Not Shown	Continuing	Not Applicable

The increase in FY 1981 funding is a result of reallocation of funds from other test facilities within PE 6.58.04.A, for high priority maintenance and repair projects. The decrease in the FY 1982 funding level is a result of the September 1981 amended budget and Congressionally directed adjustments. The small increase in the FY 1983 funding level is due to expansion of planned maintenance and repair of real property, partially offset by revised inflation pricing indices.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #DE93 Title: White Sands Missile Range
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: White Sands Missile Range (WSMR), NM, 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 (DARCOM), with the primary mission of supporting missile, aircraft, and space vehicle tests of various national programs to include Defense Advanced Research Projects Agency (DARPA), National Aeronautics and Space Administration (NASA), and Department of Energy (DOE). To meet increasingly complex and stringent range user requirements, a modernization program was recommended by the Army Scientific Advisory Panel and established in FY 1974 to insure that technological advances in range capabilities paralleled advances in weaponry. This range occupies a land area of 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, and 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. A Nuclear Effects Facility is capable of testing the effects of radiation on materials at predetermined levels of nuclear blast or environment. A mission to support high-energy laser systems testing was assigned in FY 1976, and a triservice High-Energy Laser System Test Facility (HELSTF) has been established at WSMR. Until this year, funding for the establishment of HELSTF has been provided through this WSMR project and/or within PE 6.58.04.A. To facilitate the management of this important DOD facility, PE 6.58.06.A has been established (until HELSTF achieves operational status).

B. (U) RELATED ACTIVITIES: Project DE93 (WSMR) is one of five projects comprising Program Element (PE) 6.58.04.A. The other four projects finance DE90, Yuma Proving Ground, AZ; DE91, Aberdeen Proving Ground, MD; DE92, Dugway Proving Ground, UT; and DE94, Army Electronic Proving Ground, Ft Huachuca, AZ. These four test facilities, WSMR, and other test and evaluation facilities of the Department of Defense (DOD) operate under a uniform funding policy within the overall Major Range and Test Facility Base of the Department of Defense. The High-Energy Laser System Test Facility, located at WSMR, is now funded in PE 6.58.06.A. WSMR is one of two national ranges managed by the Army, the other being Kwajalein Missile Range (KMR), PE 6.53.01.A. There is close and continuous coordination between WSMR, other national ranges, other service test and evaluation activities, and developing agencies to insure optimum support to all DOD programs and to avoid duplication and inefficiency.

Project: #DE93 Title: White Sands Missile Range
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

C. (U) WORK PERFORMED BY: Most of the work is performed by Department of the Army civilian and military personnel assigned to WSMR. Contract support to WSMR will total approximately $47 million during FY 1983. Contractors include RCA, Moorestown, NJ; Physical Science Laboratory, New Mexico University, Las Cruces, NM; IBM, Oswego, NY; Lockheed Engineering Services Division, Houston, TX; International Sensor Systems, Aurora, NE; Vega Enterprises, El Paso, TX; and Dynalectron Corporation, Albuquerque, NM. Government agencies providing support include US Army Communications Command, Ft Huachuca, AZ; Defense Mapping Agency, Washington, DC; US Army Research Office, Durham, NC; Lexington-Bluegrass Army Depot Activity, Lexington, KY; US Air Force Special Weapons Test Center, Kirtland and Holloman Air Force Bases, NM; and Department of Commerce, National Bureau of Standards, Washington, DC.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: White Sands Missile Range (WSMR) supported Department of Defense (DOD) and National Aeronautics and Space Administration (NASA) programs providing test and evaluation services to developers of missile and related systems. Production and product improvement tests are also supported. Major test projects included Patriot Air Defense System; Pershing II and Lance Ground-to-Ground Missile Systems; Hawk and US Roland Mid-Range Air Defense Missiles; Chaparral and Stinger Short-Range Air Defense Missile Systems; Tactical Fire Direction System (TACFIRE); Copperhead Cannon-Launched Guided Projectile; Nuclear Weapons Effects Program; Navy and Air Force Cruise Missile; Navy Air Weapons; and NASA Space Shuttle. Major instrumentation improvements for FY81 include replacement of the scientific and engineering computer, modernization of the communication and telemetry systems, and distant object attitude measurement system improvements. Provides for constraining further deterioration of the physical plant.

2. (U) FY 1982-FY 1984 Program: Major test programs include: M1 Abrams Tank, Nuclear Weapons Effects Program, Pershing II, Stinger, Improved Hawk, Patriot, Air Force and Navy High-Energy Laser Systems, NASA sounding rockets, Division Air Defense Gun (DIVAD), the Space Shuttle, nuclear survivability programs, Advanced Medium-Range Air-to-Air Missile, Copperhead, Lance, and numerous Navy and Air Force missile/weapon systems. Instrumentation acquisitions include procurements of modernized airspace surveillance radars; scientific and engineering computer replacements; telemetry receiving system modernization; video conversion; communications system modernization; microwave imaging radar; test and control equipment for the rain, humidity, and salt spray environmental chamber; radiographic test facility equipment; and ground-based remote control target vehicles. A significant instrumentation acquisition in FY 1984 will be a multitarget tracking radar that will replace several of the existing single-target trackers with increases in efficiency and scheduling flexibility. Provides for constraining further deterioration of the physical plant and for reducing the backlog of essential maintenance and repair of real property such as repair of environmental conditioning chambers, target ranges, and vibration test stands.

Project: #DE93 Title: White Sands Missile Range
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

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

4. (U) Major Milestones: Not Applicable.

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	109940	126593	146225	159434	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	108204	134198	138891	Not Shown	Continuing	Not Applicable

The FY 1981 funding increase came from a reallocation of funds from other projects within this PE for high-priority maintenance and repair of real property. The decrease in the FY 1982 funding level is a result of the September 1981 amended budget and Congressionally directed adjustments. The increase in the FY 1983 funding level is due to expansion of maintenance and repair of real property and of instrumentation modernization (i.e., procurement of an airspace surveillance radar), partially offset by revised inflation pricing indices.

Project: #DE93 Title: White Sands Missile Range
Program Element: #6.58.04.A Title: US Army Materiel Development and Readiness Command (DARCOM) Ranges/Test Facilities

DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

Other Appropriations:

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army						
Funds (current requirements)	1000	0	5500	320	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	Not Shown	0	Not Shown	Not Shown	Continuing	Not Applicable

FY 1981 funding was for multiuse instrumentation sites. FY 1983 funding will provide a low-altitude air defense systems launch complex. FY 1984 funding is for a "Quality of Life" project, an addition to a gymnasium at this remote location.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #DE94
Program Element: #6.58.04.A
Title: Army Electronic Proving Ground
Title: US Army Materiel Development & Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities
Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: The US Army Electronic Proving Ground (AEPG), Ft. Huachuca, AZ, is a tenant on Ft. Huachuca and a Field Operating Activity of the US Army Test and Evaluation Command (TECOM), a subordinate command of the US Army Materiel Development and Readiness Command (DARCOM). The proving ground was established in 1954. Its primary mission is to plan, conduct, evaluate, and report on and/or support development and other tests of Army communications and electronic warfare equipment and tactical automated command and control systems. Other missions are to plan, conduct, and report on electromagnetic compatibility (EMC) and electronic countermeasure (ECM) tests and analyses, and to operate and maintain three major test facilities: Electromagnetic Environmental Test Facility, System Test Facility, and the Software/Computer Evaluation Facility. Responsibility for development testing formerly performed by the US Army Security Agency Test and Evaluation Center was transferred to AEPG on 1 October 1977. This mission encompasses development testing of tactical electronic warfare and signal intelligence equipment. An expanded mission is to conduct full performance and interoperability tests of command, control, communications and intelligence systems (C3I) in an electromagnetic environment like that expected in a battlefield situation. The effort to establish this capability has been transferred to a new program element, 6.58.07.A, Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE), starting in FY 1983, to give greater management visibility to the significant effort involved. Testing support is also provided to the other military Services. The naturally quiet electromagnetic environment, expansive real estate, and low annual rainfall of the area, together with its special facilities, make the AEPG capability unique within the Department of Defense (DOD). The majority of testing is conducted within its laboratories, in the System Test Facility, on the outdoor electronic range, and in the Electromagnetic Environmental Test Facility, which is specifically designed to simulate the intended electromagnetic environment, to permit analysis of equipment in operational environments.

B. (U) RELATED ACTIVITIES: There are four other projects in this program element (PE): DE93, White Sands Missile Range, NM; DE90, Yuma Proving Ground, AZ; DE92, Dugway Proving Ground, UT; and DE91, Aberdeen Proving Ground, MD. These four, AEPG, and other DOD test and evaluation facilities operate under a uniform DOD Funding Policy. This project provides funding for indirect testing costs at AEPG; test proponents (users) pay all direct test costs. The Office of the Director of Defense Test and Evaluation reviews management, operation, and maintenance of all DOD test facilities and planned testing activities 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.

Project: #DE94 Title: Army Electronic Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development & Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

C. (U) WORK PERFORMED BY: Testing is performed by military and civil service personnel assigned to AEPG, with associated contractor support. Major contractor effort involves the operation and maintenance of the Electromagnetic Environmental Test Facility and the Systems Test Facility by Bell Aerospace Company, Tucson, AZ.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: During FY 1981, the proving ground conducted and completed 86 tests. Equipment under test included: Quick Fix (AN/ARQ-33), B-52 Offensive Avionics Support for US Air Force, TRI-TAC family of joint tactical communications equipment, Joint Services Intrusion Detection System, Platoon Early Warning System, Single-Channel Ground and Airborne Radio System, Tactical Computer System, Remotely Piloted Vehicles, and the Digital Transmission Evaluation Program. During FY 1981 and prior, test instrumentation was acquired to replace obsolete electronics instrumentation and to upgrade wire and radio communications test capability.

2. (U) FY 1982-FY 1984 Program: Scheduled tests include: Tactical Fire Direction System (TACFIRE), Field Artillery Meteorological Acquisition System, Integrated Inertial Navigation System, Joint Tactical Microwave Landing System, PATRIOT Air Defense Missile System, Analytical Photogrammetric Positioning System, TRAIL BLAZER (AN/TSQ-114A), Automatic Communications Central, and Facility Intrusion Detection System. Projected test workload will exceed projected test capability by approximately 20% each year. Starting in FY 1981 AEPG began to establish a capability for testing automated battlefield command, control, communications and intelligence (C3I) systems. In FY 1983, this effort will be transferred to a new program element, 6.58.07.A, Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE). Instrumentation for testing of electronic countermeasures (ECM) vulnerability will also be procured. AEPG will jointly procure with the Air Force the AN/FPS-117 surveillance radar to improve space positioning capability. An improved radar will be installed to provide a more efficient tracking capability. The measurement of undesired electromagnetic radiation will be automated. A modern identification test capability will also be acquired.

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

4. (U) Major Milestones: Not Applicable.

Project: #DE94 Title: Army Electronic Proving Ground
Program Element: #6.58.04.A Title: US Army Materiel Development & Readiness Command (DARCOM) Ranges/Test Facilities
DOD Mission Area: #451 - Major Ranges and Test Facilities Budget Activity: #6 - Defensewide Mission Support

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	12240	23295	16054	18074	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	12181	24679	31727	Not Shown	Continuing	Not Applicable

FY 1981 funding increased slightly to reflect actual costs of program execution. The decrease in the FY 1982 funding estimate is a result of the September 1981 budget amendment and congressionally directed adjustments. The decrease in the FY 1983 estimate is a result of the transfer of the MAINSITE effort ($17.2 million) to a new PE, 6.58.07.A, and the application of revised inflation pricing indices, partially offset by an expansion in the planned maintenance and repair of real property.

Other Appropriations:	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Army						
Funds (current requirements)	0	0	4950	0	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	0	0	5000	Not Shown	Continuing	Not Applicable

Funds are required in FY 1983 for an addition to the Electromagnetic Environmental Test Facility. The estimate has been decreased slightly as a result of refinement of estimated construction cost.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: 6.58.05.A Title: Munitions Standardization, Effectiveness, and Safety
DOD Mission Area: 4440 - Technical Integration/Studies and Analyses Budget Activity: 6 - Defensewide Mission Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	6524	7476	8047	10734	Continuing	Not Applicable
D620	DOD Munitions Effectiveness	5000	6426	6740	9377	Continuing	Not Applicable
M857	Explosive Safety Standards	776	657	917	973	Continuing	Not Applicable
DF21	NATO Munitions Standardization	748	393	390	384	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 munitions 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 logistic, strategic, and tactical advantages associated therewith. This is achieved by developing, implementing, and maintaining NATO Standardization Agreements (STANAG's) 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) located at US Army ARRADCOM, Ft Dix, NJ.

Program Element: #6.58.05.A Title: Munitions Standardization, Effectiveness, and Safety
DOD Mission Area: #440 - Technical Integration/Studies and Analyses Budget Activity: #6 - Defensewide Mission Support

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Project D620 (DOD Munitions Effectiveness) will continue to update and revise existing manuals and to add new manuals as vulnerability data, weapon characteristics, and delivery accuracy become available (see separate CDS on D620 for specifics). Project M857 (Explosive Safety Standards) supports the DOD Explosives Safety Board through determination of the fragment hazard from large stacks of stored ammunition; development of a hazard classification scheme for fragment-producing weapons; testing to evaluate thermal effects from combustible, nondetonating ammunition; development of advanced explosion-resistant structure design procedures; and development of hazard analysis and risk management techniques. Project DF21 (NATO Munitions Standardization) supports US participation in the work of the NATO Panel (AC/225 Panel III, Sub-Panel I) responsible for NATO small caliber ammunition; the implementation of NATO agreements into the US production base; the staffing, maintenance, and operation of the NARTC; and all necessary engineering and laboratory support required during FY 1983.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	6524	7476	8047	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	6303	7103	8510	Continuing	Not Applicable

Funding increases in FY82 and FY83 are due to realignment of Program Element resulting in project DF21 being included in this PE. The decrease in FY83 is a result of program realignment principally in Project D620.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable

Program Element: #6.58.05.A Title: Munitions Standardization, Effectiveness, and Safety
DOD Mission Area: #440 - Technical Integration/Studies and Analyses Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Project D620 (DOD Munitions Effectiveness): The Joint Technical Coordinating Group, Munitions Effectiveness (JTCG/ME) was established by Joint Chiefs of Staff Directive in 1963 and manages the effort conducted under this project. The JTCG/ME responds to directives from the Army Materiel Development and Readiness Command, Navy Materiel Command, Air Force Logistics Command, and the Air Force Systems Command. Steering Committee membership includes representatives from the Army, Navy, Air Force, Marine Corps, and the Defense Intelligence Agency. Quarterly meetings are held to review, in detail, current and planned programs. The project further provides the basis for the definition of and recommendation for corrective action to the Joint Logistics Commanders of problem areas and/or knowledge gaps related to munitions and weapons effectiveness; serves as a focal point for joint efforts to improve the data base and analytical methodology used to determine and predict nonnuclear munitions and weapons effectiveness in a realistic operational environment; and provides a means for the development, publication, and update of Joint Munitions Effectiveness Manuals (JMEM's) on a continuing basis. These manuals provide to the Services a uniform basis for munitions and weapons employment, planning, and use, the determination of munitions and weapons requirements, and the evaluation of new munitions and weapons concepts. Work in this project includes the preparation of JMEM's for air-to-surface, surface-to-surface, and antiair munitions/weapons systems; investigations in aircraft attrition; and supporting efforts in target vulnerability and survivability, selected systems effectiveness, and battle-damage assessment. Ad hoc tasks are undertaken as required to assist in the resolution of data deficiencies relative to existing munitions/weapons and their effectiveness. Project M857 provides for full-scale and subscale testing and supporting analysis directed toward improvement of tri-Service ammunition and explosives safety standards, published by the DOD Explosives Safety Board (DDESB) as DOD Standard 5154.4S. The DDESB, which manages this project, assesses blast, fragment, thermal, and toxic hazards to personnel and structures from potential accidental detonation of stored ammunition; develops design procedures for protective structure design and construction; and establishes operating safety standards and quantity-distance tables. The DDESB also establishes design procedures and storage layout criteria for magazines and explosives handling and manufacturing facilities. Project DF21 provides for participation in multilateral efforts to achieve complete battlefield interchangeability of all small caliber and automated-cannon caliber ammunition produced in all NATO countries; to implement resultant standardization agreements into US production; to participate in the design and operation of a mechanism for guaranteeing and maintaining compliance with NATO standardization agreements by the US.

G. (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.

Program Element: #6.58.05.A Title: Munitions Standardization, Effectiveness, and Safety
DOD Mission Area: #440 - Technical Integration/Studies and Analyses Budget Activity: #6 - Defensewide Mission Support

H. (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 the 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. 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 US Army ARRADCOM facilities located at Dover and Fort Dix, NJ.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: From 1963 to the present time, Project D620 (DOD Munitions Effectiveness) 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. Project M857 completed tests on full-scale, earth-covered ammunition storage magazines which have led to improved, less costly structure designs and to criteria for more efficient use of land storage areas. A continuing project effort has been testing and analysis of the fragment weight distributions and velocity profiles from exploding stacks of ammunition in order to improve standards for fragment protection. Project DF21 was funded from procurement allocations under which ammunition standardization programs were developed and implemented. FY 1981 was a transition year to RDTE funding. Below threshold reprograming in FY 1981 provided sufficient funds to continue ongoing efforts including operation of the North American Regional Test Center (NARTC).

2. (U) FY 1982-1984 Program: Project D620 will continue to update and revise existing manuals and to add new manuals as vulnerability, weapons characteristics, and delivery accuracy data become available. Project M857 will conduct

Program Element: #6.58.05.A Title: Munitions Standardization, Effectiveness, and Safety
DOD Mission Area: #440 - Technical Integration/Studies and Analyses Budget Activity: #6 - Defensewide Mission Support

confirmatory tests of fragmenting ammunition to validate fragmentation theory. Development of a hazard classification scheme for fragment-producing weapons will be initiated. Thermal effects studies to scale up behavior to magazine-size quantities will continue. A draft revision of TM5-1300 will be prepared, coordinated, and completed. Project DF21 will operate the North American Regional Test Center (NARTC) on behalf of NATO, conduct NATO interchangeability tests of 7.62mm, 9mm, 20mm X102, and 20mm X139 ammunition. Also, represent the US on NATO AC/225 (Panel III, Sub-Panel I) and working groups on tests technology and 25mm ammunition, authorize and monitor the application of the NATO symbol of interchangeability and conduct hazard test of European propellants.

3. (U) Program to Completion: All projects in this program element are continuing.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #D620 Title: DOD Munitions Effectiveness
Program Element: #6.58.05.A Title: Munitions Standardization, Effectiveness, and Safety
DOD Mission Area: #440 - Technical Integration/ Studies and Analyses Budget Activity: #6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: Project D620 (DOD Munitions Effectiveness): The Joint Technical Coordinating Group, Munitions Effectiveness (JTCG/ME) was established by Joint Chiefs of Staff Directive in 1963 and manages the effort conducted under this project. The JTCG/ME responds to directives from the Army Materiel Development and Readiness Command, Navy Materiel Command, Air Force Logistics Command, and the Air Force Systems Command. Steering Committee membership includes representatives from the Army, Navy, Air Force, Marine Corps, and the Defense Intelligence Agency. Quarterly meetings are held to review, in detail, current and planned programs. The project further provides the basis for the definition of and recommendation for corrective action to the Joint Logistics Commanders of problem areas and/or knowledge gaps related to munitions and weapons effectiveness; serves as a focal point for joint efforts to improve the data base and analytical methodology used in the determination and prediction of nonnuclear munitions and weapons effectiveness in a realistic operational environment; and provides a means for the development, publication, and update of Joint Munitions Effectiveness Manuals (JMEM's) on a continuing basis. These manuals provide to the Services a uniform basis for munitions and weapons employment, planning, and use, the determination of munitions and weapons requirements, and the evaluation of new munitions and weapons concepts. Work in this project includes the preparation of JMEM's for air-to-surface, surface-to-surface, and antiair munitions/weapons systems; investigations in aircraft attrition; and supporting efforts in target vulnerability and survivability selected systems effectiveness, and battle-damage assessment. Ad hoc tasks are undertaken as required to assist in the resolution of data deficiencies relative to existing munitions/weapons and their effectiveness.

B. (U) RELATED ACTIVITIES: Not Applicable.

C. (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 the Chemical Systems Laboratory at 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 Center, China Lake, CA. The project contractors are: Oklahoma State University at Eglin Air Force Base, FL, and Stillwater, OK; Falcon

Project: #D620 Title: DOD Munitions Effectiveness
Program Element: #6.58.05.A Title: Munitions Standardization, Effectiveness, and Safety
DOD Mission Area: #440 - Technical Integration/ Studies and Analyses Budget Activity: #6 - Defensewide Mission Support

Research and Development, Inc. at Denver, CO, and Albuquerque, NM; Armament System, Inc. at Anaheim, CA; Booz-Allen Applied Research, Bethesda, MD; Applied Research, Bethesda, MD; and the Denver Research Institute, Denver, CO.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: From 1963 and continuing to the present time, project D620 (DOD Munitions Effectiveness) has produced Joint Munitions Effectiveness Manuals (authenticated by the Services) 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. Realistic validation of analyses was obtained through comparison with battle data obtained during the Vietnam and Mideast conflicts. Battle damage data are stored and available for analyses at the Combat Data Information Center (CDIC). A program to assess environmental effects on weapon effectiveness was completed in 1975. Studies on vulnerability of US forces to chemical and biological attack and decontamination requirements in a chemical warfare environment were also completed in 1975. Detailed vulnerability data were published in 1967 and are continuously updated for foreign armored vehicles, field and antiaircraft artillery, airfields, field fortifications, bridges, land and water transportation, missile sites, radars, supply depots, and various complex industrial targets. From 1977 to 1981 (under severely reduced funding) vulnerability data have been increased in every category, and tests are underway to define guided and unguided bomb reliability and effectiveness against selected hard targets and clarify dynamic effects of shaped charge weapons against lightly armored vehicles. Air-to-surface effectiveness manuals for helicopters (materiel targets), the A-10 aircraft and risk estimate for friendly troops were prepared. Updates of effects data of the basic, visual deliveries, and radar delivery manuals were provided each year. Effects data were published on precision guided bombs against Soviet ships. A new technique was devised to estimate effectiveness of weapons against Soviet ships using engineering estimates. Antiair effectiveness manuals were completed for the Navy's Phalanx close-in (20mm gun) weapon system, two 5-inch/54, a 76mm naval gun, and the Improved HAWK Missile air defense system. Launch envelopes for the AIM-9H Sidewinder air-to-air missile were published. Surface-to-surface effectiveness manuals on the 5-inch/38, 8-Inch/55 naval guns, and nonnuclear Lance were published. Revisions and updates to existing manuals on 4.2-inch mortar; 105mm, 155mm, and 8-inch howitzers; the 175mm gun; Honest John rocket; 5-inch/38 and 5-inch/54 naval gun; M60A1 tank; and Infantry direct fire weapons; ammunition reliability and lethal areas were produced. A surface-to-surface Basic Manual was completed and published. The first visual target acquisition manual, an obscurants effectiveness manual, and a surface-to-surface weapons reliability manual were printed. Lethality and vulnerability data were produced in support of the Do. Joint Test of Tactical Aircraft Effectiveness and Survivability in Close Air Support Anti-armor Operations

Project: #D620 Title: DOD Munitions Effectiveness
Program Element: #6.58.05.A Title: Munitions Standardization, Effectiveness, and Safety
DOD Mission Area: #440 - Technical Integration/ Studies and Analyses Budget Activity: #6 - Defensewide Mission Support

(TASVAL). A study of the effectiveness of the Coast Guard's EX-83/R-76 30mm gun versus a Soviet patrol boat using Coast Guard scenarios was completed. An illumination effectiveness manual was produced. A first-cut manual on Red weapon effectiveness against Blue target was published. Beginning in 1980, the task of providing all future estimates of weapons effects against Soviet ships was undertaken.

2. (U) FY 1982-FY 1984 Program: Project D620 (DoD Munitions Effectiveness) will continue to update and revise existing manuals and to add new manuals as vulnerability, weapons characteristics, and delivery accuracy data become available. Specifically, air-to-surface effectiveness data against supply depots, POL refineries, two new tanks, several aircraft and helicopters, additional ships, rocket launchers, surface-to-air missile systems, and a scout car will be published. Detailed weaponeering data on the Soviet Kara and Kirov ships will be provided. A methodology for weapon effects against buildings will be updated. The surface-to-surface group will provide delivery accuracy data on the Navy's new 5-inch MK82(HIFRAG) projectile, other 5-inch projectiles, and the 76mm projectile. Work will continue on guided projectile methodology, and the mechanical-time indirect-fire fuze model will be documented. Work will start on developing delivery accuracy for the Navy's new long-range, surface-launched antiship TOMAHAWK missile. Surface-to-surface effectiveness will be provided as follows: work will continue on developing pamphlets for the M1 and M60A3 tanks, for the 105mm M102, the 155mm M198 and the 203mm (8-inch), M110AZ howitzers, for the Navy's HARPOON missile and for the effectiveness of US weapons in Military Operations in Urban Terrain (MOUT) environment; existing manuals will be updated by adding new projectiles and targets; e.g., M549 projectile, M712 Copperhead guided projectile, and several Soviet ship and artillery targets; work on new pamphlets will be initiated for the 60mm mortar M224, for the Navy's 76mm MK75 with MK92 Fire Control System, and for the M2 Army Infantry and M3 Cavalry Fighting Vehicles; and a Small Arms Handbook (less than 20mm) will be compiled. The antiair group will assess the vulnerability of a foreign aircraft to steel fragments and its engine to all threats. Updates will be made to the manuals on the Navy's 76mm, 5-inch, and 20mm guns used in a surface-to-air role and by adding helicopter targets to the Army's 20mm Vulcan air defense gun manual. New manuals on the Army's surface-to-air missiles (Chaparral, Roland, and Stinger) are scheduled to be published. Lethality envelopes for the AIM-54A (Phoenix) long-range air-to-air missile will be generated, and system performance data on the AIM-9L/M (Sidewinder) short-range air-to-air missiles will be gathered in support of new manuals for these missiles. An antiair Basic Manual will be started and published. Vulnerability of surface targets will be assessed. Work will continue on determination of hard structure vulnerability and dynamic effects of shaped charge weapons against lightly armored vehicles. Work will start on adding new weapons and targets to the Red on Blue manual. Chemical methodology will be updated, and effectiveness data gathered and generated based on the new methodology. A revised Smoke/Obscurants Primer will be published. Chemical effectiveness will be

Project: #D620 Title: DOD Munitions Effectiveness
Program Element: #6.58.05.A Title: Munitions Standardization, Effectiveness, and Safety
DOD Mission Area: #440 - Technical Integration/ Studies and Analyses Budget Activity: #6 - Defensewide Mission Support

calculated for specific air-to-surface and surface-to-surface weapons for additions to existing manuals. Results of the runway testing, hard structure testing, and dynamic effects and analyses will be factored into comparisons of weapons against foreign ships using engineering estimates, publish updates to the Basic, Visual Deliveries, and Radar Deliveries Manuals, participate in and obtain data from runway attack tests, publish an International Weapons Manual. The surface-to-surface group will initiate work on methodology to quantify indirect fire accuracy of the Navy's new 5-inch ICM projectile, formalize a rapid fire systems correlated methodology, and continue work on guided projectile methodology. Delivery accuracy data on the Navy's surface-launched antiship Tomahawk missile will be provided. Manuals will be completed for the M1 and M60A3 tanks, for the 105mm M102, the 155mm M198, and the 203mm (8-inch) M110A2 howitzers, the HARPOON missile, 60mm Mortar M224, and the M2 Army Infantry and M3 Cavalry Fighting Vehicles. The antiair group will concentrate on providing a first-cut draft of the antiair Basic Manual. Manuals for the AIM-54 (Phoenix) very long-range air-to-air missile, the AIM 9L/M (Sidewinder) short-range air-to-air missile, and for the documentation of endgame methodology will be completed. A draft manual for the AIM-7M (Sparrow) long-range air-to-air missile will be developed. Vulnerability assessments will be made for long marine cranes, foreign tanks, floating drydocks, ground supply routes in rugged terrain, reinforced concrete communication facilities and the appropriate manuals.

Project: #D620 Title: DOD Munitions Effectiveness
Program Element: #6.58.05.A Title: Munitions Standardization, Effectiveness, and Safety
DOD Mission Area: #440 - Technical Integration/ Studies and Analyses Budget Activity: #6 - Defensewide Mission Support

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

4. (U) Major Milestones: Not Applicable

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	5000	6426	6740	9377	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	5527	6445	7570	Not Shown	Continuing	Not Applicable

The reduction in the FY81 funding level is a result of reprograming to higher priority Army requirements. The funding decrease in FY82 is a result of the application of revised inflation and civilian pay pricing indices. The change in FY83 reflects the application of the revised inflation indices and reprograming of funds to higher priority Army requirements.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: # 6.56.06.A
DOD Mission Area: #451 - Major Ranges and Test Facilities

Title: DOD High Energy Laser Systems Test Facility (HELSTF)
Budget Activity: #6 - Defensewide Mission Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	14511	40224	34030	32177	Continuing	Not Applicable
DE97	High Energy Laser Systems Test Facility	14511	40224	34030	32177	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The objective of this program element is to establish and operate a High Energy Laser Systems Test Facility (HELSTF) 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 facility, when completed, will support generic high-energy laser (HEL) testing (i.e., technology testing, subsystem 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 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 HEL common-use instrumentation to insure that the test capabilities are commensurate with the state-of-the-art and appropriate to the systems being tested. Intense effort will occur to complete installation of all instrumentation and system equipment, install the High Energy Laser Experimental Test System (HELETS) equipment, integrate this equipment, insure interoperability, and prepare for cold flow testing of the Mid-Infrared Advanced Chemical Laser (MIRACL) device.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Test facility effort will intensify during FY 1983. Support of Army, Navy, and Air Force programs will continue at White Sands Missile Range (WSMR) and at contractor facilities. Beginning in the second quarter, High Energy Laser Experimental Test System (HELETS) and Navy SEA LITE equipment will be moved from contractor facilities for installation at the test facility. Construction of the facilities will be 95% complete in FY 1983. Two

Program Element: # 6.58.06.A
DOD Mission Area: #451 - Major Ranges and Test Facilities

Title: DOD High Energy Laser Systems Test Facility (HELSTF)
Budget Activity: #6 - Defensewide Mission Support

major acquisitions will be completed in FY 1983. The Fluid Supply System (FSS) will provide for storage, conditioning, transfer, control, and safety functions of supporting reactants, pressurants, and diluents (cryogenic liquids and high-pressure gases) required for laser devices under test at the HELSTF. The Pressure Recovery System (PRS) will provide exhaust vacuum and scrubbing requirements to prevent back-pressure quenching of the reaction and for removal of reactive exhaust products from the devices. The fabrication and installation of the Multipurpose Chemical Laser (MPCL) will continue. This device is a moderate-power deuterium fluoride (DF) or hydrogen fluoride (HF) laser device to be used for general purposes, including damage and vulnerability testing, test and evaluation of the performance of optical components and instrumentation, and conducting other system and subsystem test and evaluation where risk and operating costs can be significantly reduced by using a medium-power, rather than a high-power, laser device.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	*Additional* To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	14511	40224	34030	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	14511	41349	26901	Continuing	Not Applicable

The decrease in the FY 1982 estimate results from the September 1981 amended budget and a small contribution to the transfer of funds from the RDTE,A appropriation for modernization of National Guard and Army Reserve equipment. The increase in the FY 1983 estimate results from program revisions to assure that HELSTF will be capable of supporting the Navy's SEA LITE program.

Program Element: # 6.58.06.A
DOD Mission Area: #451 - Major Ranges and Test Facilities

Title: DOD High Energy Laser Systems Test Facility (HELSTF)
Budget Activity: #6 - Defensewide Mission Support

E. (U) OTHER APPROPRIATION FUNDS ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
Military Construction, Defense Funds (current requirements)	35249	0	1200	11500	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	35249	2000	15410	Not Shown	Continuing	Not Applicable

The FY 1981 figures also include FY 1979 and FY 1980 Title IV, Military Construction, Defense Funds, appropriated for this project. The construction program was readvertised in November 1980, and the contract awarded in March 1981. The FY 1982 military construction funding has been eliminated, and the FY 1983 estimate has been sharply reduced as a result of redirection of the Air Force Mid-Range Advanced Technology program, which deferred major construction in support of this program until FY 1984.

Program Element: # 6.58.06.A
DOD Mission Area: #451 - Major Ranges and Test Facilities

Title: DOD High Energy Laser Systems Test Facility (HELSTF)
Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION:

1. (U) The High Energy Laser Systems Test Facility (HELSTF) will be a national test range facility for the conduct of experiments utilizing HEL systems, subsystems and equipment requiring a major ground test facility and a large controlled airspace. Planning for the facility began in 1975 at the direction of the House Armed Services Committee. Funds in the amount of $33,449 thousand were originally authorized and appropriated in Title IV military construction (MILCON) in FY 1978.

2. (U) High Energy Laser testing was planned at three locations at the White Sands Missile Range (WSMR): the major facility, the HELSTF, located in the south central part of WSMR at the Multifunction Array Radar (MAR) Site; the North Oscura Peak (NOP) Site, located in the extreme north central part of WSMR; and the High Energy Laser Instrumentation Development Laboratory (HIDL) at the extreme south central part of WSMR. Facilities at the North Oscura Peak Site were constructed using $2.2M in FY 1976 DOD emergency military construction funds and were completed in November 1977. The site is used to engage targets from a simulated airborne platform.

3. (U) The High Energy Laser Systems Test Facility will consist of the necessary facilities, support equipment, and instrumentation to support testing of various types of high-energy lasers. The initial facilities will accommodate a chemical laser, and will consist of a fluid supply system, a pressure recovery system capable of providing adequate exhaust vacuum, a scrubber to render combustion products harmless, and a steam plant to drive the pressure recovery system. Associated construction includes facilities to house the Navy High Energy Laser Experimental Test System (HELETS), including the Mid-Infrared Advanced Chemical Laser (MIRACL), the SEA LITE Beam Director, high-power optics, beam ducting, and an airflow test stand suitable for testing the effects of high-power beams in a moving airstream. Several target sites will be built for propagation and lethality tests, including meteorological sensing equipment. The range will have an instrumented moving target vehicle and a control system for operation of the facility and integration with the remainder of the White Sands Missile Range. The facility will also include a moderate-power chemical laser (the Multipurpose Chemical Laser), auxiliary beam director, associated low- and high-power beam-handling optics, and instrumentation and control systems necessary to provide an inherent capability of producing a moderate-power beam for test and experimental purposes.

G. (U) RELATED ACTIVITIES: The HELSTF will have the capability to support high-energy laser systems of the Army, Navy, and Air Force. The Navy SEA LITE program will be the first system to be installed and tested. In support of the overall

Program Element: # 6.56.06.A
DOD Mission Area: #451 - Major Ranges and Test Facilities

Title: DOD High Energy Laser Systems Test Facility (HELSTF)
Budget Activity: #6 - Defensewide Mission Support

SEA LITE program, the HELSTF activity is providing support to the factory acceptance testing of the Mid-Infrared Advanced Chemical Laser (MIRACL) at the Capistrano Test Site (CTS). In addition to support at the CTS, the HELSTF activity is providing support to the SEA LITE Automatic Aimpoint Selection and Maintenance System at White Sands Missile Range (WSMR). This is the target selection and recognition system that will be used in conjunction with the SEA LITE Beam Director as an integral part of the SEA LITE system. As part of the Air Force's Airborne Laser Laboratory program, the High Energy Laser Systems Test Facility (HELSTF) provided support to the High Energy Laser Radar Acquisition and Tracking System (HELRATS) at the North Oscura Peak (NOP) Site. Testing was completed in FY 1980. The Army's Forward Area Laser Weapon Demonstration (FALWD) is scheduled for future testing at the HELSTF. Present plans include the necessary facilities and control area to support the FALWD program. Future support for Defense Advanced Research Projects Agency (DARPA) programs is in the early planning phase.

H. (U) WORK PERFORMED BY: The work is performed by in-house personnel (civilian) assigned to White Sands Missile Range (WSMR) and through a significant contractor effort. Since workload increases when the test facility becomes operational, the ratio of contractor-to-in-house effort will increase significantly. Contractors in FY 1981 included: 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; and Lockheed Engineering Management, Houston, TX. Other government agencies that are involved include: US Army Corps of Engineers, Ft Worth, TX; US Army Communications Command, WSMR, NM; US Army Missile Command, Huntsville, AL; US Navy 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.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: In preparation for future High Energy Laser (HEL) testing activity, White Sands Missile Range (WSMR) has spent nearly $43 million through FY 1981 to acquire specialized instrumentation, plan new test facilities, and provide operational support for HEL programs. This effort has resulted in the acquisition of a variety of special-purpose instrumentation systems and equipment capable of measuring operating characteristics of high-energy devices and ancillary equipment. Much of this instrumentation is presently in use at the Capistrano Test Site in support of

Program Element: # 6.58.06.A
DOD Mission Area: #451 - Major Ranges and Test Facilities

Title: DOD High Energy Laser Systems Test Facility (HELSTF)
Budget Activity: #6 - Defensewide Mission Support

factory testing of the Navy's Mid-Infrared Advanced Chemical Laser (MIRACL) and for support to the joint (Army/Navy) Hot Spot Tracking Program. The Auxiliary Beam Director (ABD), a modified one-meter aperture telescope formerly used in an Air Force laser radar system, was delivered and installed at the HEL Instrumentation Development Laboratory at WSMR. The ABD is currently being used in support of testing of the Navy Automatic Aim Point Selection and Maintenance system. Following this test series, the ABD will be reconfigured and installed at the HELSTF. During FY 1975 and FY 1976, a HEL test site was constructed on North Oscura Peak. This remote site supported the Air Force's High Energy Laser Radar Acquisition and Tracking System (HELRATS). In March 1981, a construction contract for the High Energy Laser System Test Facility (HELSTF) was awarded. This 2-year construction program will provide the physical plant for the HELSTF. At the end of FY 1981, construction was approximately 35% complete. Also, a contract for the design of the Fluid Supply System was awarded in FY 1981. The design effort was 75% complete at the end of FY 1981.

2. (U) FY 1982-FY 1984 Program: Phase 1 construction of the HELSTF will be completed in FY 1983. Fabrication and installation of the Fluid Supply System (FSS) and associated instrumentation control and safety systems were initiated in October 1981 by the National Aeronautics and Space Administration (NASA) White Sands Test Facility. A contract for the Pressure Recovery System (PRS) for the Navy's MIRACL Laser and a contract for the acquisition of the Multipurpose Chemical Laser (MPCL) will be awarded in FY 1982. Additional instrumentation systems will be acquired, and support to laser test programs using this instrumentation will continue. A contract modification for system integration of the HELSTF, the Navy High Energy Laser Experimental Test System (HELETS), and supporting facilities and equipment will also be negotiated in FY 1982. In FY 1983, the following activities will be accomplished: the FSS and PRS will be integrated into the facility; installation of major elements of the HELETS and HELSTF instrumentation systems will be nearing completion; performance verification of major facility and experimental test system elements will be underway; an operation and maintenance contract for the HELSTF will be awarded; and cold-flow testing of the SEA LITE system will be initiated. In FY 1984, characterization testing of the HELETS and its major components will begin; the MPCL will be installed and checked out, and will provide support to SEA LITE and other chemical laser technology development programs.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.58.07.A

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

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	(1700)*	(2300)*	17119	38595	52456	108170
D616	Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE)	(1700)*	(2300)*	17119	38595	52456	108170

*Funded as part of project DE94, Army Electronic Proving Ground (PE 6.58.04.A).

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Establishes a capability for effective and efficient testing of advanced command, control, communications, and intelligence (C3I) systems by integrating and complementing existing instrumentation and test facilities.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Provides for initiation of procurement of the Phase I MAINSITE system, to include preparation of design specifications.

Program Element: #6.58.07.A 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) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	(1700)*	(2300)*	17119	91051	108170
Funds (as shown in FY 1982 submission)	-	-	-	-	-

*Funded as part of project DE94, Army Electronic Proving Ground (AEPG) (PE 6.58.04.A), in FY 1981 and FY 1982. MAINSITE requirements were incorporated in DE94 CDS in FY 1982 submission.

E. (U) OTHER APPROPRIATION FUNDS: 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 AEPG.

Program Element: #6.58.07.A 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

F. (U) DETAILED BACKGROUND AND DESCRIPTION: The increased complexity and sophistication of the numerous automated command, control, communications, and intelligence (C3I) systems currently being developed has led to a need for new systems test methodologies and instrumentation. To meet this challenge, the Army is focusing on the application of automation and simulation technology to provide a fully integrated testing system. This new test capability is called Modular Automated Integrated Systems Interoperability Test and Evaluation (MAINSITE). MAINSITE will provide the Army with a capability to conduct systems performance and interoperability tests of large computer-based C3I systems using high-density, tactically realistic message loading in an electromagnetic environment that replicates the radio and higher frequency signals and messages expected in a battlefield situation. It will provide the tester with a system capable of either individualized or centralized control and of repeating tests or portions of tests in order to maintain positive control over the test process. It will support development testing at Ft. Huachuca or at other locations as the central MAINSITE facility will be capable of communicating with remote test instrumentation subsystems of MAINSITE in vans. MAINSITE will be capable of supporting operational tests by creating realistic signal environments and monitoring test environments and will also be capable of supporting contractor in-plant design and test of C3I hardware and software.

G. (U) RELATED ACTIVITIES: MAINSITE will have the capability to support numerous C3I development and production programs of the Army, as well as selected Air Force and Navy programs; however, operation and maintenance of MAINSITE, in support of such programs, will be funded under project DE94, Army Electronic Proving Ground (AEPG) (in PE 6.58.04.A). It is closely related, not only to project DE94, AEPG, but also to the various Army materiel development testing and operational testing 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 (in PE 6.57.12.A). Equipment specifically aimed at enhancing productivity of C3I test personnel is being acquired under PE 6.58.72.A, 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 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.

H. (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. The main system contract is to be awarded in May 1982.

Program Element: #6.58.07.A 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

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: (Funded under project DE94, US Army Electronic Proving Ground, in PE 6.58.04.A) Developed the concepts for testing large computer-based C3I systems. Prepared specifications for a request for proposal for a Phase I MAINSITE system. The Phase I system is a basic configuration comprising the minimum set of subsystems that will permit validation of the MAINSITE system design approach. The Phase I system will be used for initial system integration and acceptance testing. Test instrumentation vans that will be used for transporting mobile portions of the MAINSITE system were acquired in FY 1981.

2. (U) FY 1982-FY 1984 Program: (Funded under project DE94, US Army Electronic Proving Ground, 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. The planned date for contract award is May 1982. The contractor will prepare detailed hardware and software design specifications and will submit them to the Army. The planned date for approval of the design specifications is February 1983. The contractor will then begin procurement of the Phase I system. Completion of contractor procurement and acceptance testing of the Phase I 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) by approximately July 1984. A procurement decision regarding acquisition of the complete MAINSITE system (Phase II) will be made in the fourth quarter FY 1984. The Phase II system will be fully capable of testing advanced large-scale computer-based C3I systems.

3. (U) Program to Completion: MAINSITE is expected to have a limited (i.e., partial) capability for testing of C3I systems using the Phase I system in FY 1985. Award of the Phase II system contract for procurement of remaining portions of a complete MAINSITE system is planned for early FY 1985. Completion of this procurement is planned for e d FY 1987.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.58.72.A
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 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	3889	34139	21658	Continuing	Not Applicable
DW01	Productivity Investment Funding, Office Secretary Defense (Ballistic Missile Defense), PIF-OSD (BMD)	0	0	272	0	0	272
ME88	Resource Self-Help/Affordability Planning Effort (RESHAPE)-US Army Materiel Development and Readiness Command (DARCOM)	0	0	23171	17645	Continuing	Not Applicable
DE89	Productivity Investment Funding (PIF)-DARCOM	0	0	3960	3934	Continuing	Not Applicable
DE98	PIF-OSD	0	3889	6736	79	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for Army R&D support of DODI 5010.36, Department of Defense Productivity Enhancing Capital Investment Program; DODD 3201.1, Management of DOD Research and Development Laboratories, and DODI 3201.3, DOD Research and Development Laboratories, to improve productivity through expanded capital investment in productivity-enhancing equipment and productivity-enhancing management initiatives.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Candidate projects were evaluated and selected based on return on investment, internal rate of return, labor savings, and cost avoidance. Selected projects provide the greatest benefits relative to their costs.

Program Element: #6.58.72.A
DOD Mission Area: #473 - Defense System Cost-Effectiveness/ Improvement

Title: Productivity Investment Funding
Budget Activity: #6 Defensewide Mission Support

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands):

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	0	3889	34139	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	0	3900	1500	Continuing	Not Applicable

The FY 1983 estimate has been increased to provide for productivity-enhancing management initiatives under central fiscal controls and to provide for a higher level of capital investment in productivity enhancing equipment. Three projects (ME88, DE89, and DW01) will start in FY 1983. Also, DE98 PIF-OSD, reported last year as DE78 PIF-Ranges, has been expanded. The small reduction in FY 1982 funding is due to the application of a revised inflation pricing index.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable

Program Element: #6.58.72.A
Title: Productivity Investment Funding
DOD Mission Area: #473 - Defense System Cost-Effectiveness/ Improvement
Budget Activity: #6 Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: In FY 1982, the Department of Defense (DOD) established a Productivity Enhancement Investment Program for the express purpose of improving personnel productivity through expanded capital investment in productivity-enhancing equipment. This program element and DE78, also established in FY 1982, provide Army Research, Development, Test, and Evaluation (RDTE) support for the DOD program. Funds identified to projects within this program cannot be reprogramed without OSD approval. Fiscal controls have been established to assure that projects are funded as planned. Post-investment analysis will be conducted to identify the benefits achieved, to include the impact on productivity of the organizations involved, and the disposition of manpower savings. Beginning in FY 1983, productivity-enhancing management initiatives such as overhire and overtime to provide peak demand labor hours on an economical basis, and gain sharing are also funded under this program element. Project DE78 PIF-Ranges is redesignated DE98 PIF-OSD in FY 1983 to emphasize OSD management and interest. Beginning in FY 1983, ME88 RESHAPE-DARCOM partially funds the R&D portion of a DARCOM initiative begun in FY 1981, entitled, Resource Self-Help/Affordability Planning Effort (RESHAPE), designed to cope with the overwhelming workload imposed in modernizing the Army by improving productivity through productivity-enhancing capital investment and management initiatives such as gain sharing and overtime and overhire that provide peak demand labor hours on an economical basis. Where appropriate, RESHAPE R&D capital investment is funded under Quick Return on Investment Program (QRIP) ($3K to $100K with payback in 2 years or less) or the Productivity Enhancing Capital Investment Program (PECIP) ($3K or more with payback in 4 years or less) in project DE89 PIF-DARCOM, or in DE98 PIF-OSD ($100K or more with payback in 4 years or less). RESHAPE R&D capital investments not satisfying QRIP, PECIP, or PIF-OSD criteria are funded under ME88 RESHAPE-DARCOM. DW01 is separately reported for better fiscal control of a one-year project at Kwajalein Missile Range.

G. (U) RELATED ACTIVITIES: The DOD Productivity Enhancement Investment program encompasses efforts in all three Services and selected Defense agencies in the following appropriations: Military Construction, Operations and Maintenance, Procurement, and RDTE.

H. (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.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Productivity enhancement investment projects were not separately identified.

Program Element: #6.58.72.A
Title: Productivity Investment Funding
DOD Mission Area: #473 - Defense System Cost-Effectiveness/ Improvement
Budget Activity: #6 Defensewide Mission Support

2. (U) FY 1982-FY 1984 Program: Project DE78, Productivity Investment Funding-Ranges, was the only project funded in FY 1982. It provided for partial development of the Modular Automated Integrated Systems/Interoperability Test and Evaluation (MAINSITE) Program at the Electronics Proving Ground to establish a capability to more efficiently test software and interoperability of Command, Control, Communications, and Intelligence (C3I) systems under full interacting loads in simulated battlefield environments. Also, funds were provided under DE78 for Word Processing Centers at Dugway Proving Ground that are capable of revising, sending, and receiving test and management data among themselves, with other installations, and with higher headquarters. Funding in FY 1983 and FY 1984 for DE98 will complete the productivity enhancement aspect of MAINSITE begun in FY 1982, and includes funding for an automated food testing capability at Natick Research and Development Laboratory, Natick, MA, climate test chambers at the Electronics Research and Development Command element at Fort Monmouth, NJ, and a dynamic analysis laboratory at the Office of Missile Electronics Warfare, White Sands Missile Range, NM. Project WO1, PIF-OSD (BMD), will provide for a window energy-loss reduction project at Kwajalein Missile Range and is funded only in FY 1983. Project DE98, PIF-DARCOM, funds for capital investment under the Quick Return on Investment Program (QRIP) and Productivity Enhancing Capital Investment Program (PECIP). Planned investments at the Armament Research and Development Command (ARRADCOM), Dover, NJ, include an inertial friction welder, shell-pushing apparatus, graphics for numerical control, and interactive terminals. The planned Natick Research and Development Command (NARADCOM), Natick, MA, E89 investment in FY 1983 includes a chromospectrometer, and word processor/microcomputer and a nuclear resonance-spectrometer. The Test and Evaluation Command (TECOM), Aberdeen Proving Ground, MD, budget request includes a direct entry system and a sludge dewatering system. Project ME88, RESHAPE-DARCOM, will provide for management flexibility in selective overhire and overtime at the Aviation Research and Development Command (AVRADCOM), St. Louis, MO, Mobility Equipment Research and Development Command (MERADCOM), Ft. Belvoir, VA, the Missile Command (MICOM), Redstone Arsenal, AL, Natick Research and Development Command (NARADCOM), Natick, MA, Test and Evaluation Command (TECOM), Aberdeen Proving Ground, MD, and the Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD. Planned ME88 capital investments at ARRADCOM include interactive communications terminals, electron beam welder, fuse impact simulator tester, explosive test chamber, and toxic exposure facilities. At AVRADCOM, word processing terminals, data acquisition system-V/STOL tunnel, and a minicomputer will be acquired. MERADCOM plans on acquiring word processing equipment. NARADCOM acquisitions include an 80-station office automation system and a quadrapole mass spectrometer system. ERADCOM acquisitions are a computer-aided design and drafting system, a universal time interval computer, a digital oscilloscope, and word processors.

3. U) Program to Completion: Capital investment in Projects ME88 and DE98 will continue. Overhire and overtime under DE89 are not funded from FY 1985 forward. Project DE98 is funded on an annual basis.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: ME88 Title: RESHAPE - DARCOM
Program Element: 6.58.72.A Title: Productivity Investment Funding
DOD Mission Support Area: 473 - Defense System Cost-Effectiveness/Improvement Budget Activity: 6 - Defensewide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: Resource Self-Help/Affordability Planning Effort (RESHAPE) is a DARCOM initiative begun in FY 1981 that is designed to improve productivity through enhancing capital investment, management initiative such as overtime and overhire that provides peak demand labor hours on an economical basis, gain sharing, and organizational streamlining to reduce overhead and increase direct labor. 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. Tests conducted at Watervliet Arsenal, NY, and at Anniston Army Depot, AL, in FY 1980 have demonstrated that when used judiciously, overtime allows DARCOM to accomplish its workload at a lower overall cost compared to the cost of other alternatives; e.g., full-time employees whose services are required only in peak periods. Therefore, under RESHAPE, managers are encouraged to use overtime when it is the least expensive alternative to accomplish the mission. This is particularly the case when special personnel are needed who would not be available during regular hours and when shutdown and startup is more costly. Overhire will be employed to offset the hiring lag in order to expedite tasks and to use facilities more efficiently. Both overtime and overhire are funded only in FY 1983 and FY 1984.

B. (U) RELATED ACTIVITIES: RESHAPE capital investments identified by DARCOM have been evaluated against the Quick Return on Investment Program (QRIP) ($3K-100K with payback in 2 years or less) and the Productivity Enhancing Capital Investment Program (PECIP) ($3K or more with payback in 4 years or less), funded under project DE89 PIF-DARCOM, and the OSD Productivity Investment Funding (OSD-PIF) ($100K or more, payback in 4 years or less and OSD approval), funded under project DE98, PIF-OSD. Capital investments satisfying QRIP, PECIP, or OSD-PIF conditions are so funded. Capital investment being funded under ME88 does not satisfy the QRIP, PECIP, or OSD-PIF criteria.

C. (U) WORK PERFORMED BY: Project funds are used for salaries of DARCOM personnel and for procurement of productivity-enhancing equipment to be used by DARCOM personnel.

Project: #ME88 Title: RESHAPE - DARCOM
Program Element: #6.58.72.A Title: Productivity Investment Funding
DOD Mission Support Area: #473 - Defense System Cost-Effectiveness/Improvement Budget Activity: #6 - Defensewide Mission Support

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Not separately identified in FY 1981.

2. (U) FY 1982-FY 1984 Program: The project was not separately identified in FY 1982. In FY 1983 and FY 1984; the project will provide for management flexibility at the Aviation Research and Development Command (AVRADCOM), St. Louis, MO; Mobility Equipment Research and Development Command (MERADCOM), Ft. Belvoir, VA, the Missile Command (MICOM), Redstone Arsenal, AL, Natick Research and Development Command (NARADCOM), Natick, MA, Test and Evaluation Command, berdeen Proving Ground, MD, and the Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, MD. Planned capital nvestment at ARRADCOM includes interactive communications terminals, an explosive test chamber, electron beam welder, fuse impact simulator tester, and toxic exposure facilities. At AVRADCOM, word processing terminals, data acquisition system - V/STOL tunnel, and a minicomputer will be acquired. MERADCOM plans on acquiring word processing equipment. NARADCOM acquisitions include an 80-station office automation system, an electron microscope, and a quadrapole mass spectrometer system. ERADCOM acquisitions are a computer-aided design and drafting system, a universal time interval computer, a digital oscilloscope, and word processor.

3. (U) Program to Completion: Capital investment will continue. Overhire and overtime are not now funded after FY 1984.

4. (U) Major Milestones: Not applicable.

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
RDTE						
Funds (current requirements)	0	0	23171	17645	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	Not Shown	Not Shown	Not Shown	Not Shown	Not Shown	Not Applicable

Project: #ME88
Program Element: #6.58.72.A
DOD Mission Support Area: #473 - Defense System Cost-Effectiveness/Improvement

Title: RESHAPE - DARCOM
Title: Productivity Investment Funding
Budget Activity: #6 - Defensewide Mission Support

This project identifies FY 1983 initiatives to improve productivity of the US Army Materiel Development and Readiness Command, not identified in last year's budget request.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Project: #DE96 Title: Productivity Investment Funds-OSD
Program Element: #6.58.72.A Title: Productivity Investment Funding
DOD Mission Area: #473 - Defense System Cost-Effectiveness/Improvement Budget Activity: #6 Defense-Wide Mission Support

A. (U) DETAILED BACKGROUND AND DESCRIPTION: In FY 1982, the Department of Defense (DOD) established a Productivity Enhancement Investment Program 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 OSD approval. Fiscal management controls have been established to assure that projects are funded as planned. Post-investment analysis will be 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 RANGES, was originally established in FY 1982 to aggregate those productivity-enhancing investments managed by OSD. In 1983, DE78 is redesignated DE96 PIF-OSD to emphasize OSD management of diverse productivity-enhancing capital investments.

b. (U) RELATED ACTIVITIES: ME 68 RESHAPE-DARCOM partially funds the R&D productivity enhancing capital investment program of a DARCOM initiative entitled RESHAPE originated in FY 1981 to cope with the overwhelming workload imposed by modernizing the Army. The capital investment projects funded under RESHAPE-DARCOM do not satisfy the criteria ($100K or more, pay back in 4 years or less and OSD approval) for funding under project DE96. The Quick Return on Investment Program (QRIP) ($3K-100K, payback in 2 years or less) and the Productivity Enhancing Capital Investment Program (PECIP) ($3K or more, payback in 4 years or less) are funded under project DE69 PIF-DARCOM.

C. (U) WORK PERFORMED BY: This project provides for procurement of equipment by contract. Contractors have not yet been selected. Management is by OSD military and civilian personnel.

D. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Productivity Investment projects were not separately identified.

2. (U) FY 1982-FY 1984 PROGRAM: In 1982, Productivity Investment Funding-Ranges provided for partial development of the Modular Automated Integrated Systems/Interoperability Test and Evaluation (MAINSITE) Program at the Electronics Proving Ground to establish a capability to more efficiently test software and interoperability of Command, Control, Communications, and Intelligence (C3I) systems under full interacting loads in simulated battlefield environments. Also, funds were

Project: DE96 Title: Productivity Investment Funds-OSD
Program Element: #6.56.72.A Title: Productivity Investment Funding
DOD Mission Area: #473 - Defense System Cost-Effectiveness/Improvement Budget Activity: #6 Defense-Wide Mission Support

provided under DE76 for more efficient Word Processing Center equipment at Dugway Proving Ground that will be capable of revising, sending, and receiving test and funding data within the Dugway Proving Ground complex and with other installations and higher headquarters. Funding in FY 1983 for DE96 will complete the Productivity Enhancement aspect of MAINSITE, begun in FY 1982. FY 1983 and 1984 also include funding for an automated food testing capability at Natick Research and Development Laboratories, Natick, MA; for a vibration testing and analysis upgrade, an automatic photo mask-making system, a high-speed waveform analysis system, climatic test chambers, a computer-assisted design/drafting system, a power amplifier, and a radar target signature and antenna test range at the Electronics Research and Development Command facilities at Fort Monmouth, NJ; and a dynamics analysis laboratory at the Office of Missile Electronics Warfare, White Sands Missile Range, NM.

5. (U) Program to Completion: The program is revised annually as candidate projects are identified and submitted to OSD for consideration and approval.

4. (U) Major Milestones: Not Applicable.

5. (U) Resources ($ in thousands):

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
DE96						
Funds (current requirements)	0	3889	6756	79	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	0	5900	1500	Not Shown	Continuing	Not Applicable

FY 1983 and FY 1984 contain new initiatives to improve productivity through selected OSD-managed capital investment not provided for in last year's budget request. The small reduction in FY 1982 funding is due to the application of a revised inflation repricing index. Funding in FY 1984 and beyond will be programed according to the results of all productivity enhancement efforts in FY 1982 and FY 1983.

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: # 6.58.90.A Title: Audiovisual Support for Research and Development Program
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Mission Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	2278	2344	2408	Continuing	Not Applicable
MM80	Audio-Visual Support	0	2278	2344	2408	Continuing	Not Applicable

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This continuing program will provide resources for management and operation of audiovisual activities at RDTE-operated installations/commands.

C. (U) BASIS FOR FY 1983 RDTE REQUEST: Resource requirements for this program are requested for audiovisual services or production, duplication, or distribution of audiovisual products in support of RDTE activities at RDTE-operated installations/commands. Includes salaries and operating expenses. Through FY 1981, audiovisual activities and functions in support of Army RDTE were not reported separately but as part of the total cost for each project.

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	0	2278	2344	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	0	2280	2350	Continuing	Not Applicable

Program Element: # 6.58.90.A Title: Audiovisual Support for Research and Development Program
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Mission Support

Difference in funding between the FY 1982 and the FY 1983 Congressional Descriptive Summaries is due to reductions in the inflation indices.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

Program Element: # 6.58.90.A Title: Audiovisual Support for Research and Development Program
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: Funding provides audiovisual products and services in support of RDTE activities at RDTE-operated installations/commands. Includes in-house and contract operation pertaining to still and motion picture photography, television, audiovisual production and documentation, audio recording, replication, and graphic arts. These primarily include high-speed photo-optical and photoelectrical instrumentation and documentation products of R&D activities which provide critical data in the development of new and improved material within the Army's modernization program. These data are often available only from this source. Includes civilian personnel hire, temporary duty travel, contracted services, and procurement of supplies, materials, and equipment.

G. (U) RELATED ACTIVITIES: None.

H. (U) WORK PERFORMED BY: Subordinate RDTE commands of the US Army Materiel Development and Readiness Command.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: Not applicable; Army RDTE audiovisual support previously reported as part of total cost for each RDTE project.

2. (U) FY 1982-FY 1984 Program: Continue provision of audiovisual products and services in support of Army RDTE activities, programs, and projects at RDTE-operated installations/commands.

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

FY 1983 RDTE CONGRESSIONAL DESCRIPTIVE SUMMARY

Program Element: #6.58.98.A
DOD Mission Area: #471 - General Management Support

Title: Army Management Headquarters Activities
Budget Activity: #6 - Defensewide Mission Support

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

Project Number	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Costs
	TOTAL FOR PROGRAM ELEMENT	34004	43007	45304	49007	Continuing	Not Applicable
HH02	Army Management Headquarters Activities (AMHA)	34004	43007	45304	49007	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 Army 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) BASIS FOR FY 1983 RDTE REQUEST: The program request is based upon the authorized military and civilian staffing which is necessary to perform those management functions essential to maintaining an efficient, effective, and viable Research, Development, Test and Evaluation program for the US Army. The personnel performing these functions are located at Headquarters, US Army Corps of Engineers, US Army Medical R&D Command, US Army Materiel Development and Readiness Command, and six subordinate R&D commands. This program element is frequently referred to as a "people" element since approximately 85 percent of the total resources is used for payment of civilian salaries and related benefits. The balance of the program is for necessary administrative support, mission travel, operating supplies and equipment.

Program Element: #6.58.98.A Title: Army Management Headquarters Activities
DOD Mission Area: #471 - General Management Support Budget Activity: #6 - Defensewide Mission Support

D. (U) COMPARISON WITH FY 1982 RDTE REQUEST: ($ in thousands)

	FY 1981	FY 1982	FY 1983	Additional To Completion	Total Estimated Cost
RDTE					
Funds (current requirements)	34004	43007	45304	Continuing	Not Applicable
Funds (as shown in FY 1982 submission)	30621	39792	41807	Continuing	Not Applicable

The current requirements, as reflected above, have been restructured for comparability to reflect the transfer of resources associated with the US Army Medical R&D Command into this element from Program Element 6.58.01.A, Programwide Activities. This transfer resulted from a revision of Department of Defense Directive 5100.73, Department of Defense Management Headquarters and Headquarters Support. The revised directive designated the US Army Medical R&D Command as a Management Headquarters. The dollar resources which have been transferred into this element are: FY 1981 +$3.2 million; FY 1982 +$3.1 million; FY 1983 +$3.5 million. Additional changes from the FY 1982 submission are minor and represent reprogramming into the element in FY 1981 and application of revised inflation indices for FY 1982 and FY 1983.

E. (U) OTHER APPROPRIATION FUNDS: Not Applicable

Program Element: #6.58.98.A
DOD Mission Area: #471 - General Management Support

Title: Army Management Headquarters Activities
Budget Activity: #6 - Defensewide Mission Support

F. (U) DETAILED BACKGROUND AND DESCRIPTION: This program element was established in accordance with Department of Defense (DOD) Directive 5100.73, Department of Defense Management Headquarters, dated 11 April 1975. This DOD Directive contained instructions to update the DOD system for identification and management of the number and size of DOD Management Headquarters Activities, and identified the type of functions to be included. As a result of an Army Materiel Acquisition Review Committee recommendation, the Army's major development agency, the US Army Materiel Development and Readiness Command, realigned its subordinate headquarters into separate R&D and Readiness Commands. This combination of changes resulted in a shift of Army resources between appropriations as well as between program elements within the Research, Development, Test and Evaluation, Army appropriation. FY 1979 was the first full year of operation under this program element.

G. (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.

H. (U) WORK PERFORMED BY: US Army Materiel Development Readiness Command, Alexandria, Virginia, six subordinate R&D commands, the US Army Corps of Engineer Headquarters, and the US Army Medical R&D Command.

I. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. (U) FY 1981 and Prior Accomplishments: This program was established in FY 1979 to provide for functions identified as Army Management Headquarters Activities at US Army Materiel Development and Readiness Command Headquarters and subordinate R&D commands as directed by Office, Secretary of Defense. Funding provided in the program element supports salaries and related personnel benefits of authorized personnel and necessary administrative support.

2. (U) FY 1982-FY 1984 Program: Provides only essential resources for full support of authorized civilians, as currently identified, for operation of the R&D command headquarters. Programing includes civilian salaries and related administrative support (personnel benefits, travel, operating supplies and equipment).

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

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SECU. CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER N/A	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Volume III - Descriptive Summaries of the Research, Development, Test and Evaluation, Army Appropriation FY 1983. Supporting Data FY 1983 Budget Estimates Submitted to Congress February 1982		5. TYPE OF REPORT & PERIOD COVERED RDTE Descriptive Summaries FY 1983 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Department of the Army		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS HQDA, Office of the Deputy Chief of Staff for Research, Development, & Acquisition (DAMA-PPR-B), Washington, DC 20310		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS HQDA, Office of the Deputy Chief of Staff for Research, Development, & Acquisition (DAMA-PPR-B), Washington, DC 20310		12. REPORT DATE February 1983 13. NUMBER OF PAGES III-531
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Army Research, Development, Test and Evaluation Budget backup for estimates submitted to Congress in February 1982 for FY 1983

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

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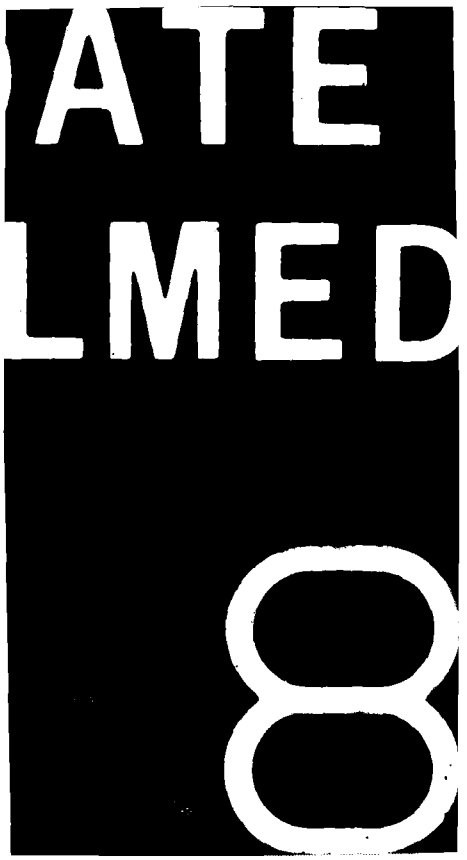
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